Research Insights

Building the Cognitive Enterprise: Nine Action Areas

Deep Dive

IBM Institute for Business Value
A new era of business reinvention is dawning. Organizations are facing an unprecedented convergence of technological, social, and regulatory forces. As artificial intelligence, blockchain, automation, Internet of Things, 5G, and edge computing become pervasive, their combined impact will reshape standard business architectures. The “outside-in” digital transformation of the past decade is giving way to the “inside-out” potential of data exploited with these exponential technologies.

We call this next-generation business model the Cognitive Enterprise™.
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Executive summary

The impact of the convergence of multiple exponential technologies on organizations continues to increase. The digital journeys of the past decade are now becoming cognitive journeys driven by the maturity of AI, blockchain, automation, IoT, 5G, edge computing and other exponential technologies. As these capabilities are applied at scale, they increasingly result in change to the core of organizations—and their mission-critical processes—rather than to the experimental periphery.

We described this new phenomenon as “The Cognitive Enterprise” in our 2018 report—a destination that is framed by business platforms derived from proprietary data and powered by intelligent workflows and new pools of expertise. We recognized then that these new approaches were allowing incumbents to strike back against digital disruptors and leverage their scale, data, skills, and channel power to win in this new era. We identified seven key success factors that underpin progress as organizations embarked on the journey to become Cognitive Enterprises.

Now, a year on, we see the vision of such transformations coming to reality, as more and more enterprises are seizing the opportunity to truly transform themselves. They are leveraging these new technologies in conjunction with their historic strengths to reshape their competitive positions.

Three key components underpin these emerging new business models:

1. **Market-making Business Platforms** leverage data as the new currency to reinvent competitive positioning and create new market opportunities, often straddling organization and industry boundaries.
2. **Intelligent Workflows** infuse end-to-end and front-to-back processes with exponential technologies to deliver exceptional outcomes and differentiation.
3. **Enterprise Experience and Humanity** recognizes that any new business platform will only succeed if it embeds a compelling experience for customers, employees, and partners throughout, while maximizing the full potential of the ever-evolving, human-technology partnership.

There are many great examples of organizations across all industries that are embracing the potential and embarking on the journey at scale. They are creating holistic transformation programs to underpin the ever-clearer strategic bets that they are placing. Many companies and governments, however, are still framing the opportunity and wondering how to start and how to escape from the “cognitive chaos” of multiple experiments and proofs-of-concept.

This report, therefore, sets out to do two things. First, showcase the latest ideas and examples of the Cognitive Enterprise brought to life. Second and, more importantly, go deeper into the “how” of building such organizations to derive utmost value.

As such, we have identified nine Action Areas which we see as critical to making progress and creating an outline framework for success:

These nine Action Areas, by key component, are:

- Market-making Business Platforms
  - Double down on “Big Bets”
  - Create a new business blueprint
  - Orchestrate compelling change
- Intelligent Workflows
  - Embed exponential technologies
  - Drive value from data
  - Deploy through hybrid multicloud
- Enterprise Experience and Humanity
  - Elevate human-technology partnerships
  - Cultivate smart leadership, skills, and culture
  - Perform with purposeful agility

We have also developed a clear point of view on how co-creation, co-execution and co-operation will be the vehicles through which enterprises can muster the diverse internal and external talents needed to pull off this transformation. We call this the IBM Garage™ approach.

We are all entering an exciting—but somewhat daunting—period of next-generation enterprise transformation. It is a fast-moving world, with many contextual challenges and uncertainties. Because this transformation is akin to performing “open-heart surgery” on our businesses and organizations, we also strive for certainty and de-risking of the journey. How we balance agility and flexibility with bullet-proof outcomes will be at the heart of success. The potential prizes for exploiting the power of these new amazing technologies to reinvent ourselves will be worth the effort.
Introduction to the Cognitive Enterprise

At IBM, we see companies placing bets on the creation of business platforms to solidify competitive advantage and differentiation. These platforms must be massively digitally connected from the outside-in and fully cognitively enabled from the inside-out (see Figure 1).

Many of the platform plays organizations are making are based on the ability to redefine the business inside its four walls by leveraging the estimated 80 percent of global data that remains proprietary. Others see the opportunity to create and participate in platforms across an ecosystem of industry partners. Still others, though fewer in number, are launching platforms to expand their expertise and compete in markets adjacent to—but until now separate from—their traditional businesses.

These are not platforms on the edge of the business. They’re not peripheral to what organizations are doing. They are the platforms through which organizations are rediscovering their core and shaping markets to their advantage. These market-making business platforms instantiate the strategic advantage organizations are seeking. And a company’s approach to platforms increasingly equates to its business strategy.

Becoming digital was never the destination. Instead it is a stage, the start of a transformation into what we call a Cognitive Enterprise. That journey starts with data and the technologies that extract its full value, then inform intelligent, differentiating workflows. But success remains a quintessentially human—not a solely technological—endeavor. It depends on deep, trusted customer relationships supported by human-centric design for ever-better engagement. It elevates the importance of the ability to upgrade employee skills and the change capabilities needed to build competitive advantage in Garage-like settings.

Defining the Cognitive Enterprise

Imagine the Cognitive Enterprise as composed of multiple business platforms. One or more of them acts as the core or primary platform(s), creating differentiation.

Figure 1
A platform-centric business model

In this new era, organizations combine outside-in with inside-out insights and capabilities.

<table>
<thead>
<tr>
<th>Business platforms</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>People</strong></td>
</tr>
<tr>
<td>Enabled professionals</td>
</tr>
<tr>
<td><strong>Process</strong></td>
</tr>
<tr>
<td>Intelligent Workflows</td>
</tr>
<tr>
<td><strong>Data</strong></td>
</tr>
<tr>
<td>Internal</td>
</tr>
<tr>
<td>External</td>
</tr>
</tbody>
</table>

Outside-in
Demand for Digital Reinvention®
- Changing customer expectations
- Pervasive interconnectivity

Inside-out
New outcomes possible with:
- Artificial intelligence
- Blockchain
- Automation
From a strategic perspective, these primary platforms will:

- Be the new instantiation of the strategy of an organization
- Act as a “North Star” for change programs and investment priorities to help navigate from legacy capabilities to the future
- Form the basis of and act as critical connective tissue with other ecosystem partners and networks
- Continuously learn and keep getting smarter over time through AI and machine learning.

Organizations will also leverage secondary or supporting platforms. For example, decision and back-office processes, as well as underlying technology suites, may be used to partner with other industry players or third parties. In the Cognitive Enterprise, these business platforms form the capability layer around which the other six capability layers coalesce (see Figure 2).

The business platforms are built on new and dynamic intelligent workflows that connect front- and back-office processes end to end. These workflows are transformed by exponential technologies—AI, blockchain and IoT, for example—that use permissioned sources of data to put situations in context and generate insights that improve processes and allow employees to make better and more timely decisions.

In turn, the business platforms, intelligent workflows, exponential technologies, and data are supported by next-generation applications. These applications span new and legacy solutions made possible by an open, secure, and hybrid multicloud infrastructure. Each of these capability layers is wrapped in an agile, skills-based culture that fosters new ways of working and drives new employee experiences.

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**Figure 2**

Capability layers of the Cognitive Enterprise

Seven layers build on each other in an integrated way.

<table>
<thead>
<tr>
<th>Culture</th>
<th>Skills</th>
<th>Ways of working</th>
<th>Experience</th>
</tr>
</thead>
<tbody>
<tr>
<td>Internal strategic platforms</td>
<td>Internal enabling platforms</td>
<td>Industry platforms</td>
<td>Cross-industry platforms</td>
</tr>
<tr>
<td>Decision processes</td>
<td>Front-office processes</td>
<td>Back-office processes</td>
<td></td>
</tr>
<tr>
<td>Artificial intelligence</td>
<td>Blockchain</td>
<td>Automation</td>
<td>Internet of Things</td>
</tr>
<tr>
<td>Proprietary data</td>
<td>Licensed data</td>
<td>Public data</td>
<td></td>
</tr>
<tr>
<td>Custom applications</td>
<td>Legacy applications</td>
<td>API-enabled applications</td>
<td>Cloud native applications</td>
</tr>
<tr>
<td>Public cloud</td>
<td>Private cloud</td>
<td>On-premise</td>
<td>Security</td>
</tr>
</tbody>
</table>

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The Cognitive Enterprise

- Culture of agile innovation
- powered by an ecosystem of business platforms
- activated by intelligent workflows
- made possible with exponential technologies
- that are fueled by data
- using next-generation applications
- on an open and secure hybrid multicloud infrastructure
Suncor: Building the layers of a Cognitive Enterprise

Suncor Energy, Canada’s leading integrated energy company with a market cap of USD 50 billion, recognized two things as it embarked on a technology-enabled transformation.2,3

First, the trends supporting the emergence of the Cognitive Enterprise presented an opportunity for Suncor to drive a step change in performance and enable new ways to make decisions. These trends include the use of business platforms that straddle organization and industry boundaries, as well as the maturity of AI, IoT, automation, edge computing and other exponential technologies, often described as “Industry 4.0.”

Second, for the transformation to succeed, Suncor would have to focus on its culture and new ways of working for its people. So, in May of 2019, it introduced “Suncor 4.0,” setting a target to create USD 1.5 billion of additional free cash flow by 2023.4

Innovation has always been central to Suncor’s success. It was already extensively using technologies ranging from autonomous haul systems and robotic process automation to remote sensing and drones. It was also harnessing digital technologies to advance data-based decision making to enhance cost and performance benefits and using real-time data to improve the safety of its employees and reliability of operations.

But Suncor 4.0 describes an even more ambitious journey: to accelerate and digitize Suncor’s strategy. Sponsored by the CEO and directly led by the executive leadership team, the program is purpose-driven, people-focused, data-informed, and technology-enabled.5

The CEO created a Transformation Management Office (TMO)—a control tower of sorts for the transformation—to build on already completed digital work and accelerate Suncor’s enterprise-wide transformation. The TMO’s mandate is to act as a catalyst to accelerate transformational change that unleashes the full potential of Suncor’s people and the organization. The office is focused on creating an engaging and productive workplace, enabling new ways of working, creating value from data and securing the company’s future through the use of advanced analytics and other digital technologies.6

Notably, TMO roles were not established as part-time roles. Instead, people were pulled from their line roles to be fully dedicated to the transformation. And, to create space for transformation, the TMO facilitated a rigorous prioritization process to decide what lower-value work should be deferred or stopped altogether in order to focus on projects that would make a difference.

Suncor’s Site Wide Lead (SWL) Advisor project is a good example of how it is becoming a Cognitive Enterprise. Suncor’s Oil Sands Base plant specializes in the oil sands value chain of mining, extraction, and upgrading. Its operations are highly integrated, complex and capital intensive. Those operations had been overseen by an SWL—a role that looks at the end-to-end process and optimizes production.

To manage such complex operations, Suncor uses over 87,000 sensors across 35 plants, tracking more than 900 key metrics—a microcosm of the Internet of Things. Data readings from all those sensors are too voluminous for humans to analyze completely and generate useful insight. So, Suncor tapped the power of AI to make the most of real-time data readings.

It developed an SWL Advisor, powered by more than 100 AI models that analyze the complex data readings and provide useful insights about the operation. The SWL Advisor analyzes data from a variety of sources, including operational data, maintenance plans, and weather data to provide operators with insights on opportunities to optimize production. The tool also provides real-time anomaly detection, predicting critical events up to an hour before they occur. It informs operators, who can then respond proactively to reduce risk, maintenance costs, and downtime.

Insights and recommendations produced by AI still need to be reviewed by experienced SWL engineers with deep technical knowledge representing decades of enterprise experience. They ultimately make any required decisions, combining the best of machine and human capabilities. The initiative has the potential to generate business value in the order of tens of millions of dollars per year by turning complex and big data into actionable insights.

The SWL Advisor has become a key part of intelligent production management workflow for Suncor, generating production plans within minutes that previously took hours. The Advisor also takes into account operations priorities and constraints, such as scheduled maintenance. Putting AI to work at Suncor has also shed light on how humans can best work with technology, as well as what new skills they need, adding value that was never before achievable.
Ultimately, all of the layers are subject to major transformation. The potential value that we envision this will create for organizations is huge.

Each of the capability layers needs to be aligned with the others and must be constantly improved upon to collectively grow the strength of the organization.

1. A culture of agile innovation

A culture of agile innovation embraces new skills, workforces, and ways of working, while humanizing the employee experience. As organizations migrate to new platform models, boundaries blur and frictions fade. Leaders are asking a deceptively simple but hugely consequential question: How fluid can both we and our workflows become?

In the Cognitive Enterprise, agile teams span organizational boundaries—between business and IT, as well as support functions. They are empowered to make decisions by the data and insights generated along intelligent workflows and intuitive tools that use exponential technologies. Leaders learn to “let go” by establishing a skills culture, one in which employees are motivated to learn and take on new roles, and by communicating purpose and goals with clarity.

2. Powered by an ecosystem of business platforms

Depending on your point of view, an economy remade by platforms is already here or imminent. In fact, it has been emerging for more than a decade. Some platforms already occupy winner-take-most status.

Business platforms create new advantage from existing capabilities, then evolve and scale those capabilities over time. As organizations decide what type of platform to launch or build out, a few clear criteria have emerged:

- Deep-seated skills and expertise that can be leveraged for the platform’s purpose
- Access to proprietary data that can be combined with external data sources to create differentiated workflows and insights
- Unique process innovation and performance potential through applied technology
- Channel access and network credibility to operate in the chosen platform area
- Scale, or potential to exploit and extend scale, through platform leverage.

Cognitive Enterprises can gain competitive advantage with a business platform composed of proprietary workflows, leveraging new technology platforms for speed and mass consumer platforms for ecosystem connectivity.

3. Activated by Intelligent Workflows

Cognitive Enterprises operating on business platforms are often focused on being the very best in one core area, whether that’s a customer-facing experience or an aspect of their supply chains. They are intended to produce entirely new outcomes and access new value pools. That ambition is achieved in part by reimagining strategic workflows.

Intelligent workflows (see Figure 3) deliver data to humans who need to make more effective and timely decisions. By automating routine activities, they free up employees to take on more complex decisions, bigger tasks, and new roles. They link processes end-to-end to straddle silos and cut across functions to expose new outcomes that differentiate the organization from its peers. Intelligent workflows aren’t just automated, optimized, and efficient; they’re dynamic. They can flex and scale with ease (see sidebar, “Suncor: Building the layers of a Cognitive Enterprise”).

Figure 3

Exponential technologies embed intelligence into workflows

Effective business platforms integrate exponential technologies with pools of expertise and proprietary data to serve users better and drive new value.
4. Made possible with exponential technologies

We are living in extraordinary times in which a convergence of new technologies, applied in combination, have the potential to transform all activities. Whether it is AI, automation, IoT, blockchain, 5G, or others, these technologies are maturing to the point where they can be deployed and exploited at scale.

What successful transformations often have in common is that they have made their customers the center of gravity. From there, they identify novel workflows and opportunities to apply exponential technologies in concert. It is the combined effect of these technologies that creates and captures new value.

Layering several exponential technologies—deploying them in concert, not discretely—further amplifies their exponential effect. In an enterprise, this enables better human-to-human and machine-to-human experiences, ever improving and scaling over time at a rate that exceeds traditional technological progress.

This, in turn, sustains the rapid lifecycle of innovation and iteration on business platforms. New workflows, leveraging these exponential technologies, extend and expand the organization’s capacity to create new value.

5. Fueled by data

Tenure has its advantages. About 80 percent of the world’s data is tucked behind the firewalls of organizations. And as they take advantage of new technologies (for example, sensors and videos), the data inside organizations grows exponentially. Incumbent organizations have also extracted data in abundance from activities in both online and physical domains. The data they’ve accumulated is often unique and proprietary. While it’s theirs to exploit, most organizations admit they fall far short of utilizing its potential. In essence, they have big data but draw too little insight and value from it.

The gap between those who use data to great effect and those who fail to do so is growing. And as we learned in the IBM Global C-suite Study, the gap exists on multiple levels. It includes the capacity to curate the data they have on hand and apply it to decisions. And, importantly, it’s seen in their ability to tap into new sources of data and to acquire and share data with ecosystem partners, a fundamental capability of industry and cross-industry platforms.

6. Using next-generation applications

The digital architecture of the modern enterprise isn’t equipped for the extreme openness and flexibility that business platforms require. Today, legacy systems lock in outmoded processes and workflows.

Organizations can’t get away with accidental architecture and unplanned growth any longer. The expectations of customers and requirements of state-of-the-art processes are too high. And the elegant, intuitive experiences customers anticipate exert new pressures on the application architecture and can be surprisingly hard to integrate into legacy systems.

The next generation of Enterprise Resource Planning (ERP) systems will act as a backbone for Cognitive Enterprises. Building on this backbone, workflows will use external and internal data and exponential technologies to integrate traditional processes. For example, by augmenting the financial journal entry process in legacy ERP with intelligent robotic process automation (RPA), companies can automate the collection, extraction, and validation of financial journal data from emails and other sources.

7. On an open and secure hybrid multicloud infrastructure

Intelligent workflows, by definition, span multiple processes and business functions, and thus will include many different applications. Front-office applications, such as customer inquiries (checking order status, for example), make up a large portion of what has gone to public cloud. At the same time, mission-critical, security-dependent applications, such as customer databases, transaction processing, finance and accounting, supply chain, and manufacturing are, in many cases, better suited to private cloud—or a mixture of public, private, and traditional IT.

In order to build out intelligent workflows, applications housed in different cloud environments will need to be orchestrated for seamless interaction and business agility. With open, hybrid multicloud, organizations can run applications in the specific environments best aligned with security, regulatory, and governance requirements. This needs to happen in a secure context that bridges the need to create frictionless customer, employee, and business partner experiences with the requirement to appropriately access permissioned data and link applications.
How to start the journey

Practically every organization is striving to embark upon this next wave of transformation, establishing digital strategies and appointing Chief Transformation and Chief Digital Officers. They are queuing up Centers of Excellence for AI, data science, and cloud. Proofs of concepts and minimum viable products (MVPs) are pouring out of agile teams.

And yet, leaders struggle to engage their wider organizations and middle management in their visions. The issue? What to do with legacy systems, skills, and operations that reinforce old behaviors. Organizations need a fresh approach to build new platforms and skills while maintaining, modernizing, and operating their legacy environments.

Attempts to build “digital islands” have largely failed to transform enterprises in sustainable, scaled, or other meaningful ways.

Where is the answer to this challenge? It’s “in the Garage.” The Garage approach involves the creation of cross-organizational spaces. There, cross-functional teams can come together with strategic partners—such as IBM, and other ecosystem players and startups—to co-create, co-execute, and co-operate on the new business platforms.

Garage environments can jumpstart innovation by putting technology and architectural options into the context of customer journeys, critical workflows, pain points, and value potential. They allow for the early testing of ideas against customer and employee feedback, avoiding wasted activity.

They also facilitate a full contextual understanding of what needs to be done to create these new business platforms. They envision how legacy environments will gradually be replaced with innovative microservices and APIs that are hosted in a modern, hybrid cloud (see Figure 4).

Design-thinking, agile, and DevOps approaches move concepts quickly from ideation into day-to-day operation, from on-the-ground, on-premises systems to open hybrid multiclouds with security features. Scrums, squads, and sprints can break up the build process into manageable, valuable building blocks. In the Garage, new business platforms, operating models, and architectures can be developed at greater pace and lower risk, enabling benefits from continuous learning.
Chapter 1

Market-making Business Platforms

In every industry, leaders are being confronted with the decision of their lifetimes: how to respond to markets remade by platforms and the changing customer expectations that come with them. They’re being asked to make big and bold bets on how the future will unfold.

Fortunately, they need not do so blindly. The hard work of building market-making business platforms is well underway, and organizations the world over are learning how to balance dynamism with stability, to deftly orchestrate activities and assets to rediscover the core of their enterprises.
Introduction

For some time now, organizations have been making investments and decisions that advance their future on market-making business platforms. Despite this, many organizations admit they haven’t always been sure about the path they’re on. It can be difficult to maintain clarity of purpose because business platforms change so many aspects of the organization at once and often evolve rapidly.

A race to the finish is now underway. The transformation that is taking place around these platforms is set to go deeper. The most successful platforms are establishing a new structure and strategy for creating value—fueled by data, taking advantage of exponential technologies at scale, and leveraging the organization’s differentiating expertise and capabilities.

Definition of a business platform

As companies describe their platform strategies, they are anchoring to the idea of a “stage” or “field of operation”—an area where they can deploy a range of unique capabilities and establish a control point over a range of value-creating activity. Platforms can have a narrower inward orientation, extend across an industry, or even beyond it (see Figure 1). Market-making business platforms can thus take a number of forms as they refocus organizations on their core advantages:

– Internal Strategic Platforms. Embedding differentiated workflows that define the next instantiation of competitive advantage
– Internal Enabling Platforms. Dramatically more cost effective and flexible front-, middle-, and back-office processes
– Industry Platforms. Upon which multiple industry players can benefit from new digital, cognitive, and cloud capabilities
– Cross-Industry Platforms. New ecosystems that straddle industry boundaries in areas such as mobility, entertainment, and more.

Platform strategies are, by definition, “boundary-busting.” Internal platforms break through the siloes inside an organization, creating new economies of scale to leverage skills, intelligent workflows, and data for new value. Internal platforms, for example, might add value by providing warranty data to supplier networks, and they could create new customer experiences with proactive product replacements through retail outlets.
A business platform doesn’t just change the organization’s business model; it becomes the new operating model, able to extract new value from data by algorithmically orchestrating processes or markets, and by providing new space to exercise expertise.

