



Research Insights

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Building the Cognitive Enterprise: Nine Action Areas

Core Concepts

IBM Institute for
Business Value



This Core Concepts document is abridged from the in-depth version, “[Building the Cognitive Enterprise: Nine Action Areas, Deep Dive](#)” that also contains the full-length case studies.

Introduction

We are at one of the tipping points in history where the scale of impact of technology on business is significant enough to transform the whole way that business gets done. Like the mainframe, PC and internet before them, the convergence of new exponential technologies such as AI, automation, IOT, blockchain, and 5G have the power to change business models, reinvent processes, and reimagine the way we all work. We call this the emergence of 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.

For over a decade we have been embarked upon the “outside-in” digital transformation journey. We’ve been connecting our organizations ever more deeply to customers and external stakeholders, leveraging the power of the internet for pervasive connectivity, and driving these “digital” capabilities deeper into our cores. This trend is now beginning to be matched by the “inside-out” cognitive transformation journey as we access the power of our data through these new exponential technologies. Organizations are combining these two forces in a new wave of truly transformational change and structuring themselves around reimagined business platforms.

All companies are becoming technology companies, and all companies are becoming “platform” companies. They are establishing new sources of competitive advantage and exist in new open ecosystems that

can straddle industry boundaries. This is not about transformation at the edge of the organization, nor a place just for experimentation and proofs of concept. We are in a chapter of change that is substantive enough that the core of our organizations—the mission-critical processes and the underlying legacy infrastructures—need to be reinvented by the application of these technologies at scale. This is about “big bets!”

The big bets that we see our clients making around the globe, and the business platforms that they are seeking to compete on, leverage three main elements:

- the 80 percent of data that still resides inside the firewalls of incumbent players, which is often combined with new external data sources,¹
- the capacity to innovate through technology around the core workflows which define their differentiation, and
- the ever-increasing expertise of the people who can seize insights from the data and reinvent the way they perform along the workflows.

Introduction

As we construct the picture of the winning Cognitive Enterprise, we see three main building blocks of success (see Figure 1):

1. Market-making Business Platforms

A “Market-making Business Platform” is the most fundamental component to get right first. It is the new instantiation of the business strategy of the organization and the clear North Star for the investment priorities and change initiatives required to shift to the future. We call the platforms “market-making” because they need to be focused, critical and impactful, whether they reinforce competitive position within an industry, shape a new role in an industry context, or open up cross-industry market opportunities.

Sometimes an internal enabling business platform (for example, talent, finance, or risk management) can be strategic enough to set the agenda. The choice of platform focus and the degree of doubling down on investments that the enterprise makes is, therefore, defining its core intent and narrative for the future.

2. Intelligent Workflows

“Intelligent Workflows” are the extended end-to-end or front-to-back processes that, through the application of technology at scale, define the customer experience and economic outcomes at the heart of the new business platforms. We need to identify the most important workflows and related value pools in front-, middle-, and back-office areas that will differentiate the company or industry.

Once clear, we can apply the right combinations of exponential technology, leverage the power of targeted data, and enable these workflows with next-generation applications in a reinvented hybrid cloud IT infrastructure. Then relevant capability layers (see Figure 1) can be architected, transitioned, and built out in service of the Intelligent Workflows and Business Platforms. Together they deliver huge potential for cost optimization and wider value realization, as well as future-proofing for the enterprise.

3. Enterprise Experience and Humanity

Perhaps the most essential component of the Cognitive Enterprise is what we have termed “Enterprise Experience and Humanity.” Ultimately, for all the technology centrality of this new world, it is the power of the “human wrapper” that envelops and leverages this technology that will be the core of lasting differentiation.

The concept of “experience” is now extending from the customer to the employees that serve the customer, the enterprise itself, and the entire ecosystem to provide a seamless environment of value and purpose. Human-centered design is becoming an ever more important aspect of the business platforms and workflows, as well as the systems that underpin them.

The Cognitive Enterprise will therefore demand a new kind of leadership, emboldened by deep technology insights, and new skills and culture to embrace this exponential potential. Perhaps the biggest challenge and opportunity will lie in the capacity to make the necessary changes in the pools of expertise, mindsets, and ways of working to bring this vision to life.