For external platforms, the allure of new platform economics and network effects is well-documented. The real platform revolution goes well beyond these benefits, with new—and sometimes bigger—value pools to be captured. There are customer integration and personalized experiences to be shaped, as well as industry-wide economics and cross-industry value creation opportunities to be realized, while efficiency, effectiveness, and many more imaginative plays can be exploited.

A multinational banking and financial services corporation headquartered in Southeast Asia, for example, launched one of the world’s largest application programming interface (API) developer platforms that consists of more than 150 APIs in over 20 categories, including funds transfers, rewards, and real-time payments. It was among the first banks in Southeast Asia to enable an end-to-end, cross-border blockchain trade platform, powered by an API framework.¹

Industry and cross-industry platforms radically restructure organizations to achieve nonlinear growth. Once organizations have gone down this path, they often look for additional opportunities to broaden their success by participating in other platforms, or linking their platform to others in their ecosystem (see sidebar, “Yara: Cultivating a high-yielding platform for growth”).

Platforms combine business and technology drivers to win

Business platform owners have to create the conditions for scale. The responsibility to design a platform for network effects, both direct and indirect, becomes the basis for execution. Multi-party platforms generate network effects and exponential growth, while traditional business platforms can also create stronger bonds and deeper relationships to accelerate growth.

Platform owners that intend to create an ecosystem should start with a sure sense of their own ambitions, but approach it with something closer to a blank sheet, created in close collaboration with the key members of their ecosystem. Organizations have become accustomed to framing innovation as an opportunity to capture revenues that others are unable to. Now they must change their mindset: the superior opportunity could very well be something created as shared value.

Most business platforms, even those already in the market, are engaged in a race of scale and speed. The prize? Attracting key members of the ecosystem. On platforms, speed is measured first as the speed of change. How fast—and how frictionless—can you onboard a new participant to your platform? How quickly can you respond to a new customer requirement? Can you assemble and reassemble new infrastructure and interfaces, new workflows and teams fast enough to outpace competitors?

The business platform must be highly architected. It must become composable, made up of highly interoperable system components and infrastructure built using cloud, AI, and other exponential technologies. Microservices and APIs can be configured and reconfigured with ease to dynamically create shared value in the form of new products and services, across an ecosystem of partners. As-a-service components enable agile business configurations. Real-time and external IoT data, coupled with AI and machine learning, create a state of intelligent awareness. The organization will then be able to simultaneously sense changes in customer expectations and environmental conditions to then reorient workflows to act on them.
In operational terms, we believe that platforms will:

- Bring purpose and intent to the task of leveraging transformative technologies, especially AI, and to critical workflows
- Create the focal point for data curation from internal and external sources
- Provide the architectural frame within which agile management approaches can be exercised to move from the old to the new
- Set the direction for skills-building and culture changes required to develop the workforce of the future
- Establish the standards for necessary trust and security across their scope.

Platforms thrive on transparency and trust

On business platforms, transparency and trust are the hallmarks of close customer relationships. In the Global C-suite Study, the leading organizations are strengthening their relationships with customers by becoming trusted custodians of personal data and demonstrating transparency by revealing more information about their offerings and workflows. Blockchain-enabled platforms are natural conduits of trust. On blockchain networks, for example, organizations can demonstrate—to a deep level of detail—the brand promise, whether it’s lowest price or eco-friendly sourcing and manufacturing.

A recent study of more than 250 business platforms revealed their four most common mistakes. One was the failure to develop trust with users and partners. The professors from Harvard, Oxford, and MIT who conducted the study advised leaders to “...put trust front and center. Asking customers or suppliers to take a leap of faith, without history and without prior connections to the other side of a market, is usually asking too much of any platform business.”

To increase trust, they suggest, data on the performance of platform members must be transparent. That includes trust mechanisms such as user reviews. The platform operator is then responsible for validating that feedback—identifying the fakes—and computing easy-to-understand scores.

Yara: Cultivating a high-yielding platform for growth

Historically, farmers have relied on word of mouth and generational farming techniques to overcome obstacles and produce successful yields. Climate change and population growth now threaten the world’s ability to produce enough food. In response, the agriculture industry is turning to technologies such as AI, IoT, and big data to help.

In Norway, Yara, one of the world’s leading fertilizer companies and a provider of environmental solutions, has partnered with IBM to build a digital farming platform that connects and empowers independent farmers. This platform represents an important extension to Yara’s existing business model, using farming data to provide enriching outcomes to farming families, and serving as a first-of-a-kind, competitive differentiator in the agriculture industry.

The platform aims to cover seven percent of all arable land and help manage existing crops with capabilities such as damage prediction and weather forecasting. It will also use IoT sensors and AI to improve agricultural outcomes for the next season. It has already been downloaded by farmers 600,000 times in one ten-week period and its adoption is increasing. It also paves the way for other advanced technology, such as blockchain, to provide full visibility of the provenance of produce to consumers purchasing it.

The cloud-agnostic platform follows a pay-as-you-go commercial model and will provide two data services: weather data and crop yield. An open innovation layer will enable Yara to create new groundbreaking algorithms, providing farmers knowledge and decision-making insights. Yara has also signed up for the IBM Food Trust platform, a farm-to-fork value chain, to expand its influence. It will be able to expand its market opportunities by creating solutions that reduce a producer’s global footprint and optimize the food chain.
AI can help accelerate a shift in cybersecurity, turning what was primarily a defensive proposition into a proactive one. In attempting to make such a shift, organizations should consider three important guidelines:

- Security of business platforms will be critical to trust and their longevity, but companies need to balance this with frictionless customer and employee experiences.
- Organizations must work to secure both the human and machine elements along intelligent workflows, data sources, their attendant applications, and the underlying infrastructure.
- The ecosystem of business platforms requires an open network approach to security across all parties, driving collaboration and insights at speed.

**Architecture inside and outside the four walls**

Most organizations are likely to be composed of a series of business platforms, some of which they own and operate, notably those for their core business and back-office. Others they participate in, often to gain efficiency advantages. The challenge: how to create a new business architecture that reflects the platform reality of multiple business platforms and their interdependencies.

As organizations create value outside the enterprise by collaborating with other institutions, the term “architect” as a job description might fall short. Enterprise architects need to think more like an urban planner building out a smart city—rather than the architect of an individual enterprise. Like urban planners, enterprise architects need to focus on creating shared value across the many ecosystems they work in and with. They have to think about the constant movement of where innovation happens, and facilitate the connections and flow of data among organizations.

The destination for most organizations is scale of both data and transactions. Thus, enterprise architecture must take into account the increasingly fluid boundaries spanning an ecosystem. Because business platforms succeed in part by scaling fast and ahead of the competition, it’s up to the platform owner to enable new business partners to join the platform as effortlessly as possible. They must engineer the platform for frictionless connection across all architecture layers: infrastructure, application, data, and exponential technologies (see Figure 2).

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**Figure 2**

Interweaving business platforms underpin the Cognitive Enterprise

The Cognitive Enterprise requires an open and flexible architecture in which information flows up and powers the exponential technologies that drive business platforms.

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**Ecosystem architectures**

**Enterprise architecture**

- **Internal Strategic Business Platforms**
  - Owned and operated
- **Internal Enabling Business Platforms**
  - Supplied/Operated

**AI, IoT, blockchain, automation**

- Data
- Application
- Infrastructure

While some platforms are positioned at the front end—directly shaping the customer experience—others massively enable internal operations. Yet, in all cases, leaders take advantage of exponential technologies deployed in concert. The time for AI tourism—automation pilots or proofs of concept with blockchain technologies—has passed. Organizations must now move beyond experimentation to industrial-strength scale operations. Therefore, they will need to make clear policy and architectural choices at all levels of the Cognitive Enterprise.
To establish market-making business platforms, organizations will need to instill new rigor and focus to move beyond experimentation, sidestep cognitive chaos, and balance stability with agility. Organizations will need to:

1. **Double down on “Big Bets”**
   Make Big Bet platform choices and align their organization, assets, resources, and investments to rapidly scale and sustain the continued evolution of the platform.

2. **Create a new business blueprint**
   Embed governance in a more open and transparent business architecture to enable rules, inform decisions made at the edge, and allow for the rapid reconfiguration of organizational components to create a new target operating model.

3. **Orchestrate compelling change**
   Establish control towers to monitor early warning indicators, orchestrate change in real time, and develop iterative and proactive change management.

**Action Area**

**Double down on “Big Bets”**

**Rediscover your core and expand market opportunities**

Business platforms are remaking the enterprise: how it competes for market advantage, structures its operating model for differentiated capabilities, and redefines the experience of customers, employees, and business partners alike. Because platforms fundamentally transform the enterprise, deciding which one to compete with becomes an existential bet.

Compounding matters, leaders are being asked to consider new rules for winning in a platform economy. In some situations, network effects, for example, may be more important than market share. The strength of a platform’s ecosystem might matter as much as the strength of its product portfolio. Platform economics are the subject of intense scrutiny and study and are yet to be fully understood. The leaders who are out front today are learning as they go.

Companies have the opportunity not only to attack and secure new markets but also to restructure their cost bases for the long term—with a possible huge payoff to their bottom lines. They are creating platforms to ramp up their forecasting skills in concert with ecosystem partners and also to link IoT devices embedded in their physical assets across extended supply chains. We think that incumbents will—as we are increasingly seeing—strike back against digital upstarts if they can leverage their own historical data, ecosystem relationships, and physical infrastructure to orchestrate change at scale.

In creating a smart home platform, appliance-maker Bosch had the boldness to take on Google’s competing platform, Nest, and also go directly to consumers for the first time. Kloeckner Metals opened up its platform to its competitors in the steel market and introduced price transparency in a market where “open” is far from the norm.

Big bets on platforms are, by definition, bold bets. While the leaders in the platform race are ready to think big, they also stay true to their core. They don’t replace that core. Instead, they augment and extend it, and in so doing, rediscover what they could be. On platforms, products evolve to include supporting services. Services grow to become orchestrated and curated experiences for customers, partners or employees.
To deliver a curated experience, platforms extend offerings to adjacent spaces, connecting complementary products and services in a way that makes the experience more holistic. New value for the customer is created by the breadth and diversity of the interactions the platform owner orchestrates. Platforms that link connected cars with travel and hospitality providers, for example, can provide concierge services to create a new customer experience.

Organizations are learning to push what they once thought were the limits. This includes new ways to monetize products and assets. Instead of selling a car, platforms could offer customers the rights to use a car for a pre-determined period of time. The platform owner could bundle the purchase with by-the-ride insurance payments and pricing linked to safe driving habits and those that reduce gasoline consumption.

When platform orchestrators bring together multiple organizations to collaborate on a new customer experience, they gain something of extraordinary value: data from a wide variety of interactions and transactions. This capacity to extract data from multiple sources and convert it quickly to insight and learning is proving to be one of the platform’s most sustaining advantages.

In this way, platforms set the data agenda. Market incumbents may need to first rediscover their cores by homing in on the proprietary data and domain expertise that fuels their competitive advantage. As well, they must evaluate their unique skills and expertise, and their cross-value chain relationships and reputation.

Incumbents have a distinct advantage over new players, thanks to their access to longstanding customers and deep knowledge, as well as related data from their processes, value chain partners, and competitive surroundings. Their unique access to proprietary data allows them to initiate new competitive plays or strike back with vigor if they are being attacked by an outsider. Not only do they have a data advantage, but they also have the expertise to do something fresh with it, especially if they find ways to harness the power of exponential technologies and intelligent workflows.

Next, many organizations will need to greatly enhance their abilities to collect heterogeneous data, tap into new data sources, mine that data for insights and mitigate bias. Incumbents, as owners of most of the world’s physical assets, should pay close attention to the value that can be derived from IoT-connected, hybrid cloud networks to fuel their data advantage, as well as the skills and expertise that enable them to use data that is almost exclusively under their own control.

Finally, they will need to develop what for most will be a new capability—an understanding of what data other organizations on their platform will need to make decisions and improve their operations. Ultimately, those big data insights could be the basis for new revenue-generating services sold to customers or platform partners.

**Choose platform type aligned to capabilities**

While consumer-facing platforms grab the lion’s share of attention in the mass media, they aren’t the only platforms that generate value. Companies can choose from the four earlier-mentioned business platforms types. Two internal types, Strategic Enabling Platforms, which embed differentiated workflows to create competitive advantage, and Internal Enabling Platforms, which can be utilized to strip out costs; and two external platform types, Industry Platforms where multiple players collaborate to create new capabilities, and Cross-industry Platforms that straddle industries to create new ecosystems.

The choice of what kind of platform to build starts with a consideration of strategic capabilities (see Figure 3), including:

- **Unique proprietary data.** The ability to orchestrate and curate data so that it’s AI or other exponential technology-ready, as well as identifying and accessing new data sources.
- **Deep expertise.** The technology expertise that is in such short supply, as well as the softer skills required for agility, collaboration, and ongoing learning.
- **Differentiated workflows.** The intelligent workflows that support the organization’s capacity to scale with speed and stay open to change.
- **Exponential technology applications.** The combination of technologies that differentiate and automate intelligent workflows and create new customer, partner, and employee experiences.
Introduction
Double down on “Big Bets”
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Action guide

Market-making Business Platforms

To create a winning business platform, clear criteria have emerged.

Figure 3
Strategic platform capabilities

Channel power—or the lack of it—may also determine platform choice. It’s never been easy for manufacturers to create direct-to-customer sales channels, as many have found out the hard way by alienating their trusted channels in their endeavors to create direct-to-consumer relationships. Retailers are more likely to have created the kind of trusted relationships necessary to attract customers to marketplace platforms. However, manufacturers and CPG organizations do have a chance to participate in and partner on other types of platforms that raise their visibility with customers and create new relationships and trust.

CPG giant Nestlé is a case in point. It is both participating in and operating a broad variety of platforms that feature its goods. Together with major retailers, Nestlé participates in the blockchain-based IBM Food Trust platform. Via QR codes, consumers can track Nestlé products from farm to factory to warehouse to store, getting the quality and safety assurances they crave. More recently, in Japan, Nestlé began piloting an AI-enabled wellness app personalized by participants’ DNA and blood tests to provide nutritional advice. In China, in partnership with Alibaba, Nestlé operates a platform to help small merchants better promote and merchandize Nestlé’s brands.

An organization with strong channel power will find it easier to scale fast to get to market first. It can also become the entry point for new services. Telecommunication companies, for example, are becoming channels through which customers can engage in healthcare discussions. On a platform with other industries, they can become the channel of choice for “virtual medicine”—including online consultations with physicians.

Established market-share leaders with loyal customers have a built-in scale advantage. But even those that control a sufficient share of the market recognize that by adding partners, or even competitors, to their platforms, they can expand the market and, importantly, their access to data.

Yara, one of the world’s leading fertilizer companies and a provider of environmental solutions, created an industry-wide business platform to connect and empower independent farmers. It will use IoT sensors and AI to provide hyperlocal weather forecasting, crop damage prediction and real-time recommendations. Already downloaded by over 600,000 farmers, this platform is transforming Yara’s existing supplier relationship and expanding its value (see sidebar, “Yara: Cultivating a high-yielding platform for growth” on page 13).
State Bank of India YONO: Attracting new customers with a next-generation platform

More than three years ago, India’s second largest bank, the State Bank of India (SBI), made an ambitious big bet. It adopted a customer-centric platform strategy to attract new customer groups, such as tech-savvy millennials, and increase cross-selling and loyalty with existing customers.

Beginning with an MVP approach of 25 customer journeys, SBI created a Digital Bank, an online marketplace for third-party offerings, and a digital Financial Superstore for its joint venture offerings under the brand SBI YONO (You Only Need One). These three solutions, driven by AI-based advanced analytics models, generate timely customer insights that lead to tailor-made offers and campaigns.

The Digital Bank allows users to conduct all relevant banking interactions online, eliminating the need for branch visits. It also offers cardless cash withdrawals at more than 16,500 ATMs by generating a one-time code in the banking app. Not only does this reduce the need for plastic credit cards, but also the likelihood of associated card fraud.

SBI offers an online marketplace with personalized offers, selling a wide range of lifestyle products to customers. For this, SBI YONO partners with more than 100 e-commerce sellers, including Amazon, Thomas Cook India, OYO Total Holidays, and Tata CLiQ, among others.

SBI’s digital Financial Superstore ties together all financial service offerings by joint venture partners of SBI such as life insurance, general insurance, credit cards, securities, and mutual funds. It thus provides a one-stop solution for all of its clients’ financial and lifestyle needs. It also offers calculators and comparison tools to help customers manage their financial lives.

SBI YONO’s platform has been incredibly successful and growth continues since its public launch in November 2017. The platform already counts more than 4 million daily logins and, on average, more than 15 new use cases deployed each month. SBI is now working to bring its winning digital experience into branches, providing a differentiated omni-channel customer experience.

On external multi-party platforms, the strength of an organization’s ecosystem will be a determining factor. Those that don’t have the clout to lead the ecosystem, or the leadership skills to collaborate on win-win propositions, are disadvantaged. Instead, they may choose to participate in a platform, and focus their investments on a differentiating platform that can interoperate with others. For example, many merchants choose to participate on State Bank of India’s YONO platform to get access to its strong network of ecosystem partners and customers. (See sidebar, “State Bank of India YONO: Attracting new customers with a next-generation platform”).

Clear winners in some ecosystems remain elusive. For example, the battle for the Smart Home has many traditional industries converging—energy utilities, telecommunications, electronics, and even media conglomerates—but no dominant provider is capturing the outsized economic value many of them seek. Consumer adoption, too, has been slower than predicted (although cause and effect remain somewhat muddled). And if the Smart Home code has yet to be cracked, solving the enigma posed by the connected city remains far more distant.

Platform alignment with the organization’s core values and purpose is paramount, as is support from its core DNA, culture, and skill development. A company needs to stress-test how far it can stretch its core while still hewing to the trusted ways of working that have been reinforced by past success. Increasingly, an organization’s commitment to social impact—not in the comfort zone of some traditional companies—is becoming a going-in design principle for a successful platform. This not only helps the organization attract and keep engaged new customers, but also new talent.

Michelin created one such platform by leveraging its 130-year history of innovation and expertise in environmental sustainability. Its platform was built around its company’s purpose—sustainable mobility—to establish new IoT-enabled fleet-management services for trucks. Using sensors embedded in tires, Michelin’s platform services help fleet operators maintain their vehicles and drive in a manner that promotes safety and reduces fuel consumption and CO2 emissions significantly.

“Our customers start seeing us in a very different way, as a company that can help them optimize their business, enable them to be more efficient, and generate more margins,” says Eric Chaniot, Michelin’s Global Chief Digital Officer. “We are also convinced our fleet customers will give preference to Michelin tires, so it is a way to both differentiate ourselves and drive the core business.”
Sustain with investments and resource reallocation

Some of the most successful business platforms are more than a decade old. They demonstrate that platforms don’t get to scale and then go into stasis. They continuously evolve with investments, expanding partnerships, exponential technology and data, and a steady development of talent (see Figure 4).

Chinese financial conglomerate Ping An’s 15-year evolution has been guided by its customers. Ping An started as an insurance provider, then moved upstream to where its customer journey begins—healthcare. The Ping An Good Doctor platform was launched by combining AI with physicians to provide medical advice. It now includes pharmacies and hospitals to facilitate other healthcare services. Ping An widened the circle to other platforms as well, including housing, auto and other areas of importance to its customers. Today, Ping An reaches almost 500 million online customers on 11 platforms.

Ping An’s growth strategy reflects its expectations and the culture it has strived to create. Targets are aggressive and, according to the deputy CEO of its Insurance Group, zero-based. That means “next year’s target is based on market potential, not on the previous year’s growth trajectory.”

Similarly, building materials supplier CEMEX is using its Go platform to pilot technologies that bring immediate value to customers and then allow it to iterate based on their feedback. The Go platform began as a “Customer Integration Platform” to provide real-time, detailed information enabling order placement, live tracking of shipments, and managing invoices and payments for CEMEX’s main products.

It has since evolved into a comprehensive digital platform to include job site orders and sales force enablement. But feedback indicated customers were most concerned about cycle times: knowing truck location, current product availability, and how to get trucks back to job sites as quickly as possible. So CEMEX added Quarry Link to CEMEX Go, automating many aspects of material pick up to reduce customer wait time.

Because market-making platforms are a mission-critical undertaking and a serious investment, the leadership team and the Board of Directors must be strongly aligned on the platform choice. Externally, the platform’s value proposition must be credible to all of its stakeholders, including ecosystem partners and investors. Internally, its intent must be understood to keep employees pulling in the same direction.

For external platform providers, credibility and buy-in from the ecosystem is a make-or-break proposition. Organizations with large market share may need to resist the urge to assert control. Since it’s difficult to lock partners into only one platform, it’s better to attract participants than compel them. And because value created on an external platform should be a win-win scenario, platform orchestrators focus much of their attention—and investment—on nurturing and building out their ecosystems.

For example, Airbus’s Skywise consortium onboarded more than 100 airlines and more than 9,000 aircraft by the end of 2019, after releasing its most recent module providing reliability insights, which was co-designed, tested, and improved in collaboration with its anchor partner, Delta Air Lines. Delta Air Lines and Skywise entered into a digital alliance to build out new predictive maintenance and health-monitoring solutions. Airlines using the platform cite numerous benefits as a result, including reduced fuel penalties, less fleet disruption, and higher productivity in maintenance operations.
This is a phenomenon we’ve seen many times on blockchain platforms: the leading platform orchestrators eschew edicts that tip the balance in their favor, or even the favor of one participating organization over another. Their role is to be a neutral steward of value creation, creating an environment where every participant can prosper. The law of attraction is what gets them to scale.

To sustain investments, organizations will require new ways to measure what matters. How do you measure the value produced by an open-API platform, for example? By tallying up revenues, counting the users, or tracking Net Promoter Scores?

Because platforms create value from network effects and business relationships and live or die on data, organizations need to question whether traditional measurements gauge new business value correctly. In the end, as these platforms are mission critical, the regular performance—and in some cases even the survival—of the company is, in fact, the ultimate measure of success.

No matter what kind of platform the organization builds, investment prioritization must swing behind the platform over multiple years. It must influence decisions the organization makes to shore up its ecosystem, including mergers and acquisitions (M&As), joint ventures, and partnership choices. Because the investments are not trivial, organizations will need to carefully calibrate their investments in “current versus future” advantage.

Reallocating resources in this way is a leadership skill. Organizations venturing onto platforms need a governance structure that supports continuous reallocation, and a coalition of leaders accountable for strategy and big bets.

Woodside Energy: Using AI to put knowledge at everyone’s fingertips

Woodside Energy, an Australian natural gas producer, recently placed a “big bet” by investing in AI and quantum computing to help reduce operating costs and build the “plant of the future.” These exponential technologies will help Woodside in areas such as operations and projects.

Woodside has been at the forefront of adopting AI in the oil and gas industry, harnessing the power of cognitive computing to extract meaningful insights from 30 years of dense and complex engineering data. Using AI technology to open the flow of knowledge has put decades of experience at the fingertips of employees across the company, helping them answer tough questions faster and enabling fact-driven decision making on complex projects.

Along with its investment in AI, Woodside is now rethinking the way its organization will innovate, accelerate, and collaborate. For example, it has adopted a Garage approach, which Woodside calls its “Accelerator.” The Accelerator convenes business owners and others from the industry in a safe space to pilot innovative ideas that could drive business value. For its first Accelerator initiative focus area, Woodside selected transforming the employee onboarding experience using its AI-powered assistant (Willow) to yield a more intelligent workflow.

Adopting more efficient ways of working is just one indicator of a shift in Woodside’s organizational governance and decision making—and its journey to become a Cognitive Enterprise. As a member of the MIT-IBM Watson® AI Lab and the IBM Q-Network®, it is now involved in the latest AI and quantum research. This will help Woodside continue to adopt new technologies, build a new business architecture, and evolve its operating model.
Create a new business blueprint

Establish an open and transparent business design

At their essence, market-making business platforms create new value in new ways. They do so by bursting through organization boundaries and connecting activities in intelligent workflows. They require organizations to ease up on controls and major on relationships. In short, they necessitate wholesale structural and cultural changes to the operating model—thus creating a new business architecture.

The big bets organizations make on platforms benefit from the fine details engrained in an operating model blueprint. The blueprint documents current and future states. It helps organizations identify and execute strategic priorities, anticipate how each change will ripple across the organization, and reallocate resources accordingly.

The blueprint is the glue between the organization chart and the business platform. The blueprint needs to address the target operating model, decision framework, culture and skills, roles and responsibilities, as well as how humans and AI work together in a new business platform context. Leaders in the organization need to create clear and explicit rules and governance on how the organization manifests itself to support the business platform—for instance, the rules of who decides what needs to be (re)aligned around the business platform intent (see Figure 5).

Most future operating models will be hybrid, meaning that the organization will operate on a platform for some of its business, but not all of it. Some may have separate platforms for customer-facing or back-end activities. Moreover, as new platforms are built out, organizations may have future state and legacy operating models running side by side.

On multi-party platforms, the product-market-partner matrix has to factor in the assets and capabilities of other organizations. Research suggests that, over time, most ecosystems will grow in size and complexity. According to recent research, the most successful platforms average about 40 ecosystem partners, compared to an average of 27 for others. They also include partners from more industries and more regions.28

New business architectures must be broad and identify platforms and workflows and the way they relate to and interact with each other. To future-proof platforms, business architectures will also need to be “open” to enable ecosystem connectivity (see sidebar, “Woodside Energy: Using AI to put knowledge at everyone’s fingertips”). This includes frictionless entry for new participants—including the functions and departments within an organization. Open technological standards take down the biggest barriers to entry. Pricing structures can become another barrier for participants. Will the platform owner charge participation fees or earn its revenues from advertising or other services that help participants manage their business?

The big bet for multi-party platforms will be decisions about what assets they own, what they orchestrate, and what they create in collaboration with others. This requires strategic choices about value levers. Although the aim is to be open, platform orchestrators may choose to own the most important control points to realize the most value possible.
TradeLens: Rules for a global shipping platform

TradeLens is driving a wave of change made possible by cross-industry collaboration. This open shipping platform, underpinned by blockchain technology, was launched to help digitize and modernize the world’s supply chain ecosystems. It now comprises more than 100 different organizations and is on target to handle more than half of the world’s ocean container cargo.

The platform, developed by Maersk and IBM, lays the foundation for digital supply chains. It empowers multiple trading partners to collaborate—publishing and subscribing to a wide range of supply chain data—by establishing a single shared view of a transaction without compromising details, privacy, or confidentiality.

A few big rules or guiding principles govern how the platform will operate and expand, as well as how participants will interact and derive value.

First principle: TradeLens is an open, neutral platform available to any permissioned party to a shipment, anywhere in the world. All authorized participants can immediately contribute to and extract value from the TradeLens platform.

Second principle: The platform enforces a standard data sharing and permission model that governs which parties to a shipment provide data and which parties are granted access to that data. Sensitive information, such as trade documents, remains under the control of the providers across a distributed network of blockchain nodes. The model promotes greater transparency, makes data more widely available, and ensures security and protection of sensitive data.

Third principle: The platform maintains an open API environment, employs standards, and promotes interoperability as the foundation for ongoing improvement and innovation. A marketplace will allow third parties as well as participants to build and deploy applications on the platform.

As a single platform connecting the entire ecosystem for secure data-sharing and collaboration, TradeLens brings value to cargo owners, freight forwarders, rail, trucking, ports and terminals, ocean carriers, customs and other government authorities, and financial services. All parties benefit from seamless, secure sharing of real-time, actionable information, empowering the participants to streamline their supply chains and mitigate problems through predictability and exception handling.

Blueprints are not one-and-done activities. The platform blueprint is more like a master plan. It encodes the organization’s vision—its long-term plans—and serves as a guide and dynamic roadmap to develop future growth. Because platforms are data- and technology-dependent, the “master” business architecture will need to be enabled by a set of master technology architectures, which act as “guide bars” (the parameters within which people have freedom to act) and enablers for agile innovation and platform-building. On top of this business architecture, organizations will need to overlay a corresponding technical architecture. The seven capability layers (see Figure 2 on page 5) can help an organization think through all key dimensions.

Organizations the world over are experimenting with new business designs that favor openness and transparency. Haier, a multinational manufacturer headquartered in China and one of the fastest growing providers of appliances in the world, has had an open and transparent operating structure for more than a decade. Its operating model is composed of highly autonomous micro-enterprises, which, says Haier CEO Zhang Ruimin, “are not connected in a traditional cascading way. They are connected in a parallel way and are interconnected so that they can work together to create value for the user.”

Transparency is established by Haier’s guiding principle that each micro-enterprise, and every member in it, should have “zero distance” from its customers. Its IT systems deliver data freely across each micro-enterprise and ensures that the right data is available to each employee.

Codify big rules and governance to create new value

The big rules of an organization’s operating model will help drive the intelligent workflows and the algorithms embedded in them. While these rules should be big, they should not be exhaustive. Too many rules with too much detail choke growth. They lock organizations into one way of doing things, and a way that may quickly become out-of-date.

Consumer giant P&G recently streamlined its operations in major markets to create ten product categories that drive growth through executional freedom. Category leaders have ownership and accountability all the way to the staffing levels of salespeople in the market. In smaller markets, as long as teams are executing with predefined
strategies and are delivering on their financial targets, teams will have “freedom within a framework” to make real-time changes without the need for engagement with regional or global resources. The freedom within a framework approach, first introduced by Coca-Cola, has also been adopted by startups and incumbents across industries and is a great example of how guide bars effectively work.  

Every organization will need to determine its own big rules. It is imperative that the organization broadly and explicitly communicates these rules to drive alignment. A starting set for building out market-making platforms might include:

- Headquarters will set the core intent and focus of business platforms
- The market will define customer service models and channel choice
- Core back-office processes will be standardized
- IT architecture will be open.

Rules that govern individual intelligent workflows will operate at a different level. Because most organizations consider data their most differentiating asset, policies that explicitly guide the sharing of permissioned data—who can see it and under what conditions—are vital. Governance for AI models helps mitigate bias and uses AI in a responsible and ethical manner.

Because many platforms are a nontraditional form of business, the regulatory environment is not always clear at the outset. New developments, such as the European General Data Protection Regulation, often have significant and even worldwide impact. Platforms, therefore, have to operate in a framework of regulatory big rules too.

Some rules will be new to the organization. Ecosystem governance covers the business, legal, and technical challenges of coordinating activities and growing the network. A well-governed network determines network policies based on the mutual interests of the community.

Traditional structures for partnerships and supplier relationships will need to give way to a more collaborative approach to governance of ecosystems. The decisions of most consequence will include whether the platform is open, managed, or closed—and how value is distributed (see sidebar, “TradeLens: Rules for a global shipping platform”).

In open ecosystems, participants must meet some basic standards to participate, but for the most part there are few hurdles to entry. Standards are usually maintained to preserve security, reputation, or compliance to regulations. A managed ecosystem controls which organizations can join and what ecosystems can do on the platform. Guidelines might include customer-facing pricing structures, engineering specifications, or quality controls. In general, organizations benefit by being as open as possible in order to scale and keep customers from roaming to other platforms.

In a closed ecosystem, as implied, participation is tightly controlled. This might be necessary during the build-out stages of a platform when the organization needs stricter control of its value proposition to attract specific customer segments. This is often the case when organizations are creating a highly disruptive new offering—a platform for developing autonomous cars, for example.

Governance that establishes ecosystem participation should also take into account value distribution. This includes transparency—alignment across the ecosystem on what value is at stake and how each organization will benefit and contribute. Even though competitors on an industry platform aren’t giving away what differentiates them, they often fear they might do so. This mindset makes clear consensus on value alignment a critical aspect of governance.

Create a new meeting architecture for decisions and decision rights

Exponential technologies allow organizations to extract never-before-possible operational insights that enable better, timelier decisions. For example, sensors, wearables, and robots are generating data streams for and from intelligent workflows on factory and shop floors. Virtual reality showrooms can capture data from customers’ gestures, facial expressions, and vocal intonations as they interact with products they wish to buy. Digital twins, precise data replicas of intelligent workflows, are being used to troubleshoot logistics bottlenecks from afar, optimize machinery on a construction site, and monitor the safety of workers.

AI can make sense of intricate patterns of contextual data and learn from them. Every person and every thing becomes more knowable, and insights about them more actionable—not just in the abstract, but in the moment. These new multi-directional data flows, insights, and learnings will break apart existing hierarchical information flows and become a big part of the agile culture the Cognitive Enterprise requires.
As decisions that used to require a consensus from a large number of stakeholders and that used to take a lot of time go away, where and how decisions are made will radically change. This includes which decisions and parts of the workflow can be automated; which decisions depend on a human touch or broad consensus; and which decisions can be pushed out to the front lines of the organization.

We see two new centers of gravity for decisions. Some decisions will move to the interface between the platforms and the intelligent workflows. Other decisions will be made at the edge of the enterprise.

As activities on workflows become automated, organizations will need to identify the escalation points for human intervention and decision making. Fears that automated, or “lights-out,” workflows might run amok are allayed by both algorithmic and common-sense controls. Humans still need to periodically check that things are running as intended.

As organizations change the points along the value chain where decisions are made—often by humans and machines acting in concert—they’ll create a new “meeting architecture.” This requires the careful review and reconsideration of where decisions are made today, especially consensus-heavy decisions, such as sales and operations planning. Up to now, such decisions have typically required a cadence of meetings at multiple levels with multiple departments to achieve consensus.

With sufficient data as well as AI models and tools, complex consensus-based decisions and existential bets can be made with ever-greater precision and with far fewer in-person meetings. Yearly planning decisions can be reviewed, reconsidered, and readjusted with greater frequency—at the moment of need. Some procurement auctions can be automated, for example, to free up talent for the kinds of decisions where humans are best—complex negotiations that benefit from the human touch.

In too many organizations, data still is viewed as too open to interpretation to be relied on for decisions of consequence. In the IBM Global C-suite Study, just 49 percent of over 13,000 respondents said their C-suite had the data mindset needed to improve the quality and speed of decision making. What has prevented so many organizations from adopting a data mindset? Many of the C-suite executives we surveyed chalk it up to hubris. Those in the C-suite, they tell us, value the wisdom derived from decades of experience above insights gleaned from big data. This problem is particularly acute when answers derived from data reveal something unexpected.

Getting senior leaders to make decisions based on data is part culture change and part pragmatics. Fifty-two percent of organizations admit they simply haven’t yet collected the data they need to make informed decisions. For these organizations, a data-for-decisions inventory is in order.

In most organizations, decisions are among the least understood and measured activities. Enhanced visibility into the inputs and outcomes of decisions made by humans and machines are important for learning and course corrections. Ultimately, success of market-making business platforms is predicated on data harnessed by intelligent workflows. It can be measured by the quality of decisions and the value of the outcomes that result.
Orchestrating compelling change

**Initiate next-generation change management**

Change management was never meant to be a checklist, but it often felt that way. At times, a description of some desirable “to-be” state was tacked onto a project management plan, riding on the assumption that people seeing the organization’s vision would just do it.

Of course, that was never going to work out. Despite decades of deliberation by experts in the field, change-management failure rates continue to be high. Researchers estimate that some 50-70 percent of change projects fall short.37

And now change, like new technologies, has become exponential. The Cognitive Enterprise can keep pace with this phenomenal rate, depth, and scale of change by adopting next-generation change management. Like agile methods, next-generation change management supports frequency, modularity, and speed of release. It introduces continuous change to intelligent workflows and the teams that support them. It takes into account the need to continuously and deliberately refresh skills and data.

Agile breaks projects into short, iterative cycles or sprints. It rests on the principles that the planning, design, development, and testing cycles are never done. These ways of working create an aptitude for constant change.

As organizations go up the experience curve, they can increase the speed of change on a project-by-project basis. But orchestrating rapid changes occurring at different levels of the organization at the same time is a different matter. While change happens, the overall organizational impact needs to balance dynamism with stability. Moreover, on changing platforms, that equilibrium must be perpetuated across the organization’s ecosystem.

In ecosystems, leadership moves beyond mere collaboration to cultivating coalitions, joint action based on a strong sense of shared purpose. Coalitions are created for the express purpose of change. They thrive on shared data, particularly data that foreshadows a future state, and leaders who understand how to motivate others to action.

In every organization, the biggest change underway will be to its skills—not just periodic technology skill gaps—but the wholesale and frequent change of all types of skills across its entire workforce. This means leaders must own the skills agenda and continuously assess precisely where new skills are needed, and how best to help employees acquire those skills. Effective training programs and self-service learning systems are part of the equation.

Learning by doing is equally important. To nudge employees along an experiential learning path, leaders will have to pay close attention to the composition of the teams they create, incorporating practices like project rotation, stretch assignments, and peer-to-peer coaching, while also exploring new areas such as virtual-reality based simulations and gamification.

Next-generation change management aligns technological change—the adoption of exponential technologies—with the organizational changes required to exploit them to full effect. And because the Cognitive Enterprise creates value by orchestrating multiple exponential technologies in concert, organizations will need to pay close attention to architectural elements such as open standards and human-centered design thinking. This combination brings users into the technology DevOps cycle, and not incidentally, also creates a cadre of change agents.

**Establish control towers for real-time visibility and monitoring**

The Cognitive Enterprise has many moving parts, all subject to simultaneous change as the organization learns, adapts, and creates new connections. This concurrent change to workflows, systems, and people is interwoven with a proliferation of new components to create value—a flurry of agile squads, AI, bots, microservices and the like. Increasingly, the molecules of change around those components have become smaller and smaller while organizations are trying to build bigger things. To manage complexity and circumvent chaos, organizations need something in the middle of all of those moving parts: a control tower.

Like aviation control towers, an organization’s control towers are designed for safe takeoffs and landings. They do this, in part, by monitoring environmental conditions, including unpredictable events, which threaten to disrupt mission-critical workflows or put outcomes at risk. They are architected to increase visibility, communications, and intelligent response.
Insight: Dataspaces for immersive data interaction

Control towers of a Cognitive Enterprise will need physical environments that embrace new forms of hardware and new interactions that support new ways of working and decision making. These physical spaces can be called “Dataspaces,” as they will enable teams to interact collaboratively with very large data sets. Dataspaces will tap new technologies, such as large reconfigurable interactive screens, robotic arms, gesture controls, and speech-to-action algorithms supporting an immersive collaborative experience. They will also display complex data in new ways—either for short-term decision making or for real-time monitoring and action—using natural interaction paradigms for increased accessibility and comprehension.

Dataspaces will allow a business to adapt to meet new needs at any moment. For example, a company could use its Dataspaces to monitor, control, and fix its supply chain. The space could be configured into individual pods where smaller teams work together on day-to-day operations. However, should a natural disaster strike, the space would be fully reconfigured at the touch of a button to allow the teams to react and maintain the integrity of the supply chain.

A Dataspaces could be used as a strategic planning environment. Businesses are inherently complex, and it is often difficult to see the interdependencies and relationships across operational areas. By showing the structure of an organization in detail, Dataspaces will enable unprecedented visualization and comprehension, allowing organizations to identify bottlenecks, then triage them using analytics that identify where automation can be integrated to improve operational performance.

As organizations shift to a hybrid-workforce model where humans and intelligent bots operate in tandem, human workers can be engaged through conversation with these new bot workers, which will be monitored and tweaked by the data they create.

To cope with data and workforces that operate in new ways, Cognitive Enterprises will need to move beyond the current approach of responsive web applications to new flexible and immersive technologies.

Figure 6

Control towers orchestrate through several interactive layers

Advanced technologies and live data streams provide new levels of insights and coordination.

Just as control towers designed for flight must communicate with pilots in the air and crews on the ground, organization’s control towers handle every aspect of operations and are prepared for instantaneous intervention. In the enterprise context, the control tower tracks the takeoff of initiatives until they land in a way that creates business value. Control towers should sit at the center of the organization, so that everything revolves around them.

Control towers need to operate at multiple levels across the change continuum and the organization’s scope (see Figure 6). In many ways, they reflect the different capability layers of the Cognitive Enterprise model, measuring both performance and the changes underway. Control towers provide a view of issues such as the overall stability of the enterprise and important interdependencies. At the apex of the control tower, senior leadership has visibility into the success of the business platform strategy and its execution, as it’s being built in release “bricks.” At the base are the fundamentals of the functioning of the next-generation IT infrastructure. In between, the performance of key workflows and Garage-enabled innovations can be constantly monitored and adjusted (see sidebar, “Insight: Dataspaces for immersive data interaction”).
Coupled with an agile way of working, control towers serve to monitor a state, measure progress, and measure outcomes. With progress being agile and modular in nature, senior leaders in the control tower are armed with constant updates and new information. This enables confident and swift decision making that impacts important parts of the business. Control towers work well when the underlying organization is agile in nature and has learned to receive and act on signals coming from the control tower.

Control towers monitor activity in real time, sending alerts when critical junctures in a workflow get out of sync, data doesn’t reach its destination, or compliance standards are breached. They can monitor apps as they move to clouds or customer calls gone awry. Decisions and their consequences are tracked and kept as part of the organization’s institutional memory. Routine workflows can more safely run on their own, sending alerts when human intervention is required. Armed with a broad view of workflows and platforms across the entire organization, control towers gain a perspective that allows for organizational-scale change at speed.

Control towers bring exception management to full fruition. In situations where complexity makes it difficult to know where to intervene, control towers learn to detect even small deviations from plans and alert all necessary parties.

Control towers can zoom in on the minutiae and also reveal the big picture. They help leaders orchestrate the overall transformation program, monitor progress against performance targets, and identify areas that require more focus. To do this, control towers will need to operate at multiple levels across the enterprise—tracking people, processes, system activities, business and technology platforms, and critical workflows (see sidebar, “OCP: A control tower enables ‘pit-to-customer’ workflows”).

Like control towers designed for flight, an organization’s control towers marry the best of human intelligence with machine intelligence. Data streaming from sensors reveals context at scale. AI extracts insights from these rich data flows and shines a spotlight on areas that might otherwise go unnoticed. Experienced leaders often know intuitively which events could be critical to an organizations’ success; insights from control towers lift management by intervention and long-term planning to a science.

OCP: A control tower enables “pit-to-customer” workflows

OCP Group (OCP), in Morocco, is the worldwide phosphate production market leader with control of over 75 percent of the world’s proven phosphate reserves. Over the last decade, OCP has pursued a comprehensive downstream supply chain expansion strategy, which led to increased complexity. To manage this complexity, OCP created Teal Technology Services as a joint venture with IBM to align its business with a comprehensive Industry 4.0 vision.

As a first step, OCP decided to establish a control tower at Jorf Lasfar, Morocco, the world’s largest fertilizer complex. The control tower is the nerve center of OCP’s operations, encompassing three functional areas: planning optimization and scheduling; real-time monitoring and supervision; and analysis and cognitive learning.

According to Ilias Elfali, OCP Executive Vice President in charge of Industrial Operations, “Control tower as a platform allows my team to react in real time to every meaningful event, act on data that is trustworthy, leverage advanced analytics and AI to grow our organization’s capabilities to anticipate bottlenecks, and streamline orchestration of our key ‘pit-to-customer’ workflows. Our ambition through this platform is to achieve traceability of any product shipped to the customer throughout its lifecycle all the way to the raw material sourcing.”

The control tower gathers and consolidates relevant operations data from IoT systems, sensors, and other IT systems, creating a single “point of truth” across the enterprise. Based on this data, complex AI and data analytics models generate insights on key workflows and end-to-end processes. Deviations and associated countermeasures are recorded and scheduled into an AI engine for continuous process improvement and advanced exception management.

The control tower infuses a progressive evolution into the roles and the skills required to operate it, increasingly exposing the organization to new technologies such as AI. Due to its initial success, OCP will be scaling out this platform to all of its mining and chemical sites.
Engineer control towers with deep intelligence and security

As organizations embed AI and other exponential technologies into their control towers, their responses can become less defensive and more proactive. Chief among these may be cybersecurity.

When DevSecOps—the integration of security into the entire DevOps lifecycle—is engineered into the control tower itself, it can efficiently monitor the performance and security of technology development. Security automation and vulnerability scanning helps detect possible exposures before they are exploited by attackers and remediate them continuously.

Over time, new AI technologies, drawing on machine learning, will signal the proactive changes needed to keep up with new skills requirements, reconfigure intelligent workflows, and optimize operations on the fly.

Just as AI has transformed the maintenance of machines from failure detection to failure prediction and prevention, organizations will be able to better forestall systemic failures.

By tracking alerts sent from decisions with bad outcomes, bottlenecks that choked a procurement pipeline, or apps that failed to scale, for example, an organization’s lessons learned can be learned by machines. Deep learning applied to an organization’s failures de-risks the transformation. Applied to the operations and external events monitored on control towers, predictive and real-time situational optimization could recalibrate complex logistics.

AI-enabled control towers are already transforming what’s possible. A control tower could spot market unrest in one region, for example, and glean how a parts production slowdown in that region would crimp deliveries to a supplier in another region. Control towers that track skills across organizations and ecosystems could align availability with demand and prescribe precisely where new skills might be needed now, and in the future.

Quantum computing could take situational optimization to a whole new level. Consider a logistics problem that includes 50 items. Arranging the choices in optimal order involves 30,414,093,201,713,378,043,612,608,166,064,768,844,377,641,568,960,512,000,000,000,000 possible combinations. Historically, humans made these types of decisions based on intuition or prior experience. Calculating the most cost-effective sequence would take years on a supercomputer, and even then, the answer would be an approximation. Quantum computing could potentially perform that task in minutes.

By closing information gaps, real-time insights from control towers—AI-enabled today, quantum-enabled tomorrow—help leaders “see around corners,” and develop something akin to foresight.
Action guide

**Market-making Business Platforms**

1. **Double down on Big Bets**
   Decide which platforms create differentiating advantage at your core and align your organization’s data, skills, and investments to rapidly scale and sustain the platform’s ongoing evolution.
   - Rediscover your core and expand market opportunities by tapping into new data sources and ecosystem partners to curate new offerings and experiences for customers, partners, and employees.
   - Choose platform types aligned to your capabilities, including your ability to orchestrate data and also relationships across your ecosystem while remaining open to change.
   - Sustain platforms by prioritizing investments and resource allocation (for current and future advantage), including joint ventures and partnership choices to build out your ecosystem over multiple years.

2. **Create a new business blueprint**
   Embed governance in a more open and transparent business architecture to enable rules, inform decisions made at the edge, and allow for the rapid reconfiguration of organizational components to create a new operating model.
   - Establish a master plan that documents the current and future states of business and IT architecture to identify investment priorities and reallocate resources, including how to enable more open ecosystem connectivity.
   - Codify big rules and governance to create new value by coordinating activities and collaborating across an ecosystem that is as open as possible.
   - Create a new meeting architecture for decisions and decision rights that are automated and also pushed down and to the edge of the organization, enabled by new flows of data.

3. **Orchestrate compelling change**
   Establish control towers to monitor early warning indicators, orchestrate change in real time and develop iterative and proactive change management.
   - Initiate next-generation change management that is fast, frequent and iterative and built on the need to continuously refresh data, skills and workflows.
   - Establish control towers for real-time visibility and monitoring of the constant and concurrent change of the many moving parts, including AIs, apps, microservices, and automated activities.
   - Engineer control towers with deep intelligence and security to proactively de-risk the overall transformation and predict next best actions and outcomes.
Chapter 2

Intelligent Workflows

Market-making Business Platforms will stand or fall on the intelligence and innovation of the workflows that underpin them. As new end-to-end process models are knitted together through the power of exponential technologies and fresh combinations of data, higher customer expectations will be met, pain points will be eradicated, and greater economic outcomes will result.

Targeting, shaping, and building these Intelligent Workflows and the skills that surround them will become the core focus of the agile teams in organizations as they realize new value and experiences.
Introduction

Customer expectations keep rising. Today, customers expect seamless experiences across all the channels of an organization. Tomorrow, customers will demand seamless experiences across organizations connected on platforms.

Intelligent workflows, augmented by AI and infused with a range of other exponential technologies (automation, blockchain, IoT, 5G, and edge computing) at scale, underpin business platforms’ capacity to deliver exceptional differentiated outcomes. AI combined with blockchain can capture information at the source and then route it to ecosystem partners for action. When a customer submits an insurance claim, for example, it could trigger requests across the platform ecosystem, scheduling a repair request and other notifications, and even negotiate and issue payments.

The expectation for seamless experiences isn’t confined to customers. An organization’s entire ecosystem—its business partners and suppliers as well as its own employees—has come to value just-in-time optimization and proactive responses. For enterprise operations, seamless means the synchronous flow of abundant and real-time data.

Intelligent workflows enabled by AI and the IoT, for example, can detect everything happening around them, from the movement of a person or a piece of equipment, to inventory turns or downed power lines. Organizations that quickly detect changes in the environment can optimize workflows for situational awareness, including the unexpected. Trucks could balance their own loads to automated demand. Sales forecasting could drive real-time supply adjustments on the factory floor.

We see intelligent workflows leveraging data and enabling expertise, as the key focus and starting points for market-making platforms.

These intelligent workflows are driven by the needs of customers (both external and internal) and deliver enhanced business outcomes in terms of value, cost, and experience. As such, they are more expansive than processes and straddle organizations and siloes. In fact, they are born from the shattering of existing processes, and the reassembly of end-to-end workflows.

Self-aware operations

Workflows are made intelligent by the application at scale of a combination of exponential technologies that transform the process effectiveness and allow value to be mined from data. And as organizations learn to contextualize data for better customer engagement, they’ve now begun to adopt a similar approach for domain- and industry-specific operations (see Figure 1).

These new agile workflows can even become the inspiration for new business models. With just-in-time and predictive optimization, real breakthroughs become possible, from the end of waste, whether it’s errors or inventory, to the automation of fully dynamic processes.

Few organizations allow machines to make decisions—to act with some autonomy. With AI, machines can learn from patterns and trends, and recommend changes and reconfigurations to their own workflows. In this way, “intelligent automation” is ushering in the Fourth Industrial Revolution.

Figure 1

Intelligent Workflows affect all aspects of how business will be done

Domain-specific
Quote to cash, supply chain, customer service, etc.

Industry-specific
Claims processing, Know Your Customer, fraud detection, etc.
In this next generation of how organizations compete, we have seen many great examples of intelligent workflows—across the front-, middle-, and back-office:

– Cognitive Care in Banking, where, for instance, user needs are anticipated and solutions suggested

– Smart Insurance Claims in Insurance, where IoT input can validate claims, and environmental metadata can be used to quickly resolve issues (see sidebar, “Groupama Assicurazioni: Intelligent Workflows speed and improve decisions”)

– Frictionless Supply Chain Planning in the CPG industry, where stock levels are set based on upcoming events and news triggers

– Intelligent Talent Acquisition, where candidate profiles are prescreened and annotated for optimum interviewer efficacy

– Automated Procure-to-Pay, where smart blockchain contracts trigger payment based on event updates, such as movement of goods.

Groupama Assicurazioni: Intelligent Workflows speed and improve decisions

Groupama Assicurazioni, a leading motor insurer in Italy, has been offering telematics-enabled motor coverage since 2015. To take full advantage of the benefits of the data it collected and serve its customers better, it needed to develop its own solution, based on data ownership access to analytics and AI.

First, Groupama Assicurazioni needed to establish an agile, customer-oriented and innovation-driven way of working within the company. So, its subsidiary, G-Evolution, collaborated with IBM—using the IBM Garage approach—and rapidly developed an initial telematic solution supported by Watson IoT™. The solution collects data from driving behavior and combines it on a cloud-based platform with other heterogeneous data such as weather data, traffic, and individual claims data.

By using unique AI models, this data enables digitally augmented, intelligent workflows that helps the company make faster decisions in processes, such as claims handling and emergency dispatch. As data quality improves, Groupama Assicurazioni expects such processes can be further automated.

Already now, more than 25 percent of its insured vehicle portfolio consists of connected cars, leading to more intelligent and data-driven operations. Indeed, assistance costs have been reduced by 50 percent and customer care costs by 45 percent, with a simultaneous improvement in service.

Its digital journey, however, is not over. Next, the company wants to use the power of AI and the inherent benefit in its data access to transform its entire claims process, as well as introduce smart pricing options reflecting actual risk. Furthermore, the insurer is exploring how to use its capabilities to coach drivers on better, safer driving habits, making Italy’s roads safer for everyone.
The unexpected power of intelligent workflows

As we work with clients on designing intelligent workflows, we see that the act of redesign is a great way to identify which data sources and architectures are most valuable to the organization. These intelligent workflows also establish a framework for proactively reskilling the workforce to perform the new higher-value activities that the future requires.

Over the past year, we have analyzed over 200 intelligent workflow implementations in customer care, operations, finance, HR, IT, and cybersecurity to better understand how AI and other exponential technologies best work together. This analysis also revealed where they have the most impact (for an example, see Figure 2).

Figure 2

Progression path for customer care in a bank

As organizations grow their capabilities, AI and other exponential technologies can materially impact the intelligence of workflows.
Our analysis proved that, compared to strong traditional execution, strong execution with AI and exponential technologies typically yields three times more benefits (see Figure 3). More importantly, these intelligent workflows lead to unique, valuable, and convincing customer, process, and competitive benefits.

From this work, we have learned that state-of-the-art intelligent workflows share key characteristics:

- Increasingly, customer-facing workflows are humanized, as well as automated, end-to-end
- Adaptive operational processes and workflows continuously learn and become self-aware in context
- Platform workflows are open and able to span entire ecosystem networks.

Figure 3
Impact of Intelligent Workflows
Our analyses of real cases demonstrate the clear benefits of implementing intelligent workflows.

<table>
<thead>
<tr>
<th>Cognitive + Business as usual execution</th>
<th>Cognitive + Strong execution (AI and exponential technologies)</th>
</tr>
</thead>
<tbody>
<tr>
<td>3X Benefits</td>
<td></td>
</tr>
</tbody>
</table>

| Status quo                                                                 |
| Basic technology + Business as usual execution | Cognitive + Strong execution |
| X Benefits (e.g., cost savings)                  |                              |

Source: IBM analysis

The principle of openness
Intelligent workflows will be underpinned and brought to life by “Intelligent IT and Data.” The world of cloud computing and related open architectures will be key to driving the flexibility, modularity and agility of the new end-to-end workflows.

The principle of openness is becoming increasingly critical to the architectures of an organization. This will allow platforms to be extended, as well as new applications and business areas to be connected to evolving processes and approaches. It will be important that the technology components that enable the intelligent workflows can be shared and moved as the wider environment is developed. The APIs, microservices, algorithms, and data sources that were once fragmented can now be orchestrated in loosely coupled architectures to derive repeatable value.

Data flexibility and access will be essential enablers of intelligent workflows. The workflow needs will set the agenda for what data is required and how it should be presented. Open information architectures will enable AI and IoT applications, which will increasingly be accessed over cloud infrastructures.

As workflows are transformed, the applications and infrastructure that enables them will be transformed too. This transformation will become the real value driver behind many organizations’ moves to the cloud. The ability to leverage hybrid environments—combining on-premise, private, and public cloud capabilities—to address the specific characteristics and demands of a given workflow module will be key. As the value of wider application modernization is realized, and legacy infrastructure is decommissioned, it is important to ensure that solutions are open and portable.

We can envisage the orchestration of the hybrid multicloud environments that will result from all this activity as a key layer in the control tower, which oversees the overall transformation effort. Here, too, the principle of openness will be critical.
Intelligent workflows are the starting point for market-making platforms, and a framework for reskilling and new ways of working. For that all to happen, organizations will need to:

1. **Embed exponential technologies to change ways of working**
   Apply exponential technologies to build highly dynamic and intelligent workflows that radically change how work gets done and new experiences are designed. Teams that span functional boundaries can work in parallel, iteratively, and with greater degrees of autonomy to unleash exceptional productivity and innovation.

2. **Drive value from data**
   Leverage curated data across intelligent workflows to mine the most important value pools. Establish robust governance to engender trust in your data and AI models so that decisions can be pushed out to the front lines of the organization.

3. **Deploy through hybrid multicloud**
   Adopt hybrid cloud to access data and put it to new use, house intelligent workflows, and modernize applications in a flexible, open, and de-risked manner. Use the journey to the hybrid cloud to bridge the divide between business and IT.

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**Action Area**

**Embed exponential technologies**

**Identify differentiating workflows for intelligent redesign**

Market-making Business Platforms are differentiated by and dependent on the shift from linear hidebound processes to dynamic intelligent workflows. These intelligent workflows radically change both how work gets done and how new value is realized.

Intelligent workflows by design allow teams to span functional and even organizational boundaries. They can work in parallel, iteratively, and with greater degrees of autonomy. The result is exceptional productivity, innovation, and speed to market.

To create and capture new value, organizations should first identify and target the most important workflows, those that will underpin platform success, and expose new value pools. These workflows should be defined as holistically as possible in order to pull end-to-end and front-to-back value levers. For example, a customer-care workflow in banking could integrate a front-end virtual agent to back-end activities, such as fraud detection and Know Your Customer (KYC) to resolve customer issues instantly, with substantial revenue uplift and a new customer experience.

Component Business Model analysis (a modern way of identifying strategic advantage), in combination with solid value chain analysis and benchmarking, can readily expose untapped value pools. To do so, organizations need to look first at where the bottlenecks are. For example, what’s preventing the enterprise from dynamically adjusting its pricing based on real-time market demand, or implementing a vendor-managed inventory strategy in which its suppliers assume greater responsibility? Which physical assets could an organization share—rather than own outright—to free up capital? Where is value “trapped” today due to the lack of innovation skills or reliable partners?

Teams that include external partners can help. Outsiders who often bring their own best practices with them can open eyes to new ways to modernize workflows. Quantifying multi-year benefits often reveal how much value remains out of reach by just continuing “business as usual.”
Insight: AI in the boardroom

As corporations tap AI to transform themselves into Cognitive Enterprises, one group of leaders is finding it especially crucial to get up to speed quickly: corporate Boards of Directors.

The issue is particularly critical because AI is unlike other exponential technologies. For boards, understanding its potential is important, but understanding the technology itself, and how it works, is absolutely essential. Why?

AI differs in its nature from traditional software, which, though complex, is explainable. A set of instructions governs its outcomes. Not so with AI.

AI’s greatest strength can unleash its greatest risk: it learns and, guided by algorithms, can adapt, refine, and alter its responses and decisions. It is therefore not always entirely predictable, nor easily explainable—it may not always be apparent why an AI system has reached a particular conclusion.

AI is also beholden to the data it is trained on and fed. Biased, faulty, or unreliable data will yield untoward results, potentially damaging a company’s reputation.

A recent study by the IBM Institute for Business Value (IBV) reports that more than half of the 1,250 executives surveyed believe AI actually can improve their companies’ ethical decisions. Yet, while 8 out of 10 directors believe the ethical questions raised by the deployment of AI are board-level issues, only 45 percent feel fully prepared to oversee them.

Therefore, once boards understand how AI works, they need clarity on the best way to approach its governance, how to anticipate and assess the new types of risk it creates, and how to oversee management’s definition of and adherence to AI ethical standards. For discussions with company management, boards should consider commissioning an analysis that outlines and quantifies the opportunities and threats of AI, including assessments of where, how, and why competitors are using AI.

After potentially differentiating and value-creating workflows have been identified, a new design approach is vital. In the past, processes were re-engineered; intelligent workflows, by contrast, should be reimagined. That requires a clean sheet, design-thinking approach.

To design an intelligent workflow, organizations need to view how the application of exponential technologies could change three things concurrently:

- **People**: including employees, ecosystem partners, and customers, from the perspective of the desired experience
- **Processes**: that straddle siloes, are change-tolerant, and create new value
- **Data**: framed by the need to support decisions, learning, and automation.

To reimagine the employee experience, for example, organizations might consider how more agile teams could work in parallel; employees could make more decisions on their own; or mundane tasks could be automated, freeing up employees for higher-value activities. To reconceive processes, the first step is to envision how processes could be linked and extended from outcome to starting point. For example, procurement processes that span activities from source to pay will link to functions from finance to operations or sales activities that link tasks from lead to cash to include supply chain and finance functions.

The objective isn’t just to connect processes end to end, but to infuse processes and activities with intelligence. To do so, organizations determine which insights are needed to provide more prescriptive guidance for decisions. They design for data that feeds situational awareness and enhances predictive capabilities. And they establish feedback loops to enable a two-way flow of learning among humans and machines.

Intelligent workflows are different in kind than processes. Processes function like the backbone of the organization; intelligent workflows function more like its nervous system. They are a highly sophisticated sense and respond system, extracting information from the environment, determining the appropriate response, and sending signals and feedback to the right people and other workflows at the right time (see sidebar, “Insight: How workflows align and integrate processes”).
The operative word is flow. First, the full flow of intelligence coursing through an organization’s operations and extended to its partners and customers. Second, the flow of work conducted by teams, the capacity to generate more ideas and innovation, coordinate handoffs with ease, and drastically reduce the time from prototype to market scale. Ultimately, intelligent workflows force a faster flow of value to the user, whether that user is a customer, employee, or ecosystem partner.

**Apply exponential technologies and realign skills to capture new value pools**

For decades, processes have been the focal point of the enterprise, determining how value is delivered with efficiency and quality is maintained. With the advent of exponential technologies, organizations can lift their view to capturing new value and profit pools.

Workflows become the target areas for new value realization. Exponential technologies can be tested against them to evaluate impact. First, organizations must develop a deep understanding of what exponential technologies—AI, blockchain, hybrid clouds, extended reality, IoT, and quantum computing—make possible now or in the future. In particular, boards need to appreciate the benefits, risks, and responsibilities of adopting AI (see sidebar, “Insight: AI in the boardroom”).

What happens when these technologies combine to generate contextualized and hyper-localized data, for example? Or when more things become knowable in the moment instead of long after the fact? When ecosystems can share data on blockchains while maintaining control over proprietary data, what new market-making platforms might result? Questions like these drive the ongoing design of newly dynamic intelligent workflows.

When an insurance company has the capability to curate and analyze unstructured data, for example, it could allow customers to submit a photo of damage to their home from a storm instead of filling out a lengthy form and waiting for an inspector to show up. That’s new value for the customer, but also for the organization. Agents freed from the need for in-person inspections can be redeployed to higher-value tasks or new roles. One insurer has taken it a step further. Its customers don’t have to even take and submit a photo. After a severe weather situation, the insurer is sending drones to assess its customers’ rooftops. The drone, supported by advanced AI capabilities, can determine the difference between damage to shingles caused by hail versus birds or normal wear and tear.

Finding the right combination of technologies to apply will be key. Understanding where the value pools lie along the intelligent workflow is just as critical. The first question should be: where does the value lie today and where could we create new sources of value in the future? The answer shouldn’t be confined to the value realized by the end-user or customer, but the value that could be created by all of the employees, partners, suppliers, and systems that participate in different parts of the workflow. A growing library of exponential technology benchmarks can help identify how these technologies, applied at scale, can drive business value in terms of productivity, flexibility and service (see Figure 4).

**Figure 4**

The many aspects of value from exponential technologies

AI and other technologies impact how business is done in the future.

*When deploying emerging technologies, what benefits are most important to your organization?*

<table>
<thead>
<tr>
<th>Benefit</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Increased revenue</td>
<td>54%</td>
</tr>
<tr>
<td>Improved brand reputation</td>
<td>52%</td>
</tr>
<tr>
<td>Increased product/service innovation</td>
<td>52%</td>
</tr>
<tr>
<td>Increased productivity</td>
<td>50%</td>
</tr>
<tr>
<td>Reduced costs</td>
<td>47%</td>
</tr>
<tr>
<td>Enhanced skills availability and scalability</td>
<td>44%</td>
</tr>
<tr>
<td>Improved customer service</td>
<td>43%</td>
</tr>
</tbody>
</table>

Source: IBV 2018 Global Economic Competitiveness Survey, n = 5215.
Insight: From processes to Intelligent Workflows

An organization’s approach to building out intelligent workflows is often sequential, starting with technologies applied to a single process and culminating in a multi-process, multi-functional intelligent workflows.

1. Technology-enabled process improvements

For example, an organization might begin by applying AI to a single process such as accounts payable to automate processes consist of organizational tasks and activities, typically within a function, such as accounts payable within the finance function or lead management within sales. Traditionally, these processes have been siloed and left independent of one another, limiting their efficacy, while also leaving improvement opportunities untapped.

Workflows, by contrast, encompass related processes and often cross both process and functional silos. They align with external or internal customer needs and enable clear, measurable, and improved outcomes from visibility into all related processes. Exponential technologies are applied in an integrated manner to the processes that sit along a workflow and data is shared across all processes.

Intelligent workflows connect the front of the organization to the back, create more effective end-to-end experiences, and learn from data, then improve themselves based on feedback. They are important for the experiential and economic value they create, but also for the opportunity to facilitate flexibility and de-risk an organization.

Intelligent Workflow stages

Stages as organizations move from singular processes to end-to-end intelligent workflows.

<table>
<thead>
<tr>
<th>Stage</th>
<th>Technology-enabled process improvements</th>
<th>Multi-process or single function intelligent workflows</th>
<th>Multifunction or business platform-centric intelligent workflows</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Individual process within a single function, not connected throughout organization</td>
<td>Set of interconnected processes spanning one horizontal or industry specific function</td>
<td>Set of end to end processes spanning front to back, across horizontal or industry specific functions</td>
</tr>
</tbody>
</table>
| Examples: Customer workflows | - Target prospecting  
- Sales cycle management  
- Loyalty program | - Customer acquisition  
- Customer engagement  
- Customer retention | Examples: Multifunctional intelligent workflows |
| Examples: Supply chain workflows | - Supply chain design  
- Strategic sourcing  
- Inbound processing | - Supply chain planning  
- Supply chain warehousing  
- Transportation process | - Integrated customer care  
- Lead to cash  
- Source to pay  
- Plan to fulfillment |
| Examples: Finance workflows | - Accounts receivable  
- Budgeting/forecasting  
- Expense management | - Order-to-cash  
- Financial planning and analysis  
- Record to analyze | - Integrated business planning  
- Strategic planning and supply chain optimization  
- Talent planning and management |
As organizations test the impact of exponential technologies, they must take into account what data and applications are available to transform the intelligent workflow. Of equal importance will be a detailed understanding of how the workforce and the pools of expertise (both human and machine) are aligned along the workflow. For example, where skills or expertise are in short supply at different points in the workflow, bottlenecks are likely to emerge and handoffs to break down. If the promise to the customer is a personalized experience but the organizations’ AI systems can’t ingest data across the enterprise, the promise isn’t likely to be realized.

These assessments should lead to an intelligent workflow blueprint, which establishes the business case opportunity and priority areas to address (see Figure 5). This is essential for the move from indiscriminate experimentation with exponential technologies to a more focused and sustained investment in game-changing capabilities (see Figure 6 on page 40). The beauty of blueprints is that they open up new vistas, ways to see and then build out new value from intelligent workflows.

By aligning current capabilities—assets, skills, and technologies—across the workflow, blueprints can determine the organization’s priorities. Where skills are in short supply, for example, the priority might be which tasks in the workflow can become pass-through activities automated by technology, freeing up talent to take on new roles.

With a blueprint at hand, leaders can scan their organization to determine what new skills and new roles are needed, where reskilling and upskilling might be required (see sidebar, “IBM Human Resources: Using AI to better understand—and grow—a team’s skills” on page 40). They can decide where to standardize or shift parts of the workflow to business processes as a service (BPAAS) and redirect investments to more differentiating workflows.

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**Figure 5**

**Intelligent Workflow blueprint**

Blueprints establish the business case opportunity and important areas to address.

<table>
<thead>
<tr>
<th>Customer value</th>
<th>Workforce and Skills</th>
<th>Workforce and Skills</th>
<th>Enterprise value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>AI</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Impact/value</td>
<td>- Sequence</td>
<td>- Impact/value</td>
<td>- Sequence</td>
</tr>
<tr>
<td>- Sequence</td>
<td>- Architecture</td>
<td>- Sequence</td>
<td>- Architecture</td>
</tr>
<tr>
<td>- Architecture</td>
<td>- Data requirements</td>
<td>- Architecture</td>
<td>- Data requirements</td>
</tr>
</tbody>
</table>

---
IBM Human Resources: Using AI to better understand—and grow—a team’s skills

The rapid evolution of technologies means half of what we learn will become obsolete or forgotten in five years.³
And over the next three years, as many as 120 million workers in the world’s 12 largest economies may need to be retrained or reskilled as a result of AI and intelligent automation—a set of interesting challenges for any Human Resources (HR) function.⁶

The IBM HR function concluded that, to meet these challenges, it needed to put skills at the center of the employee journey so employees could thrive in a culture of continuous learning. To do this, the function is using exponential technologies to create more intelligent workflows.

Understanding the skills the company has was a critical first step. Skills inference technology powered by AI now ingests over 230 million documents and 22 data sources (at 85 percent accuracy) and is fully transparent to employees. In fact, inference learns from employee feedback.

AI-enabled skills inference also fuels personalized learning recommendations via the IBM Your Learning platform, which is used by 98 percent of IBMers every quarter. Employees can easily find personalized learning as well as job recommendations based on their skills and access the most popular material based on their peers’ experiences. They can also register for targeted learning channels, and explore the skills and badges aligned to IBM’s in-demand roles.

Aggregate employee information also helps HR and business leaders see progress toward closing skill gaps in a business unit so it can respond to emerging needs. Understanding clearly each employee’s skills enables IBM to reward employees appropriately for acquired critical skills. Each manager receives personalized pay recommendations based on an accurate understanding of the skills of the team, in addition to pay competitiveness, performance, and potential.

To compete for and cultivate talent, IBM is using AI to make its employee journey more engaging and differentiated. Over the past four years, this has led to an 18 percent increase in engagement and USD 100 million net benefit per year from advanced analytics and AI solutions.

Deliver scalable and flexible workflows in “building blocks”

Wherever possible, intelligent workflow design should be “open” to allow for future organizational or ecosystem extensions. On market-making business platforms, organizations need to be able to scale with speed and change course with ease. Their workflows can’t lock them in to only one way of doing things. When one part of a workflow is redesigned, the upstream or downstream components shouldn’t become out of sync.

New end-to-end intelligent workflows needn’t be—shouldn’t be—a monolithic proposition. They can be composed as modular workflows in much the same way app developers combine “containerized” micro-services. That means they are designed to be open, extensible, and scalable. They are also portable; they can be easily deployed to a wide variety of environments and any cloud without modification. In this way, they’re not only change-tolerant or future-proofed, but also easier to implement on market-making business platforms.

Figure 6

Ahead of the curve

Leaders expect to excel at next-generation exponential technologies.

High ROI expected in the future from exponential technologies

440% more 54%

Leaders
Aspirationals

By putting in place the right “packages” of technology, people, and data as intelligent workflows, organizations can create new building blocks of value, which are then developed and deployed by teams in agile sprints (see sidebar, “Medtronic: Building talent by building a better employee experience”).

Approached as modular workflows, options to balance cost with investments and reconfigure intelligent workflows for differentiation multiply. Organizations can standardize some activities for cost take-out and efficiency, or choose to consume those activities as a service. They can also choose to differentiate these more standardized workflows by layering innovative and proprietary modular workflows across them.

A more standardized order to fulfillment workflow, for example, could be differentiated by a modular workflow that solves a classic “last-mile” challenge such as order expediting. With AI applied to customer and logistics data on a blockchain, IoT sensors monitoring all kinds of environmental conditions, and mobile apps sending up-to-date information to truck drivers—all connected across an intelligent workflow—delivery windows could be measured in minutes or orders routed in the moment to wherever the customer wants.

The choices organizations make about both their enterprise and IT architectures will be important to the scaling and compatibility of modular workflows. These choices include market-making business platforms that are as open as possible, hybrid clouds for the seamless flow of data and access to exponential technologies, and an agile culture to move with speed from beta prototypes to industrial-strength scale.

Intelligent workflows deployed across open architectures underpin the creation of new value on platforms. The result is a shift from linear, siloed processes and hierarchical, bureaucratic organizational structures to new ways of working that are highly dynamic and open to constant change. With humans and systems newly able to learn on the go, new value will be discovered in the flow.

Medtronic: Building talent by building a better employee experience

Medtronic, headquartered in the Republic of Ireland, is the world’s largest medical device company. It is engaging in a comprehensive cognitive transformation project to prepare for future challenges. The HR organization was one of the first functional areas to engage in the cognitive transformation.

To tackle some of the world’s most challenging diseases, you must have and empower the right talent. So, Medtronic decided to use the IBM Garage approach to assemble the right people, technology, and data to transform its employee experience.

The HR Garage introduced agile and lean startup approaches, as well as enterprise design thinking, to introduce new ways of working within the HR organization. This new, innovation-driven culture enabled Medtronic HR to start recreating its service offering with a strong focus on the value it generated for end-users.

Within just 90 days, Medtronic was able to identify 17 HR use cases, conduct two AI-enabled proofs of concept, and develop an MVP. A key objective of the initial use cases was to assist managers with HR tasks and free up time. The first MVP consisted of a chatbot to help employees find answers to common HR-related questions.

Medtronic’s cognitive HR transformation now covers more than 17 areas of innovation, with an expected multimillion-dollar payback. Medtronic also expects it to improve customer satisfaction and help with employee retention.

Importantly, these “building blocks of value”—people, technology and data—have introduced new innovation competencies into Medtronic’s HR function. So, it is now expanding the competencies across other functions and moving from employee experience-led design within HR to human experience-led design across its organization.
Action Area

Drive value from data

Create new paths to value

Data may not be on a company’s balance sheet, but it is the currency that generates outsized returns on market-making business platforms and, as it is infused in intelligent workflows, ignites new value.

As IoT sensors spew out zettabytes of new data at a startling pace and, as more organizations adopt AI to convert data to insights, data is fueling new economies—the API and the circular economy, to name just two. Cities, countries, and whole regions are focused on how they can best help their constituencies harness data to drive economic growth and competitive advantage. To provide real value, organizations must focus on data that makes a difference, have it readily available when and where needed, and confirm its trustworthiness (see Figure 7).

Incumbents already steeped in data from decades of operations are taking advantage of newly available external data sources to exploit new value pools. They’re combining internal and external data to create hyper-localized data to do things like individualize pricing, optimize crop yields, and forecast on the fly. They’re pulling data from cars on the road, oil rigs at sea, and refrigerators at home to anticipate what their customers need in the moment and employees should do next.

Figure 7

Data value factors

The value of exponential technologies rests on the accessibility and quality of the underlying data.

<table>
<thead>
<tr>
<th>AI</th>
<th>IoT</th>
<th>Blockchain</th>
</tr>
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<tbody>
<tr>
<td></td>
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</table>

Data Value/Focus

Data Access/Readiness

Data Trust/Absence of Bias

Figure 8

Platforms expand the value of data

A majority of executives agree that data generates more value in a platform than a traditional business model.

![Data Value Factors Chart]

Disagree
Neither agree nor disagree

Agree 64%

13%

23%

Source: IBV Platform Economy study, n = 1670 total.

Data, held close and kept proprietary, has long been the incumbent’s advantage. As new business models on platforms emerge, data shared across platforms is one of the surest ways to create the network effects and winner-take-most status these platforms can confer (see Figure 8).

Unlike most assets, data is non-rivalrous, meaning the same piece of data can be utilized by any number of organizations to produce value. Moreover, the value generated by data grows exponentially when one dataset is combined with another. This is pulling organizations in opposing directions—between maintaining the proprietary advantage of their data versus sharing it widely across organizations.

Most organizations have yet to resolve this tension. Just 37 percent of more than 13,000 executives participating in the Global C-suite Study are acquiring and sharing data extensively with network partners. Not surprisingly, the leading organizations are more apt to do so, but even that number—56 percent—is relatively low, given the leaders’ intentions for new business models and platforms.
What’s holding so many back? In the words of a US telecommunications CIO, companies are just beginning to learn how to “thrive through transparency while maintaining a strategic advantage.”

To leverage the new economics of data, each organization will need to evaluate which of its datasets should remain proprietary and which are made up of data that could be shared to accrue new value. Moreover, organizations will have to determine where proprietary data creates a current, but transient, advantage and then assess whether sharing that same data could create a superior future advantage.

Governments have turned their eyes to the value of sharing data as well. They’re eager to encourage wider data sharing so they can grow their country’s GDP, jumpstart innovation, and contribute to the public good. In the EU, for example, banks are required to share some of their transactional data with other organizations—when their customers consent. Many incumbents aren’t grumbling; instead, their eyes are on a new “open banking” future. Some have established open API platforms to monetize the data they hold. Digital startups once seen as competitors are becoming their partners of choice in new ventures.

At the same time, changing consumer sentiment about personal data is leading to regulations that create an alarming possibility: the sudden scarcity of business and consumer data. Digital trails are disappearing as customer consent for cookies is mandated. Personal data already in an organization’s custody is being purged on demand. Many are concerned that third-party consumer data, beset by new regulations, may quickly dry up.

No organization is immune to the prospect of data scarcity, but some are better at preparing for it. In our Global C-suite Study, 82 percent of leading organizations—those that excel at extracting value from data—have a singular focus on how they use and safeguard data to strengthen customer trust. Organizations that do earn the trust of their customers are more likely to keep the data they have—their customers won’t ask them to purge it—and collect more of it in the future. At the same time, 56 percent of these leading companies have developed the capacity to share data across ecosystems. Leading organizations are learning to share data liberally without giving away their competitive edge.

Provide the right data to support decisions

Intelligent workflows are predicated on the ability of employees to make timely bias-free decisions. Data readiness, which includes the accuracy, cleanliness, and curation of data, becomes a precondition.

Data scientists spend an inordinate amount of time preparing, validating, and cleansing data sources before they can train their data models on them. They spend a surprisingly small amount of their time designing the AI models that convert data to value. It’s estimated that 80 percent of the effort in deploying AI involves getting data ready for use. New capabilities such as DataOps can automate the preparatory work required for quality assurance, freeing up data scientists to spend time on data models and information architecture.

AI needs an information architecture that is based upon the principles of “hunting” for the right data to meet a workflow need. Organizations recognize that it’s no longer sufficient to pour all their data into a data lake, or swamp, and expect everyone to go fishing in hope of finding some insight. Instead, they must curate data as part of an intelligent workflow, ensuring that permissioned data is always available for the right person at the moment of need.

Information architecture, a conceptual representation of how data assets will be organized, makes data visible—and usable—across the entire enterprise. It guides how data will be maintained and governed, including the standards and permissions necessary to easily integrate and curate datasets. It should be founded on the concept that while intelligent workflows will change with frequency, the foundational data architecture underpinning them should be stable, even as specific data needs may evolve.

Three quarters of the leading organizations in the Global C-suite Study recognize something that others don’t. Employees don’t just need new skills to be comfortable working with data; they need new tools. Woodside Energy, the pioneer of the liquefied natural gas industry in Australia, has made data-for-everyone its mission. The company has created a “citizen science platform” that anyone, even those who can’t code, can use for oil and gas exploration. Employees can use drag-and-drop algorithms and other visualization options to discover new patterns when looking at data.
“We want all our great minds tapping into data because each one will look at things differently,” says Woodside Chief Digital Officer, Shelley Kalms. “We’re aiming for a ‘learn-it’ mindset, rather than a ‘know-it-all’ mindset. We’re trying to unlock the collective intelligence of our organization by bringing the data, information, and insights together to improve our operations and the working lives of our people.”14

The right data tools, including real-time visualization tools, can now make citizen-scientists of us all (see sidebar, “Discovery Holdings: Giving people the data they need to be healthy”).

Establish trust in enterprise-wide data through AI governance and ethics

Customers and employees alike are being asked to put their trust in AI-derived insights and answers. For that to happen, they will need assurances that bias in AI models has been mitigated. AI-enabled answers delivered along intelligent workflows must also be explainable. That means answers are offered with evidence, a transparent explainable path back to how the algorithm arrived at the answer.

Governance, the rules for the collection, usage, sharing, and protection of data, becomes even more critical as organizations adopt AI, which can only be as effective as the data upon which it is based. Governance includes uncovering the cognitive bias, which sometimes gets baked into AI models because of the data it uses.

The sheer complexity of identifying and eliminating each piece of potentially biased data makes the process an excellent candidate for automation. Organizations are learning to train the models themselves to recognize and automatically suppress biased data. Most organizations are learning to master the basics of mitigating bias in AI models, but have yet to develop guiding principles that frame how AI should be responsibly and ethically used.

Data requires a code, and so do ethics. AI ethical guide bars should influence how products and services are developed. When developing a voice-enabled concierge in a hotel room, for example, AI ethics attuned to privacy would help teams design it to record continuously while deleting that data every five seconds.

Discovery Holdings: Giving people the data they need to be healthy

Trust and data form the twin strands of Discovery Holdings’ corporate DNA. The South African financial services firm started in 1992 with what was then a completely novel idea: provide health insurance that makes people healthier. Customers who sign up with its Vitality program agree to let Discovery track everything from their physical activity to their nutrition. In return, the company rewards those who make positive lifestyle changes. The more points they earn, the more perks they get and the lower the premiums they pay.

Discovery mines members’ personal data for behavioral insights, which it uses to promote healthier choices. It also collaborates with other organizations to offer incentives. Under one such agreement with Apple and US insurer John Hancock (a division of Manulife), Vitality members can buy heavily discounted Apple Watches. They pay a modest upfront fee and, if they work out often enough each month, they pay nothing more.

“So Apple sells more watches, and we obtain more data [from the health and fitness apps on the watches],” Derek Wilcocks, Discovery’s CIO, explains. That’s the demand side of the company’s business model. On the supply side, Discovery operates a joint venture with Australian fintech Quantium, using machine learning to extract clinical insights from blinded data and enable healthcare providers to make more informed decisions.

Discovery’s approach rests on treating its customers with complete probity. “We collect highly sensitive data. In South Africa, for example, we have about 65,000 members on antiretroviral treatments for HIV. That’s not something people would want to get out,” Derek Wilcocks notes. “So, we’ve established a strong ethical foundation for the way we collect and use data. We go to great lengths to protect our customers’ confidentiality. Trust is at the heart of what we do.”15
Customers demand transparency of data associated with products and services and, in the case of personal data, assurances that it’s used in a fair manner and kept safe. Their purchase decisions depend on detailed product information: data about how products are manufactured and under what conditions, reviews from users and influencers, accreditations from third parties, and more. This demand for transparency extends across intelligent workflows. Partners in a supply chain rely on transparently shared data to eliminate blind spots and bottlenecks, as well as advanced capabilities such as just-in-time replenishment.

The transparency conferred on blockchains helps organizations prove their credentials. On blockchain networks, organizations can document the brand promise in detail. For example, a blockchain-based business platform that traces the provenance of coffee—supporting its sustainability claims as it moves from farm to factory to corner store—has trust built into its fabric.

If transparency must be proved, reciprocity must be earned. Simply put, to secure access to personal data, organizations will have to give their customers something meaningful in return. The challenge? They often don’t know what their customers would consider a fair exchange. According to one recent consumer survey, the promise of personalization alone may not be enough to make them share their data.

The third principle, accountability, is synonymous with brand integrity. This covers a commitment to data security and respect for data privacy. Consumers choose brands as one of the most important factors to guide their purchase decisions. According to the 2019 Edelman Trust Barometer, 81 percent of consumers say they “must be able to trust the brand to do what is right.” And in that same research, trust in brands has continued to fall while expectations of social responsibility are on the rise. Accountability, in the form of social impact, goes a long way to engendering customer trust and attracting talent to the organization.

As organizations are learning, data is your currency, but trust is the key to accessing more of it and unlocking its full value.
Deploy through hybrid multicloud

Design for dynamic orchestration with hybrid multiclouds

It would be hard to find an organization that isn’t already operating on the cloud—or, to be precise, more than one cloud. According to a recent IBV survey, 85 percent of organizations have already installed multiple clouds to manage their workloads. On average, most organizations have at least five clouds that are needed for particular applications. And if they don’t have a hybrid multicloud environment, that’s a challenge.

Without that, the more clouds they add, the harder it becomes to operate at the required speed of change. As they add a new service, reengineer a process, or take on a new business partner, instead of a seamless move to a cloud, they hit a brick wall. Sending data, workloads, and apps from one cloud to another creates an operational complexity that defies the ability of their teams to manage, let alone optimize. And as many have found, higher-than-anticipated costs are too often the result.

Instead of eliminating data siloes, multiple cloud environments may create new ones. Moreover, intelligent workflows could be stalled at the gate. To circumvent issues such as these, the Cognitive Enterprise will be enabled by hybrid multicloud infrastructure and applications. Hybrid clouds link the many public and private clouds with on-premise IT systems so that data and workflows can move seamlessly among them. Organizations can access data from multiple disparate platforms and run applications across them, aligned under common policy requirements for security, regulatory compliance, and governance.

The next generation of ERP systems will act as a backbone for Cognitive Enterprises, on top of which other technology-specific clouds add elements to bring intelligent workflows to life (see Figure 11).

As organizations evolve to become Cognitive Enterprises, they’re likely to operate on a series of market-making platforms, some of which they own and operate; others they participate in. Increasingly, their intelligent workflows won’t just span the enterprise, front to back, but their ecosystems end-to-end. As this occurs, their clouds will have to be interoperable with the clouds of other organizations.
Modernize legacy and deploy new applications with open and agile principles

Hybrid clouds are where legacy systems accelerate the journey to modernization, achieve scale, and extend across an enterprise through APIs and software-as-a-service. As they do, data becomes seamlessly available, AI can achieve scale, and workflows can become more intelligent.

Legacy and new applications need to be evaluated on a case-by-case basis on where they should be housed—on-premise, private, or public cloud environments. As they make choices, organizations need to take architectural standards into consideration.

For market-making business platforms to be composable and intelligent workflows to be dynamic, organizations will want to leave their options open, including open to their ecosystems. Open platforms and open software support portability, interoperability, and getting to scale. They prevent a single provider from dictating ways of working. Container technologies, such as those from Red Hat, will be the “middleware of change.” They allow new applications to be built and legacy applications to be modernized with lower risk in a flexible, open manner.

Microservices allow applications to be broken down into single-use services—such as inventory, shipping and accounting for an online retailer—so that teams can work on them in parallel. Containers bundle those microservices in such a way that they are portable. They can be easily automated and deployed to any cloud without modification. This enables the organization to move their applications and data as their ecosystem evolves and extend them with ease to participants on their market-making platforms.

To retain optimum flexibility in a hybrid cloud environment, organizations should implement an orchestration layer to sit over the clouds as part of its control tower. With an orchestration layer, organizations can monitor status in real time, make visible the connections that have already been made, and make decisions about where the cloud environment needs to be optimized, scaled, or made more open.

A hybrid strategy unleashes the full value of clouds: By our estimates, it adds up to 2.5 times more value than a public-cloud-only strategy. That value runs the gamut, including the ability to migrate more applications, remove duplicative processes, enhance cyber security, and reduce regulatory risks (see Figure 12).

Figure 12

Hybrid multicloud elements of value

Next generation cloud unlocks new layers of value.

<table>
<thead>
<tr>
<th>Strategic drivers</th>
<th>66%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reduce operating costs</td>
<td></td>
</tr>
<tr>
<td>Improve customer experience</td>
<td></td>
</tr>
<tr>
<td>Create/support new business models</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Operational drivers</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Reduce operating costs</td>
<td>66%</td>
</tr>
<tr>
<td>Deliver a self-service customer experience</td>
<td>68%</td>
</tr>
<tr>
<td>Provide executives with visibility, governance, and control</td>
<td>57%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Infrastructure drivers</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Cut infrastructure costs</td>
<td>65%</td>
</tr>
<tr>
<td>Avoid vendor lock-in</td>
<td>59%</td>
</tr>
<tr>
<td>Improve latency</td>
<td>59%</td>
</tr>
</tbody>
</table>

Source: IBV Assembling your cloud orchestra study, n = 970. Percentages reflect respondents who consider a driver to be important or very important.
Use the journey to the cloud as an opportunity for reinvention

As pervasive as cloud is, about 80 percent of enterprise workloads have yet to be migrated to the cloud.15 The critical work—and often, the movement of the most critical workloads—lies ahead. This includes activities that require much stricter controls for privacy and security and are intermingled with data within multiple applications.

Security-dependent applications, such as customer databases, transaction processing, finance and accounting, supply chain, and manufacturing not yet on the cloud but integral to intelligent workflows will need to be linked in agile hybrid architecture.

Also, there are business cases for change that include intelligent workflow re-engineering—with the attendant savings and added value—combined with application renewal and new delivery models all on hybrid cloud architectures. Tangibly, this results in decommissioning legacy applications and systems, thus avoiding the cost of maintaining solutions that are no longer fit for service.

As organizations shift new workloads to the cloud, they have an opportunity to also change the way they work. Namely, business and IT will need to work together and align the governance of cloud environments with the governance of changes needed to deploy intelligent workflows and reskill employees continuously. Intuitive tools and platforms on the cloud will enable employees in the business functions to team with IT personnel in agile squads to build out new workflows and other capabilities, including new ways to monetize their data.

Hybrid multiclouds also allow enterprises to monetize their data by becoming cloud providers, too. For example, a business that holds customer loyalty data in a private cloud would be able to responsibly and selectively share that data with vendors managing loyalty programs. Organizations that operate business platforms can turn valuable permissioned data into new cloud-based services available to others.

As technology and business become synonymous, the barriers between the governance of IT and the governance of business will become blurred. IT governance will need to become more sensitive to business issues such as data privacy and AI ethics, not to mention even more tightly aligned with business strategy. And the business function will need to be more open to and aware of technology considerations like cybersecurity and architectural standards. As such, the role of CIOs will change to become more collaborative and new coalitions across the C-suite will need to become accountable for technology enablement.

At the same time, governance must be strictly managed through an operating model clear to all parties from the various groups involved. This needs to include elements such as cloud strategy, processes and tools, competencies and skills, deployment, performance management and, especially, organization and culture, which defines the specific interactions between units and team members—all managed via the control tower.
Action guide

*Intelligent Workflows*

1. **Embed exponential technologies to change ways of working**

   Apply exponential technologies to build highly dynamic and intelligent workflows that radically change how work gets done and pull value levers to create significant new outcomes, both economic and experiential.

   - Identify differentiating workflows for intelligent redesign, to connect processes end to end, straddle siloes and infuse data and skills to unleash exceptional productivity and innovation.

   - Apply exponential technologies and realign skills to capture new value pools by mapping skills, assets, and technologies across workflows to determine priorities for automation, standardization, and differentiation.

   - Deliver scalable and flexible workflows in “building blocks” composed of people, processes, and data so that you can build out rapidly and keep upstream and downstream components in sync.

2. **Drive value from data**

   Leverage curated data across intelligent workflows to mine the most important value pools. Establish robust governance to engender trust in your data and AI models so that decisions can be pushed out to the front lines of the organization.

   - Create new paths to value from data by understanding what data should be more widely shared—with permission—to ecosystem partners to accrue new value and create future advantage.

   - Make the right data available to support decisions by implementing an information architecture that automates data readiness and tools that make data accessible to everyone.

   - Establish robust enterprise-wide data and AI governance and ethics to mitigate bias, engender trust in AI-derived insights and answers, and use AI responsibly and ethically.

3. **Deploy through hybrid multicloud**

   Adopt hybrid cloud to access data and put it to new use, house intelligent workflows and modernize applications in a flexible, open and de-risked manner. Use the journey to the hybrid cloud to bridge the divide between business and IT.

   - Design for dynamic orchestration with hybrid clouds to operate at the speed of change, eliminate data siloes that could gate intelligent workflows and house the exponential technologies that differentiate them.

   - Modernize legacy and deploy new applications with open and agile principles including microservices and containers that port applications to any cloud environment.

   - Use the journey to the cloud as an opportunity for reinvention of intelligent workflows, with business and IT working in tandem to innovate while they shift work to the cloud.
Chapter 3

Enterprise Experience and Humanity

With so much change underway, organizations are redoubling their efforts to stay focused on what matters—understanding and responding to the whole human being, whether that person is their customer, employee, or ecosystem partner.

As exponential technologies become pervasive, the next great opportunity becomes the opportunity to elevate the work and skills of employees, to meet their aspirations and values, along with those of your customers and partners. This new enterprise experience has the potential to infuse fresh purpose into every endeavor.
Introduction

Technology, once a source of efficiency, has turned a corner, ushering in an era of intense personalization. Whatever technology now makes possible—including intelligent workflows and market-making platforms—will only succeed if it is conceived and designed for its impact on enriching the lives of humans.

Organizations that have learned to delight and engage customers by curating rich customer experiences now recognize the need to do so as well for the experiences of their employees, their business partners, or ecosystem, all linked in one continuum. We think of this as the enterprise experience.

This raises the bar for expectations around the personal touch, human relationships, creativity, and empathy—qualities that allow companies to stand out. It raises the bar as well on what organizations can do—should do—to enrich the societies in which they operate.

The advent of AI and deep learning enhances the view. Many of the environmental and societal challenges that once seemed intractable can now be mitigated—if organizations and the people who lead them commit to intelligent action and unite with their partners in common purpose.

Humans and AI at work

The interplay between people and AI, also known as augmented intelligence, resets organizations’ expectations for what they can do. Bots, once relegated to online self-service customers, are now becoming trusted advisors to employees. They can help humans better interpret customer needs anywhere so more empathetic decisions are made on the front lines and in the moment, whether for a salesperson on a shop floor, a customer service rep in a call center, or a procurement specialist (see sidebar, “Crédit Mutuel: AI helping smarter agents make happier customers”).

Augmented reality and touchscreens are transforming storefronts. Virtual and augmented reality apps are creating immersive environments to build and maintain airplane engines, monitor agricultural fields from afar, and meet with customers in virtual showrooms.

Crédit Mutuel: AI helping smarter agents make happier customers

Crédit Mutuel, one of France’s leading banks, has over 5,000 branches that receive more than 350,000 online inquiries a day—and volume is growing 23 percent a year. Last year, Crédit Mutuel announced a digital reinvention, partnering with IBM, to better serve 12 million customers.

To consolidate its position as number one in customer relations for the banking sector in France, it continued to reinvent the role of client advisor by empowering them with AI to free up time. The bank set a bold strategy to infuse AI across all lines of business, positioning itself as the benchmark for relational banking in a digital world.

Crédit Mutuel launched several AI projects, including an email analyzer to manage high email volumes and a virtual assistant to decrease customer advisor response time. Customer advisors handle 1,000 customers across 400 product lines. The cognitive email solution analyzes 6 million emails per month and detects customer intent with more than 80 percent accuracy, enabling advisors to execute up to 1.5 million subsequent actions. Due to this, the bank reassigns 200,000 working days annually toward training, upgrading advisors’ skills, and expanding sales activities. The pilots validated that AI technology could empower 20,000 employees across 5,000 branches, strengthening the human-technology relationship.

Nicolas Thery, chairman at Crédit Mutuel stated, “As a mutual bank with a strong local presence all over the country, we continue to invest in our branches to help advisors deliver more personal relationships with our clients. AI is a perfect working partner to assist our professionals, augment their service quality and help them bring more value to clients.”

Crédit Mutuel also established a cognitive factory that provides a fertile environment for identifying, building, and deploying new AI solutions. With many internal IT teams involved, IBM and Crédit Mutuel are creating industrial tools and training assets to efficiently expand cognitive solutions to 100 percent of the business lines of the company. Crédit Mutuel has now successfully launched 15 cognitive assistants across various lines of business, including a virtual assistant able to provide 15,000 different answers in nine business domains, from Savings and Credit to Insurance. This allows client advisors to find the right answers to most customer questions three times faster than previously and with much higher precision.
Counterintuitively, the astute use of AI can deepen insights into what makes us human, as well as humanize the experience. Tone analyzers, for example, can read emails and tweets to determine if the writer is angry, frustrated, or thrilled. Sentiment analysis, alongside traditional demographics, can improve the prediction accuracy for consumer preferences.

For leaders, elevating the human-technology partnership requires first that they get to know—deeply—the exponential technologies available to their organizations. Then they will need to learn how to deploy those technologies to foster new experiences along the value chain.

In our Global C-suite Study, correlation analysis revealed that leading organizations most frequently use exponential technologies in concert. They aren’t majoring in just one technology. Instead, they are creating value by combining them. AI is central to that effort. The leaders stood apart from all others in their focus on AI to make sense of data in context and light up new paths forward. Seventy-two percent were planning large investments in AI or machine learning in the next few years.3

These AI-supported organizations turned decisions into iterative innovation and intelligent workflows. They’re at the forefront of delivering customer experiences that are not just personalized but humanized, building trust through never-before-possible services.

Smart leadership skills

The Cognitive Enterprise is all about doing things differently, and this will require a different kind of leadership. That leadership will need to be more than simply tech-savvy: a deep and real understanding of the power that exponential technologies have to transform markets and to create new business models is vital.

They will also need to paint a clear picture of how technologies will enable the organization to seize new opportunities, while at the same time to remove the fear of change that may exist. Leaders, while being even clearer about the intent and purpose of the organization, must empower teams at the edge of the enterprise to innovate around that intent with an understandable set of values that support the brand. The operating model to empower these teams will be key, as will a deliberate strategy for upskilling people to build confidence in the brave new world ahead.

The requirement for change has two components: leaders and teams. Leaders will need to implement a set of design principles that help lower the center of gravity, empowering smaller multidisciplinary teams to get to client-valued outcomes more quickly. When customer-facing teams span the full functions of the organization, including operations, they can be fully responsive to customers. But experience shows that change won’t happen if an organization’s leaders aren’t able to let go.

Leaders will need to empower cross-functional teams to make decisions that can enhance customer intimacy, keep a project on track, or remove a logjam with dispatch.

The new learning organization

A deliberative skills agenda includes skills gap analysis, as well as a review of the programs for hiring, training, and managing talent. This should occur frequently as a joint exercise among functions—not just as an HR endeavor. New AI tools and systems now make this level of analysis possible.

Using data from an organization’s HR systems, its social and collaborative spaces, and other sources, AI can infer which skills are available with significant granularity. As a result, organizations are developing talent frameworks in which they curate skills profiles based on their specific requirements, as well as industry standards. If they have access to deep data sets, both internal and external, organizations can even associate specific skills and competencies with outcomes and predict which skills will be important in the future.

An essential component of the new learning paradigm is the recognition that learning should be both continuous and deeply personalized. Employees expect experiences at work that are contextualized to the moment. These enterprises embed learning into every aspect of workflow so that employees can learn continuously and in the manner that suits them best (see Figure 1).

As the Cognitive Enterprise begins to adopt augmented and virtual reality to improve the customer experience, it can—and should—apply them to create more immersive learning environments for the workforce as well. This is particularly important in industries that rely on physical interactions, such as healthcare and manufacturing, and also appeals across generational divides.

New skills are essential for business platforms to effectively integrate people, workflows, exponential technologies, and data to deliver new outcomes.
As we progress from the digital to the cognitive era, hierarchies and traditional structures will give way to self-activating and learning organizations.

In the Cognitive Enterprise, business platforms and intelligent workflows are constantly evolving to create new value for customers—and do so by helping to enable new ways of working. Agile teaming, empowerment, and deep collaboration are foundational. Leaders that hold themselves accountable for formulating and executing a dynamic skills agenda are the spark.

One way to link to the outside world is to establish cross-functional teams that are empowered to make decisions to enhance customer intimacy. Customer-aligned teams can balance the need to satisfy customers today with the demand to accelerate discovery of unmet customer desires so that they can delight them tomorrow. When these teams directly collaborate with customers, they can become a source of innovative services and products. Co-creation with customers can help direct where innovation will be of most benefit, and by working with customers directly to develop prototypes of new apps, products or services, these experiments can also reveal unknown needs and value opportunities.

When customer-facing teams span the full functions of the organization, including operations, they can be fully responsive to customers. An added and not inconsequential benefit from cross-functional teams is information spillover. Team members naturally share insights, ideas, and data that otherwise might be trapped in functional siloes. They learn on the go, and they learn from each other—and should be encouraged to teach and coach each other. Effective teaming is how self-directed skills development and learning become baked into the culture.

The Garage approach: Catalyst to build human-technology partnerships

The Garage approach involves the creation of cross-organizational spaces where cross-functional teams come together with strategic partners, such as IBM, and other ecosystem players and startups to co-create, co-execute, and co-operate the new business platforms. As such, garages become the physical instantiation of the change, a place where teams innovate, learn by doing, and build skills and confidence in the application of new technologies.

Garage environments can jumpstart innovation by putting technology options into the context of customer journeys, critical workflows, pain points, and value potential. They allow for early testing of ideas against customer and employee feedback, avoiding wasted activity.

Design thinking, agile and DevOps approaches move concepts quickly from ideation into day-to-day operation. Scrums, squads, and sprints can break up the build process into manageable, valuable building blocks. In the Garage, new business platforms can be developed at greater pace and lower risk, enabling benefits from continuous learning.
Creating a new enterprise experience, therefore, requires organizations to seamlessly interweave AI and other new technologies with the people who will use and benefit from them, while also cultivating a culture of continuous learning, adapting and applying what’s learned. To do this effectively, organizations will need to:

1. **Elevate human-technology partnerships**
   Embed the enterprise experience everywhere, which includes understanding how the organization’s purpose shapes the customer, employee, and ecosystem partner experience; ensures a continuum between them; and establishes the human-centered design that is the foundation of innovation.

2. **Cultivate smart leadership, skills, and culture**
   Develop leaders with a combination of business and technology acumen and the capacity for open engagement beyond traditional industry networks, who are accountable for creating a continuous learning and skills culture and proactively managing the redeployment of skills along intelligent workflows.

3. **Perform with purposeful agility**
   Drive purposeful agility that optimizes the flow of value and time to market, infuses structure to avoid agile chaos even as the organization lets go, and unfreezes the organization to move fast as it reinvents its core.

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**Action Area**

**Elevate human-technology partnerships**

**Establish the organization’s “North Star” purpose**

For business platforms to succeed, they will need to instantiate the core values of an organization and the motivating beliefs of the people within it. Increasingly, we see the emergence of business platforms that embody a wider societal intent alongside the traditional shareholder/stakeholder values. This aspect becomes an important part of the way the humanity of business platforms wraps itself around, and stands upon, the new technology capabilities.

Now more than ever, organizations are aligning their purpose to the needs of society at large. This is particularly true when considering environmental issues and sustainability. A case in point is lighting, which accounts for 15 percent of the world’s electricity consumption and 5 percent of the greenhouse emissions. Signify, formerly part of Philips Electronics, has become a leader in the circular economy, which features alternative approaches, often sustainability-driven, to get products, such as renting them or buying pre-owned goods. Signify offers energy-efficient lighting-as-a-service to companies and municipalities, allowing them to control reuse and recyclable materials. Recently, it introduced 3D print-to-order light fittings, lowering the carbon footprint by 47 percent as compared with a typically manufactured product.

Similarly, the IBM SkillsBuild® platform, in partnership with NGOs, helps jobseekers, including those with long-term unemployment, refugees, asylum-seekers, and veterans find employment opportunities. The platform provides the career counseling, training, and experiential learning they need to re-enter the workforce.

We see blockchain-enabled platforms are helping organizations the world over source everything from salmon to coffee to cobalt sustainably. They are working to support Fair Trade practices, manage carbon credits, verify cap and trade, prepare and deploy humanitarian relief for natural disasters, and distribute the loads on electric grids for greater efficiency.
A purpose beyond profit rallies customers, partners, and employees alike. Purpose is the tie that binds people to each other and to the enterprise, creating deep trust, an eagerness to collaborate and steadfast commitment—loyalty from customers, motivation from employees and commitment from partners (see Figure 2).

Purpose inspires because people want to be part of something greater than themselves. On market-making business platforms, customers can apply their values to the purchases they make. Employees supported by intelligent workflows are empowered to make meaningful contributions to the company’s intent. Ecosystem partners can more closely collaborate to execute high-trust business models that help customers realize their goals and live happier and healthier lives.

The trust customers once gave, almost blindly, to brands has been slipping away for some time now. Brands recognize that they need to stand for something, and that it must be genuine, not a marketing campaign.

Ford, Volkswagen, and Volvo have been collaborating with IBM on a blockchain platform to advance the ethical sourcing and production of minerals from mine to market.6 Shoe store Zappos recently launched its new Goods for Good platform exclusively for sustainable goods.7 Anheuser-Busch’s Better World Team is a platform inside the organization to help its many brands act on their purpose-driven initiatives.8

In a recent IBV study, just one third of employees recognized their brand vision as core to their company’s DNA.9 That level of disconnect reflects, in part, a failure of communications or a lack of clarity in the organization’s vision. Whatever the cause, the effects are troubling.

A strong sense of the organization’s purpose, researchers recognize, is closely tied to employees’ motivation to learn, take on new tasks, and acquire new skills. As such, organizational purpose isn’t just a magnet for talent, it directly impacts employee eagerness to learn. It shapes the organizations’ culture in profound ways.

In the same IBV study, respondents almost unanimously agreed that the organizations’ brand vision impacted the behaviors and decisions of their executives. But the numbers fall precipitously further down the ranks—to 58 percent of the leading organizations and 25 percent of all other organizations for non-managerial professionals; and 47 percent and 17 percent for support staff.10

Figure 2

Experience and purpose

Purpose and intent ultimately drive the customer experiences you create and the way you work.

Values, skills and ways of working

Too many employees—often those on the front lines—do not always have the data, tools, training, or authority to apply the brand vision to their day-to-day activities. And if leaders, don’t communicate their vision effectively, these employees may be only dimly aware of it.

“Purpose,” says Professor Dan Cable at the London School of Business, “is meant to elicit an emotional reaction. It is meant to be felt. You can’t just talk about purpose.” In other words, lofty speeches don’t do the trick.11

Leaders at Manulife, a multinational financial services company headquartered in Toronto, have taken the storytelling approach. “Culture is created by stories. When we listen over and over, there’s a comfort and reaffirmation of the values we believe in, the things we’re afraid of, and what we feel protects us,” says Francesco Lagutaine, Manulife’s Chief Marketing and Experience Design Officer. But, he observes, “There is a tendency for organizations to say, ‘Once we’ve said it, it’s done.’ But culture is built by constant reaffirmation. This is one of my key lessons learned: Never stop reminding people why we’re doing what we’re doing and recognizing their part in it.”12
Adopt human-centric design to Enterprise Experience

Market-making business platforms have accelerated the adoption of exquisitely curated customer experiences. These experiences aren’t just personalized but humanized, an experience that goes well beyond life-like bots or putting a human voice to AI. Organizations that seek to provide humanized experiences think about how their relationships with customers can create emotional bonds.

They cultivate empathy inside their organizations to understand what customers need, including a better understanding of their unexpressed, or latent needs. They look for opportunities to earn a higher degree of trust—among customers, employees, and their ecosystem partners. As a baseline for trust, they pay close attention to their customers’ changing requirements for data privacy and permissions.

To foster an enterprise experience, organizations draw on design thinking, experiential learning, and feedback loops to reinforce high-quality, high-trust experiences. The organization’s purpose is the starting point for how experience design is instantiated.

Design thinking cultivates employee empathy and understanding of human needs. Understanding customers isn’t just about making accurate predictions with data about their behaviors. It’s about getting to know customers as people first, “users” second. Becoming essential to customers is a continuous conversation as organizations iterate their offerings. It requires robust feedback loops as well to direct learnings and customer conversations back into the organization and across the ecosystem.

Just as they do with customer journeys, organizations adopt design thinking to develop employee personas. They consider experiences that embody the culture and norms they want to cultivate, including agile boundary-spanning teams and the empowerment of individuals within them. They create environments where employees can work iteratively and innovate exponentially.

To align the design of employee experiences with the continuous uptake of new skills required by differentiating intelligent workflows, organizations pay close attention to experiences that motivate employees to learn as they go. They give employees access to up-to-date data, intuitive tools, and feedback loops for continuous learning and decision-making at the moment of need.

For humanized customer experiences to be developed and sustained, organizations must thoroughly understand the links in the end-to-end experience “chain”—a customer experience that is driven by the employee experience and, as well, the ecosystem experience. In our “From customer experience to employee experience” study, two-thirds of the leading organizations recognize the necessity of considering a prospect’s brand vision when determining which companies they want to engage as part of their ecosystems.

The IBM Garage approach is designed to help embed enterprise experience. With a Garage approach, an organization creates entrepreneurial teams outside its normal operations. The teams are able to unleash innovation by co-creating with talent across disciplines and ecosystems and apply the principles of design thinking and agile to rapidly develop MVPs and test them for scale.

Kraft Heinz was able to accelerate innovation across the company to fulfill its founder’s observation that “quality is to a product what character is to a man.” At the Garage, their teams co-created a state-of-the-art algorithm that measures real-time product information, predicts sales, and distribution alternatives. By embedding these insights into intelligent workflows, they are able to connect technologies and teams, ensuring that its product development, supply chain, and sales teams are now in sync. This new enterprise experience facilitates the kinds of collaboration needed to rapidly prototype and deploy new products, all based on live store data (see sidebar, “Generali: Humanizing the customer experience with AI”).

Orchestrate compelling, trusted human-technology interactions

A human-technology partnership requires trust. For humans to “partner”—instead of merely interact—with technology, hard experience design factors, such as the user interface (UI), tools and environments, will need to be married with soft factors such as empathy, behavior, story-telling, and radical collaboration (see Figure 3).

A call-center design, for example, could deploy AI to detect the tone of its callers and route calls to those best suited for the situation. The system could infuse a personal touch by asking callers whether they would like to talk to the last agent who handled their call, or, if they were dissatisfied, make sure that the caller isn’t connected to that same agent.
Generali: Humanizing the customer experience with AI

Generali, one of the largest insurance companies in the world, is using AI to transform its business model and provide better customer and employee experiences as it becomes a Cognitive Enterprise. As part of its ambitious Excellence 2022 strategic plan, Generali France aims to transform insurance distribution through the “digitization of the agent-customer relationship.” The plan promises to scale up automation and AI in core operations.\(^\text{16}\)

AI has been a central strategic focus for Generali over the past two years and the insurance provider is bringing it to life by piloting various technologies. Generali partnered with IBM to set up an AI Factory in Paris to design, develop, and scale AI solutions. The AI Factory allows Generali to create innovative human-technology partnerships through collaboration with an ecosystem of partners including startups, platforms such as Microsoft and Google, and other existing solutions in the market.

Using human-centered design, Generali began to develop three virtual assistants for its employees and customers including Leo, an intelligent conversational agent that interacts with customers and prospects to help with questions, transactions, and generating new leads. Leo answers 300 queries daily with 75 percent accuracy. Letizia is another AI-powered conversational agent that works behind the scenes to help agents quote policy rates and register policy sales within the conversation. Over the course of the first year, Letizia has conducted more than 10,000 conversations.

Another solution created within the AI Factory helps sales consultants sell home insurance policies by converting voice calls to text, understanding the intent of the call and automatically delivering house insurance certifications without human intervention 60 percent of the time. A recent focus of the factory includes combining robotic process automation with AI technology to create more automated and powerful solutions.

Generali is looking to embed AI and other exponential technologies into its processes beyond customer service to create intelligent workflows, bringing it one step closer to becoming a Cognitive Enterprise.

At Club Med, AI-enabled systems can alert employees in call centers about the context of a call—what website pages customers were looking at, for example—as well as offer detailed histories of customer behavior. The company is now introducing a system that uses machine learning to analyze everything from customers’ emails to the level of satisfaction they express in consumer surveys. In the next round, it will be able to personalize its interactions with every customer on every incoming call.\(^\text{17}\)

A well-designed employee experience engenders trust with customers and with each other. Often organizations start by shining a spotlight on situations where employees can be empowered with cognitive assistants and other mobile apps in handling customer interactions.

Retail associate mobility solutions could address customer service issues on the spot. Sales teams armed with next-best-action dashboards could instantly reconfigure options and terms during negotiations. Airline stewards could delight customers by being empowered to offer upgrades, waive a fee, or rebook a connecting flight at no charge.

At Japan Airlines, a suite of mobile apps have replaced 3.3 million printouts with digital data that can be accessed anywhere, enabling “under the wing” maintenance engineers to radically improve the efficiency of how they work and ground staff to turn around planes faster.\(^\text{18}\)

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Figure 3

The human-technology partnership

Human intelligence meets Artificial Intelligence.
The combination of human and artificial intelligence may be the world’s most important feedback loop. AI can provide humans the answers they need to do their jobs, freeing up their time to apply creativity and pursue higher-value tasks. And the experiences humans have gained over a lifetime can train AI to deliver eye-popping results (see sidebar, “Lloyds Banking Group: Better customer journeys via human-centered design”).

At Alibaba, a chatbot trained by one of its merchant’s most experienced employees realized sales 26 times higher than the merchant’s top sales associate. On Alibaba’s biggest sales day, the chatbot handled 95 percent of customer queries, totaling some 3.5 million interactions.19

Social workers are burdened by paperwork, often spending as little as 20 percent of their day on human interactions. Cognitive technologies can relieve that burden and also help them create personalized interventions for people at risk. Aspiranet, which serves families in California, has turned to AI applied to help youth make the difficult transition from foster home care to living on their own by providing personalized advice ranging from safe housing to employment and educational opportunities.20

Solving the problems that plague humankind, from ridding our oceans of plastic to pathways out of poverty, from understanding disease epidemics to modeling hate speech for automated detection, are the stories we all hope our organizations can someday tell.

Lloyds Banking Group: Better customer journeys via human-centered design

In the world of banking, customers demand timely, personalized, and digitally enabled banking interactions. However, like most traditional banks, Lloyds Banking Group in the United Kingdom has to manage this digital demand across complex legacy architectures spanning multiple systems. To realize its “best bank for customers” vision, Lloyds needed to align around its North Star—“Transform the group for success in a digital world.”21

Since 2014, Lloyds has exponentially increased its investment in digital banking. As a result, it has ranked as the top mobile banking app in the UK for the past three years. Lloyds aligned its strategic priorities to develop new sources of competitive advantage, including data-driven customer experience.22

It has taken a human-centered design approach by transforming 50 different customer journeys such as financial planning and retirement and 15 different enterprise journeys across central functions. By placing the customer at the heart of these propositions through the lifecycle, Lloyds is much better placed to align to its strategic vision of “best bank for customers.”21 In parallel, and to underpin the transformation, its IT infrastructure modernization focused on selectively upgrading core systems, standing up a hybrid cloud, and transitioning to more SaaS-based software.

In the latest strategic review cycle, it is focusing on better tailoring the experiences it provides to its segments of customers with lower market share and creating personalized propositions through enhanced data capabilities. The latest strategic review cycle will complete at the end of 2020, further establishing Lloyds as a digital banking leader.

Through its latest strategy, Lloyds is driving the use of virtual assistants to serve its clients, managing up to 5,000 conversations daily, increasing customer satisfaction by 10 percent and the containment rate to 25 percent. Lloyds has migrated more than 400 of its applications to the private cloud ahead of schedule and aims to complete the migration of 100 percent by end of 2020.
**Cultivate smart leadership, skills, and culture**

**Embrace disruption and lead as a change agent**

Change starts from within. For smart leaders that means expanding their horizons—a far deeper level of understanding about what exponential technologies make possible and also a far richer understanding of what makes humans tick.

They must be more than tech-savvy. They must develop deep technological acumen—have a firm grasp of the real content of the potential of exponential technologies to transform and disrupt the dynamics of their business.

That’s a completely different level of insight and understanding of technology than most leaders have today. It requires continual exposure to new technologies and ongoing learning (see sidebar, “CEMEX: A Digital Academy for the next generation of disruptors” on page 60).

Smart leaders can’t just kick the tires of exponential technologies; they will need to understand how the engines work. That helps them make better choices about the technologies they deploy, and just as importantly, the use cases they can develop, and the operating models they can target. Only by understanding deeply and intuitively what new technologies could make possible tomorrow will they be able to reimagine their intelligent workflows.

As they build out new business platforms, all organizations are going to be transformed by technology; every company becomes, in effect, a technology company. There’s no escape. On business platforms, the digital component of every offering is the part that’s growing and creating the financial and experiential outcomes leaders count on. Technologies are (often) an organization’s best bet to scale growth.

Smart leaders will need to ask and then periodically ask again how could new exponential technologies—often working in concert—change my value proposition? In this respect, incumbents will need to think more like born-on-the-platform startups and digital giants.

The highly successful restaurant chain Sweetgreen, for example, was well on its way to a highly anticipated IPO, when its founders hit the pause button. Sweetgreen was known for its commitment to sustainable and healthy food supported by a transparent supply chain that fostered close relationships with local farmers. The chain had already established a strong sense of community among its farmers and customers when its founders decided they could do something more.24

They declared their decision to become a tech company, with big ambitions “to fix the entire restaurant industry and improve the health of the world.”25 To do so, they would evolve to a food platform. That meant many things, all made possible by new technologies. They would pursue many possibilities, from reconceiving their restaurants to be more like Apple stores to personalizing their recipes right down to the level of an individual’s microbiome and letting chefs from other restaurants take advantage of their supply and delivery chain. As a self-declared tech company, their purpose both anchored and elevated their ambition.

As smart leaders in every industry are learning, they have to combine technology content with business acumen and empathy to develop a clear point of view about their organizations’ strategic direction. Only then can they direct where major investments are needed.

Pundits call this “the pivot to tech.” It has become somewhat of a trope for CEOs to say that their company has to become a technology company, when in fact many are a long way from realizing that intent. And, for some, it may not even be the right goal.

There is a difference between embracing the power of exponential technologies to shape new business platforms and intelligent workflows and really operating as a fully-fledged technology player, with the attendant economics and business models. Tech companies derive value—and their market valuations—from very unique platform economics and only a few truly survive to dominate their markets. For most companies, there is a middle ground where technology is substantively more embedded, but the value is still derived from what the company considers its core activities.

**Foster a culture of collaboration and innovation across ecosystems**

As agents of change, smart leaders must stand up a culture that fosters greater autonomy of decisions and actions across the workforce. Leadership is moving to the edge of organizations, to agile teams. Leaders must set the direction, the guide bars, and then let go to foster agile ideation and execution. They must also ensure broader corporate (and ecosystem) strategy is aligned with specific platform plays.
To reimagine and reconfigure intelligent workflows, organizations will need to be open to adapting the operating model and rules of engagement across organizational siloes and convene new leadership team coalitions. This needs to start in the C-suite but then extend into middle management layers and even collaboration across front-line employees.

For example, reconfiguring the meeting architecture in a CPG company’s Sales & Operations Planning (S&OP) processes—a complex interplay of many related functions integrating to drive profitable sales—must be based on an agreed-upon set of design principles from the heads of global category/brand marketing, global and geo-level sales, manufacturing, distribution, IT, Finance, and even HR. Macro-level questions might include:

- Who owns the P&L? What tangible role do “shadow P&Ls” play? When and where are costs of goods sold and operating costs allocated?
- What is the role of the country general manager? What new or discontinued accountability does he or she have?
- Who adjusts brand- and country-level sales targets based on a dynamic promotion environment?
- What tolerance level is acceptable for demand and supply forecast (in)accuracy? Who takes responsibility for mismatches, and how does that occur?

Only then can a meeting architecture be cascaded to (cross-functional and cross-geo) management to design the more specific decision rights and handoffs that correspond to these guiding principles. Done poorly or in a sequenced, waterfall manner, reimagining this type of workflow could result in demand creation without supply, costly inventory build-up, and lower customer satisfaction. Yet, a successful outcome includes a lower process and organizational burden from the recurring cadence of meetings and pre-meetings, as well as a more accurate and timely matching of stimulated demand with dynamic supply.

Reimagining these workflows sometimes even includes bringing partners and outside experts into the organization to co-create and even execute new workflows. As leaders look to engage with a wider and more open ecosystem of business relationships and partnerships—beyond their traditional industry networks—the art of letting go takes on new meaning. They may need entirely new rules of engagement. Accesses to another organization’s design team, for example, means treating partners’ employees as well as you do your own. That shouldn’t be lip service. Instead, organizations will need to consider: Are you holding back

CEMEX: A Digital Academy for the next generation of disruptors

CEMEX, based in Mexico, is one of the world’s leading heavy building materials providers. Over the past three years it has invested in an enterprise transformation to better compete and differentiate its proposition for its B2B customers and ecosystem partners.

It recognizes that this transformation must begin with its leaders. So the evolution of its business platform focuses on developing smart leadership, while still fostering a broader culture of innovation in collaboration with employees, ecosystem partners (including startups), academia, and established technology leaders. According to CHRO Alberto de Armas, “We realized that a traditional approach to change management would not work for an ambitious platform transformation agenda, customer-facing workflows, and a global footprint.”

Starting with its top 80 executives, CEMEX pioneered a robust development program and learning environment to introduce its leaders to new concepts and skills, including business model innovation and emerging technologies. This program launched new digital approaches under the campaign “Being Digital”, and today drives practical changes in how CEMEX is organized and the new skills it cultivates in product management, experience design, data science, and engineering.

In addition, CEMEX established a Digital Academy to systematically increase adoption of emerging skills needed across the enterprise. The Digital Academy used a new digital learning and development platform, CEMEX University, to provide a common corporate vocabulary, assets, and delivery channel. CEMEX University not only exposes talent to new skills and ideas, but also convenes talented people from across functional silos to experiment and learn together. The platform combines in-person learning moments with other learning experiences, such as the launch of the Monterrey Digital Hub, an innovation ecosystem connecting CEMEX with entrepreneurs.

These platforms are also providing CEMEX’s talent the opportunity to help steer corporate strategy in an era of rapid transformation. In 2019, CEMEX expanded the platform with “Digital Foundations Program” an effort targeting senior leaders, managers, and the front-line to learn how to grow, lead, and work effectively. This next leg of its journey will scale a multidisciplinary foundation to encourage rapid ideation, problem solving, and value capture for CEMEX’s growth strategy across geographies, customer segments, and products.

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information or freely sharing permissioned data? Are you creating opportunities for the design team to have a voice, to question a direction, and to learn?

Organizations will need to move beyond traditional (often contractual) collaboration to create different coalitions of leaders than those they’ve turned to in the past. This happens both inside and outside the enterprise. Instead of relying on or working solely with peers—a Chief Supply Officer, for example, might find herself working directly with the CIO in a partner organization to improve inventory turnover or a team deep down in her own organization to develop new approaches to forecasting.

**Drive accountability for new workflow-aligned skills**

More than 120 million workers in the world’s 12 largest economies may need to be retrained/reskilled in the next three years as a result of intelligent workflows and AI-enabled automation. In the past, the skills shortage has been most acutely felt at the technology side. Recently, things have begun to shift. In 2018, so-called soft skills dominated the top four competencies global executives seek.27 The soft skills in demand involve critical thinking and problem solving as well as collaboration and communication—all skills that rise in demand as AI and automation free up employees to pursue higher-value tasks.

As organizations redesign intelligent workflows, it changes what skills are needed and where those new skills should be aggregated. It’s thus even more important that the skills agenda is deliberative, not an ad-hoc exercise but a system of governance.

Many leaders have become really good at building a center of excellence or filling a gap around some part of their business. But as organizations scale to operate on platforms, which are by their nature dynamic, new skills gaps will crop up with greater frequency.

Moreover, the time it takes to learn new skills is rising dramatically, from 3 to 36 days on average, while the half-life of skills continues to drop.28 Some skills take longer to develop because they are behavioral, such as teamwork, communication, creativity, and empathy. Others are highly technical, but technologies keep changing at the same time. Organizations can bring soft and hard skills in a next generation of Centers of Excellence, where learning, sharing and growing new skills is all accelerated simultaneously, particularly important for the emerging technical skills.

Leaders must become the champions of comprehensive workforce reinvention and reskilling. This includes understanding in precise detail what new skills are needed, and when and where they need to line up against intelligent workflows. That involves reallocating resources with greater frequency, moving employees to new teams and new areas of responsibility, creating an environment for learning by doing—and empowering employees to act (see Figure 4).

AI can do much of the heavy lifting. For example, organizations are applying AI-based real-time skills inference to determine which skills will grow in demand in their organizations and which will decline. By making the process transparent and sharing that information with their employees, they encourage the workforce to avail themselves of new opportunities to learn. With greater frequency, AI is also being used to personalize learning systems inside the organization, including new initiatives for experiential learning.

A US healthcare organization led the industry in the adoption of a platform-based Talent Acquisition intelligent workflow that uses AI, automation, and data to drive a new agile operating model. It delivers an integrated and targeted experience for candidates and hiring managers, increasing hiring manager Net Promoter Score by 40 points and reducing candidate touch points by 66 percent.

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**Figure 4**

**Developing smart skills**

Leaders need to create a culture of empowerment to grow talent.
Leaders have thought a lot about creating a culture where employees are motivated to learn, upskill, and take on new challenges. Certainly, there’s much that can be done to improve the learning experience. But this may be one of those times when “just start doing it” actually works.

What we’re finding is that as employees acquire new skills and recognize that they will be given more opportunities to do so, their mindset changes. Once branch advisors in a bank, for example, begin to take advantage of new technologies, their confidence grows and they tell everyone about it. Suddenly, organizations have a bunch of new agents for change in the organization. Culture change is also driven by the act of re-skilling and upskilling so that employees can participate in workflows where more of the intelligence flows directly to them. That’s what we mean by a skills-led culture.

Compelling content, rewards, and incentives go a long way to motivating employees to learn. Agile teams with heterogeneous skill sets enable peer-to-peer and experiential learning. By moving people from one team to another, skills transfer becomes viral. By assigning people from one organization in the ecosystem to a joint initiative with another organization, skills transfer becomes exponential.

As noted Harvard Professor, Amy Edmondson, says, “Learning to learn is mission-critical. The ability to learn, change, grow, experiment will become far more important than subject expertise.” This capacity for learning to love learning is why hiring for and fostering behavioral skills are the most sought-after skills today. In our recent IBV study, “The enterprise guide to closing the skills gap,” adaptability to change was the number one skill in demand (see Figure 5).

Employees with high IQ and EQ must now also have AQ—so that employees can participate in workflows where more of the intelligence flows directly to them. That’s what we mean by a skills-led culture.

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Employees with high IQ and EQ must now also have AQ—their Adaptability Quotient. This measures their ability to adapt and thrive in a fast-changing environment. Our research demonstrates that at this point in time, the skills gap in adaptability has reached a critical stage. To thrive in the era of the Cognitive Enterprise, leaders need to create the culture and environment where employees embrace change, can learn fast, and learn as they go.

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**Figure 5**

**Behavioral skills on the rise**

Executives now point to behavioral skills as the most critical for members of the workforce today.

<table>
<thead>
<tr>
<th>2016</th>
<th>2018</th>
<th>Behavioral skills</th>
<th>Core/technical skills</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
<td>Willingness to be flexible, agile, and adaptable to change</td>
<td></td>
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<tr>
<td>1</td>
<td>2</td>
<td>Time management skills and ability to prioritize</td>
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<tr>
<td>3</td>
<td>3</td>
<td>Ability to work effectively in team environments</td>
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<td>4</td>
<td>4</td>
<td>Ability to communicate effectively in business context</td>
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<tr>
<td>5</td>
<td>5</td>
<td>Analytics skills and business acumen</td>
<td></td>
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<tr>
<td>6</td>
<td>6</td>
<td>Technical core capabilities for STEM</td>
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<tr>
<td>7</td>
<td>7</td>
<td>Capacity for innovation and creativity</td>
<td></td>
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<tr>
<td>8</td>
<td>8</td>
<td>Basic computer and software/application skills</td>
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<tr>
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<tr>
<td>12</td>
<td>12</td>
<td>Industry- or occupation-specific skills</td>
<td></td>
</tr>
</tbody>
</table>

Source: 2016 and 2018 IBM Institute for Business Value Global Skills Surveys.
Perform with purposeful agility

Team across boundaries to accelerate innovation

The structures that once supported a business and its people are fast becoming obsolete. Integration that was once vertical is becoming horizontal. Cultures that were once hierarchical are flattening. As market-making business platforms and intelligent workflows take root, they are hastening changes like these, crossing what were once natural organizational boundaries, and even stepping outside them. As such, the enterprise will require new coalitions of skills and capabilities from its people.

Many organizations are adopting agile methods. Some of their teams will be fully agile; others will not be. To operate seamlessly as they move from ideation to scale—and to avoid a disconnect between agile teams and more traditional ones—leaders may need to think less about agile methodologies and more about the values and norms that foster agility across all parts of their business. Two areas are particularly important to all organizations: new ways to team and speed to value.

New ways to team

There is a need to bring together teams and coalitions of leaders that straddle IT and the business and cut across functional lines. Organizations must also include ecosystem partners and startups in their teams. This fosters diversity—of mindsets, expertise, and experiences.

When building teams, leaders aren’t just assigning resources—they’re framing their approach to a problem. Diverse teams see the same problem from many angles. Each team member brings their unique perspective and expertise, widening the range of possible outcomes. While it takes effort to harness and align different perspectives, it’s at the intersection of these differences that the most meaningful breakthroughs emerge. In short, if you want a breakthrough idea, you’re more likely to get it with a diverse team.

Agile organizations frequently bring in external partners and customers from the outset. Most often, this occurs in co-creation or innovation spaces—for in-person collaboration—and dedicated to a specific initiative. The IBM Garage integrates both agile and design thinking as a co-creation space with the express purpose of helping our clients develop new approaches that they can take back to their organizations.

Over time, as market-making business platforms begin to dominate, ecosystem-oriented teams are likely to form on a more pervasive and ongoing basis. Diversity is a more organic feature on these teams; in effect, diversity is built in. As anyone who has worked in a joint venture knows, cohesion is more likely to be a challenge. Thanks to conflicting incentives or cultures, organizations will need to take the time to build trust-based relationships.

Speed to value

To drive speed, work needs to be broken down into smaller releases of value and innovation. Iterative design relies on continuous feedback and learning.

If diversity helps teams generate breakthrough ideas, empowerment turns those ideas into outcomes. A team bogged down in meetings, constantly trying to win stakeholder agreement for every little operational decision, may not get anywhere and certainly won’t move fast. In contrast, empowered teams have the agency to make everyday operational decisions on their own. They’re equipped with the expertise and authority to deliver outcomes without relying on others for leadership or technical support. By pushing operational decisions down to the lowest level, teams deliver value at the pace of change.

When ideation is agile it is always iterative. It is designed to collect direct user feedback every step of the way, both in development and with every release to the market. To design teams, everything is a prototype, everything is evolving to the next generation of offerings based both on the feedback they collect and the evolving context every offering inhabits (see sidebar “Orange Spain: Teaming with customers to build better tools” on page 65).
Adopt agile principles and design thinking mindsets while sidestepping chaos

The word “agile” has become the cool way for companies to engage in cross working. We see countless examples of companies spooling up tribes, squads, stand-ups, and scrums in pursuit of speed and change. Most are still in the early stages of agile deployment or maturing, and have not yet integrated it fully across their organizations (see Figure 6).

The challenge is to avoid agile chaos, where there is more celebration of the number of agile teams in place than their impact. Agility devolves to chaos when it isn’t implemented fully and leaders, especially managers in the middle, either fail to let go, or let go before they have guide bars in place that establish an architectural direction.

To avoid getting stuck in the middle and mired in chaos, organizations need to create something we think of as purposeful agility (see Figure 7).

Transformation is taking place deep down in organizations. It involves massively different combinations of exponential technologies and people, including ecosystem partners, coming together in squads and scrums or ways that are otherwise more agile. They are composing transformational business platforms and intelligent workflows in bite-size pieces, quickly creating and then assembling these building blocks of value. If that work is not purposeful, there are too many way teams can get trapped in the purgatory of pilots or find that they have gone down a dead end.

Agile ways of working have huge value in unfreezing the organization, but they need to be made purposeful by aligning teams with the business platform or intelligent workflow intent. This helps determine who should be on teams and also to set clear goals and milestones for progress.

Figure 6

Becoming agile

While 18 percent of companies report a high level of competency with agile practices across their organizations, the majority are still maturing.

Purposeful agility:
a better way of working

Clearly defined outcomes drive orchestrated agile teams.

**Agile “chaos”**

- Purposeful agility

Purposeful agility lines up agile teams along workflows. If an organization has tribes, then have a tribe for each workflow or parts of it; have them think about how they are going to transform that particular workflow. By doing this, organizations bring that natural structure and purpose to what people are trying to do and they can build on each other more easily.

The leader’s role in purposeful agility is to describe outcomes with clarity, not how the teams do it. They tell teams where to go, not how to get there, empowering them to explore breakthrough ideas without losing sight of the goal. To help teams act in line with the organization’s intent, progress toward the goal must be measurable.

Leaders clearly define and align desired outcomes across teams. They design for transparency so that they can see work in progress. With radical transparency, it’s much harder to “game the system.” Performance, decisions and results are visible daily through activities like standups and playbacks. They can be fed back to other parts of the organization to encourage learning and key an eye on overall performance and outcomes.

It’s then up to leaders to stop measuring success by counting the number of agile teams but by raising the visibility of successful, measurable outcomes and the teams that develop them.

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**Orange Spain: Teaming with customers to build better tools**

Orange Spain, a mobile network operator headquartered near Madrid, wanted to use cognitive solutions to redefine the way it interacted with and supported clients. The company aimed for an agile transformation of its customer service management function to increase customer satisfaction.

First, Orange developed a cognitive virtual assistant called Djingo. The first iteration of Djingo was able to refer clients to relevant online FAQs. By deploying its MVP to a select group of customers, the team was able to learn quickly, and gather new insights and ideas for improvement. Next, the team used agile methods to continuously enhance the tool with new and more complex functionality.

Today, Djingo can address complex customer queries with customized answers, and is even available via smart speakers and WhatsApp. At the same time, it grew in both functionality and reach: within a year Djingo is expected to process 7 million conversations.

When Djingo needs human support, it refers the customer to a human service agent and provides the agent with necessary contextual data. The virtual assistant has significantly increased agent productivity compared to agents without its support, improving customer satisfaction while lowering costs to serve.

Djingo, however, is only one piece of Orange’s new customer service transformation. Orange is also building a cognitive assistant for call center agents and in-store sales reps to provide faster contextual data on customer requests, real-time answers, and alerts. By adapting an agile way of working, Orange developed cognitive solutions more quickly, learn from real customer interactions and scale to transform its entire customer service management.

Additionally, by using AI to automate the analysis of more than 60,000 text documents in Orange’s customer management system, Orange has reduced time-consuming administrative tasks and kept its talent focused on what really matters: its customers.31
Sustain agile at industrial-strength scale

Building the Cognitive Enterprise requires mission-critical change at the heart of an organization’s new business platforms and workflows. This by definition necessitates change at scale with enterprise-wide impact. The trick is to use agile methodologies not only for the early building blocks, but also for bigger slabs of meaningful and secure change to avoid sacrificing speed.

As leaders infuse agility into new ways of working, they become the architects of change. This includes the skills-building agenda, the flow of data and feedback to support decisions made at the edge of the organizations. And when all is said and done, leaders will pay particular attention to the one phase of change that could put everything at risk—when prototypes move from pilots to market scale.

This requires a holistic approach to a new definition of change management, one which is more fast moving and adaptive, which moves the skills-building agenda as fast as the needed changes, and that propels the culture of the organization to broadly support continuous reinvention.

For individuals, the very act of becoming agile creates its own culture. By working in small teams where experimentation is encouraged, teams become less concerned about failure. Failures are “contained” because they’re both localized and fast. Because agile team members are encouraged to try out new roles with frequently, they don’t just learn as the go, they learn more.

Leaders learn to forego command-and-control management styles. Instead they become well-versed in creating environments strong on trust and empowerment. Leaders provide the resources the teams need, including access to end users. They establish the guide bars, delegate accountability, describe outcomes with clarity—and then they get out of the way. They manage their meeting architectures flexibly, whether that means holding “stand ups on steroids,” or tracking decisions by a control tower. They give teams access to all the data and feedback they need to stretch and grow.

Ultimately, every agile ideation faces its moment of truth—the moment when it must scale. Anything an organization is ideating, no matter how agile they’re trying to be or how much design thinking they’ve adopted, has to land in a bullet-proof place. And keeping that in mind from the beginning is a really important part of the change process.

To avoid innovation being trapped at the proof of concept, MVP, or pilot stage, organizations need to define the “scale-up” interface—the handoff, or off-ramp, from agile teams to the teams that will execute and scale it to industrial strength.

The ability to scale has to be fully integrated into the ideation process from the outset. Organizations do this, in part, by setting the guide bars of architecture. Those guide bars are the architectural choices organizations make from the operating model level right through to the workflow level and then into their application and infrastructure levels.

Just as important is a concept we think of as the changeover box. That’s the moment when a relay runner passes the baton to a teammate. For organizations, the changeover box comes into play when their agile and execution, or steady state, teams come fully together to act as one. This can also be viewed as an approach to address a similar challenge—specifically, the relationship between high-growth digital businesses and the simultaneous transformation of the more mature traditional business.

Organizations need to define in advance the specific criteria for when the handoff occurs. As prototypes move to pilot, the stakeholders assigned to take over if the pilot eventually scales begin to become a bigger part of the team or take on more central roles. Running together in the changeover box, agile ideation and operational teams become the on-ramp back into the organization and out to the marketplace at industrial-strength scale. The IBM Garage methodology is designed to help with this changeover by enabling seamless co-creation, co-execution, and co-operation.
Action guide

Enterprise Experience and Humanity

1. Elevate human-technology partnerships

Embed the enterprise experience everywhere, which includes understanding how the organization’s purpose, including its brand purpose, elevates the customer, employee and ecosystem experience, and ensures a continuum between them.

- Establish the organization’s “North Star” purpose, its mission and values in service of the aspirations of its customers, employees and partners, and society at large to change the human experience.
- Adopt human-centric design to enhance enterprise experience, cultivate empathy, understand human needs more intuitively, design feedback loops for experiential learning, and move rapidly from experimentation to scale.
- Orchestrate compelling (trusted) human-technology interactions to empower employees to make better decisions, work autonomously, and solve problems on the front lines and at the moment of need.

2. Cultivate smart leadership, skills, and culture

Develop smart leaders, accountable for creating a culture of trust and continuous learning and who can champion comprehensive workforce reskilling and upskilling, as well as learn to lead in new ways, with a combination of business and technology acumen and empathy.

- Embrace disruption and lead as a change agent by rethinking your role and your organization’s value proposition as something much closer to the bold ambitions and culture of a tech company.
- Foster a culture of collaboration and innovation across ecosystems by finding new ways to let go and assembling new coalitions of leaders, creating the conditions for trust with more open rules of engagement.
- Drive accountability for new workflow-aligned skills with AI-enabled insights into when, where, and how new skills should be developed and platforms that support developing a skills culture for continuous learning.

3. Perform with purposeful agility

Drive purposeful agility that optimizes the flow of value and time to market, infuses structure even as the organization lets go, and unfreezes the organization to move fast as it reinvents its core on market-making business platforms.

- Team across boundaries to accelerate innovation by designing multidisciplinary teams able to work in parallel, iterate to speed the time to value, and empowered to act with autonomy.
- Adopt agile principles and design thinking mindsets while sidestepping chaos by establishing purposeful agility, and align teams to intelligent workflows to determine outcomes with clarity and set milestones.
- Sustain agile at industrial-strength scale through the careful design of the moment of changeover, the phase when ideation is complete and prototypes are ready to move back inside the organization to scale.
New way of building: Garage

As organizations apply exponential technologies and reshape their workforces to build the business platforms and intelligent workflows of the future, they would seem to be embarked on a sure-footed path. But this shift in direction and decision-making creates uncertainty and a need to work differently. How does an organization innovate quickly while keeping appropriate guide bars in place to reduce the risk of disarray?

The answer: Garages. A bold, comprehensive approach that helps employees adopt new ways of working and thinking with the speed of a startup, but at the scale of an enterprise.
In becoming a Cognitive Enterprise, how a company transforms its business platforms and reengineers its workflows can make the difference between coherence and chaos. Agility is essential, but rapidly multiplying decentralized iterations can spiral out of control. To help mitigate the risks of rapid change, organizations need the right method to convene and empower agile teams (see sidebar, “Insight: Risks to the Cognitive Enterprise”).

The IBM Garage approach is just that: a bold, comprehensive approach to innovation and transformation. It enables companies to co-create, co-execute, and co-operate the business platforms and intelligent workflows of the future.

Garages incorporate a business’s entire ecosystem: clients, customers, citizens, designers, developers, architects, partners, suppliers, resellers, regulators, and all other relevant stakeholders to innovate together with the assistance and guidance of the best people, assets, and knowhow. This open collaboration with agile squads accelerates delivery and learning. The Garage experience can help companies move faster, work smarter, access the right talent, and fundamentally reconceive the way they build, innovate, and grow.

Garages must be integrated into the core of a business if they are to have a major impact and stimulate engagement and knowledge transfer. Garage is not merely a technology exercise. To fully succeed, alignment among core workflow operating models and key agile “tribes” is critical. These include HR, marketing, sales, finance, technology, and operations, as well as other key business teams.

Garage comprises five attributes:

- **The right intent**—Clearly defined intent, focus, and direction for the platforms and workflows in scope.
- **The right people**—Selected participants across the entire ecosystem, along with experts to contribute intellectual and data assets, as well as trained and experienced facilitators to guide the experience.
- **Applied technologies**—Exponential technologies, such as AI, hybrid cloud, IoT, 5G, edge computing, and blockchain for enabling scaled, agile iteration.
- **Agile processes**—Scaled, agile methods to create new ways of building.
- **Innovation-inducing locations**—Either at an existing Garage facility, a dedicated and innovation-inducing location, or a trusted third-party, qualified setting.

**Insight: Risks to the Cognitive Enterprise**

Becoming a Cognitive Enterprise affords compelling advantages. It enables companies to transform themselves and compete in ways they previously couldn’t. But the journey is not without some types of risk—especially if care is not taken when applying new technology and implementing new ways of working.

First, risks can arise from the nature of exponential technologies—AI in particular. AI relies on the data used to train it—data which is the lifeblood of the Cognitive Enterprise. So contaminated data, or data of questionable provenance or reliability, could result in a crisis of trust, not only in the data itself, but also in any decision making based on it. Related to this, improper or sloppy use of data and AI could risk “mass-scale digital influencing” and the proliferation of deep fakes.

The very nature of human interaction with new technology can also introduce risk. Organizations may tend to overlook the human element—and their workers’ human needs, such as a fundamental purpose—as they focus primarily on the technology they are investing heavily in, especially as the human-machine interface shifts. Exponential technologies also tend to initially disrupt employment patterns and displace legacy skills, leaving those with outdated skills in a kind of limbo.

New ways of working may at times have unintended consequences. If an organization is not prepared and vigilant, “cognitive chaos” could result from an overwhelming proliferation of new technologies. At the same time, decentralized rapid innovation via agile squads can undermine an enterprise’s focus and health.

Finally, at the societal level, closed networks and proprietary ecosystems could distort and imbalance the market, thus reinforcing a divide between winners and losers, the “haves” and “have nots.”
Frito-Lay: Delivering snackable innovation

North Americans consume Frito-Lay products approximately 20 million times a day. The company must get the right product to the right place at the right time. With 25,000 Frontline employees, 300,000 customers, and 2,500 SKUs, how does it manage complex value chain logistics, distribution, and sales challenges?

To accelerate innovations to market and transform its Frontline sales force to meet consumers’ changing needs, Frito-Lay partnered with IBM Garage throughout three phases.

Co-create
User-centered design thinking was the core of the co-creating phase. IBM and Frito-Lay employees sat side-by-side to complete over 650 hours of user research interviews and field visits. Every pain point from the user research was ranked and mapped to help ensure that the transformation backlog was prioritized by overall impact and value. By co-creating the backlog with value as the key factor, executives were able to make decisions more quickly. The teams were able to understand how the pivots and changes fit into the overall vision and direction.

Co-execute
One of the most exciting outcomes from Frito-Lay’s transformation is that not only did the IBM Garage framework help continually enhance the core systems, it also established future innovations for the organization to seamlessly integrate. The teams built and delivered proofs-of-concept that were “vertical slices” of some of the largest challenges the organization was facing. The teams took these slices into pilot markets, with users learning and understanding what worked and what needed to change. The insights gained from slicing, piloting, and learning led to more accurate, accelerated solutions to the big problems.

Ultimately these innovations are what accelerated the transformation program. Frito-Lay was truly able to increase its agility within the co-execution phase by leveraging key accelerators: advanced agile techniques, design language system, value tree analytics, and control tower dashboarding.

Co-operate
Co-operating is defined in three different terms of scale for this company:

1. Frito-Lay has more than eight garage tracks. This kind of scale only comes when meaningful orchestration happens across the entire organization, including business, IT, finance, HR, procurement, and others. As they have scaled from one to many garages, the enterprise encountered new friction points and opportunities. This meant breaking out of traditional siloes and engaging the entire organization.

2. Scale to Frito-Lay also means getting the solution to their more than 25,000 Frontline employees. This means driving change in behaviors, operations, communication, change management, and ultimately the path for end user adoption.

3. And finally, scale means using technology to manufacture products to meet consumers’ changing needs in order to get the right product at the right place at the right time.

After 100 weeks, Frito-Lay achieved these tangible accomplishments:

- The average duration to get a request in market has gone from 240 weeks to less than 30 days
- New features are pushed to market weekly
- Intelligent workflows are accelerating AI-driven ordering
- Customer-facing workflows are increasing and driving adoption.1
Speed of a startup and scale of an enterprise

At Garage’s core are a series of “lifecycle phases” and a set of proven agile practices that integrate experience, implementation, and cultural change to guide solutions from idea to enterprise-scale adoption. These lifecycle phases are represented by the loops in Figure 1.

Of course, the place, processes, people, and technologies are not the end goal. Nor is the Garage itself. They are a means to achieving the underlying business goal of driving holistic, compelling customer experiences—and with them, enterprise success.

The Garage approach describes how to start implementing specific practices. It focuses on working in teams and groups. We outline three lifecycle phases: co-creating, co-executing, and co-operating. In each case, the “co” is a big deal. It emphasizes working together.

Figure 1
Tracing the Garage journey
How creativity and practicality come together to craft a new future.

Co-create to envision the future: Uncover a new business opportunity or drive critical new insights into an existing situation. Ideate with your entire ecosystem, or with relevant smaller squads, to co-create a visionary, compelling, and energizing solution that fits within clear architectural guide bars.

Co-execute to build out and scale up: Expand and create additional squads to build out the team that will realize the future vision. Develop the MVP prototype into a first production-ready release and launch the solution into full production. At the same time, be ready to improve your solution based on what you learn from users and scale up rapidly with robust architectures.

Co-operate to iterate and continuously improve: Keep sharpening and hardening your tools, architecture, and reliability, while monitoring and testing for continuous improvement. This leads to continuous delivery that is crucial to deeply transform your culture. Much of the work can be done with distributed squads throughout the enterprise (see sidebar, “Frito-Lay: Building a platform with customer feedback iterations”).

Source: ibm.com/garage/method
These three lifecycle phases are built on a set of seven practices that each define an overall business transformation goal and achievable activities to reach that goal:

- **Discover**: Dig deep into the broader opportunity domain, align on common goals, and identify upside innovations as well as potential problems and bottlenecks.

- **Envision**: Use Enterprise Design Thinking and related practices to understand the user and identify the highest-priority candidates for improvement.

- **Develop**: Adopt DevOps development practices to help squads collaborate and produce high-quality comprehensive solutions with related code that is ready for production.

- **Reason**: Select, develop, evaluate, and optimize AI and data science models, make them ready for production, and infuse them into development.

- **Operate**: Continuously monitor the status and performance of apps, with a focus on building automation to increase availability and reliability while also reducing infrastructure costs and resources.

- **Learn**: Use hypothesis-driven development and analyze data to learn how squads work together and how customers use the new apps.

- **Culture**: Build a culture that supports small, co-located autonomous teams with a diverse set of skills that make decisions based on efficiency and knowledge.

Garages help a business focus first on experiences and business outcomes. The Garage approach helps define and enable new business platforms, intelligent workflows, and enterprise experiences at a faster pace, with reduced risk, and greater buy-in. It promotes identification and adoption of best practices, compelling use cases and global expertise—all vital to create a new enterprise culture while enabling people to continue learning and keeping up with new skills.
Conclusion

A new way to grow, a new way to compete

As leaders have discovered, it’s time to move beyond the exploration of what exponential technologies can do and—if they haven’t already—begin breaking ground on a new construct, the Cognitive Enterprise.

This shift from experimentation to scale to impact is a massive undertaking. It is the province of leaders asked to orchestrate value in ways once unimaginable and now attainable. Leaders will need to exert their best and rally their teams and partners to do three things at once:

Focus on framing and scaling business platforms for maximum impact
To rediscover the core of the enterprise and shape new market opportunities for competitive advantage, leaders will need to have a sure sense of their organizations’ direction—their ambition and intent—backed up by a detailed blueprint of what it will take to get them there. They will need to think through and lay out new guide bars and control systems for the robust governance of organizations that move fast and, on any given day, have multitudes of concurrent changes underway.

Prioritize the design and deployment of differentiating intelligent workflows
Workflows are the building blocks that underpin the platform’s differentiating advantage and expose new value pools. Because intelligent workflows require exponential technologies orchestrated at scale and the intensive upskilling of the workforce, identifying which workflows to build out first will be particularly important. Helping to make sure that the organization’s data and AI is fit-for-purpose becomes a C-suite imperative.

Strengthen and elevate the enterprise experience of everyone in the ecosystem
The outside-in and inside-out transformation of platforms and workflows culminates in—and is subsequently sustained by—purpose-led experiences. The leader’s role to communicate that purpose and bring it to new life is at the heart of everything they do. Paired with a strong commitment to demonstrably raise the skills of its workforce as well as its value proposition with partners, the enterprise experience is where leaders architect a new future by performing at their personal best.
Related reports from the IBM Institute for Business Value

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Chapter 2: Intelligent Workflows


Chapter 3: Enterprise Experience and Humanity


Chapter 4: New way of building: Garage


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