Figure 1:

The capability layers of the Cognitive Enterprise

Market-making Business Platforms	Internal strategic platforms	Internal enabling platforms	Industry platforms	Cross-industry platforms		<i>An ecosystem of business platforms</i>
Intelligent Workflows	Customer & Innovation workflows	Finance and Operations workflows	Talent workflows	Industry workflows		<i>activated by intelligent workflows</i>
	Artificial intelligence	Blockchain	Automation	Internet of Things	5G	<i>made possible with exponential technologies</i>
	Proprietary data	Licensed data	Public data			<i>that are fueled by data</i>
	Custom applications	Legacy applications	API-enabled applications	Cloud native applications	Digital applications	<i>using next-generation applications</i>
	Public cloud	Private cloud	On-premise	Security		<i>on an open and secure hybrid multicloud infrastructure</i>
Enterprise Experience and Humanity	Culture	Skills	Ways of working	Experience		<i>powered by culture of agile innovation</i>
IBM Garage	Co-create	Co-execute	Co-operate			<i>delivered through the IBM Garage</i>

The areas that most organizations are struggling with as they embark on the journey to become Cognitive Enterprises are (a) how to really get started at scale, (b) which execution and funding vehicles to use, and (c) how to orchestrate the complexity of the change.

This report sets out our point of view, drawn from multiple real-life client examples, of the key action areas that we believe all organizations need to engage in to make substantive progress.

We are describing wholesale business and technology change and the reimagining of the mission-critical components of the company. Following through on this will require engaging all parts of our companies in new coalitions of executive sponsors and teams working across departments. This journey calls for strategic partnerships and extended open ecosystems.

It demands new, more agile approaches for co-creation, co-execution and co-operation. We are on the cusp of the next period of true technology-enabled business transformation. We look forward to charting this journey together.

Suncor

Building the layers of a Cognitive Enterprise

Suncor Energy, Canada's leading integrated energy company embarked on "Suncor 4.0" in May 2019, a people focused, data informed and technology enabled, transformation to accelerate and digitize Suncor's strategy² targeting USD \$1.5 billion of free cash flow by 2023.³

Suncor established a Transformation Management office—control tower to accelerate operations and started to build AI-powered solutions to help streamline complex operational analysis. These solutions became a key part of intelligent production management workflow for Suncor, generating production plans within minutes that previously took hours.

To drive a step change in performance and transform culture, Suncor put AI to work by building solutions and intelligent workflows.

Results

Created a Transformation Management Office—a control tower—to accelerate Suncor's enterprise-wide transformation

Site Wide Lead (SWL) Advisor analyzes data from **87,000** sensors across 35 plants, tracking more than 900 key metrics

100 AI models were used to develop a SWL Advisor to analyze complex operations



Charting the journey to the Cognitive Enterprise

There is no fixed recipe or definitive roadmap for the journey to the Cognitive Enterprise, and organizations are at very different starting points and stages. That said, we can see patterns of successful activity that begin to frame the key action areas we think are important. The sequence of initial programs will differ from organization to organization as business imperatives, context, and other change factors play out. We do, however, think that whatever the starting point, having a perspective on, and plan for, the Nine Action Areas we have outlined in the blueprint that follows will reinforce the likelihood and pace of success (see Figure 2).

A coordinated set of nine action areas helps move organizations from today into the cognitive future.

Figure 2:
Nine action areas

Action Area	Market-making Business Platforms	Double down on “Big Bets”	Create a New Business Blueprint	Orchestrate Compelling Change
Action Area	Intelligent Workflows	Embed Exponential Technologies	Drive Value from Data	Deploy Through Hybrid Multicloud
Action Area	Enterprise Experience and Humanity	Elevate Human-Technology Partnerships	Cultivate Smart Leadership, Skills, and Culture	Perform with Purposeful Agility

Clarity about which market-making business platform(s) an organization is selecting as the core of its future competitiveness is clearly an important prerequisite. That said, some companies may find themselves backing into these choices as they see specific activities driving superior impact. There will also be emergent strategies that evolve from the exploration of the potential of data and differentiated applications of technology.

However, once the choice is made, doubling down on the big bet will be vital. It will also be necessary to address the business architecture and operating model implications of the selection and put in place an overall transformation and governance approach to steer and coordinate the many moving parts that will result.

The success of the market-making platforms will depend upon the quality and differentiation of the Intelligent Workflows that underpin them.

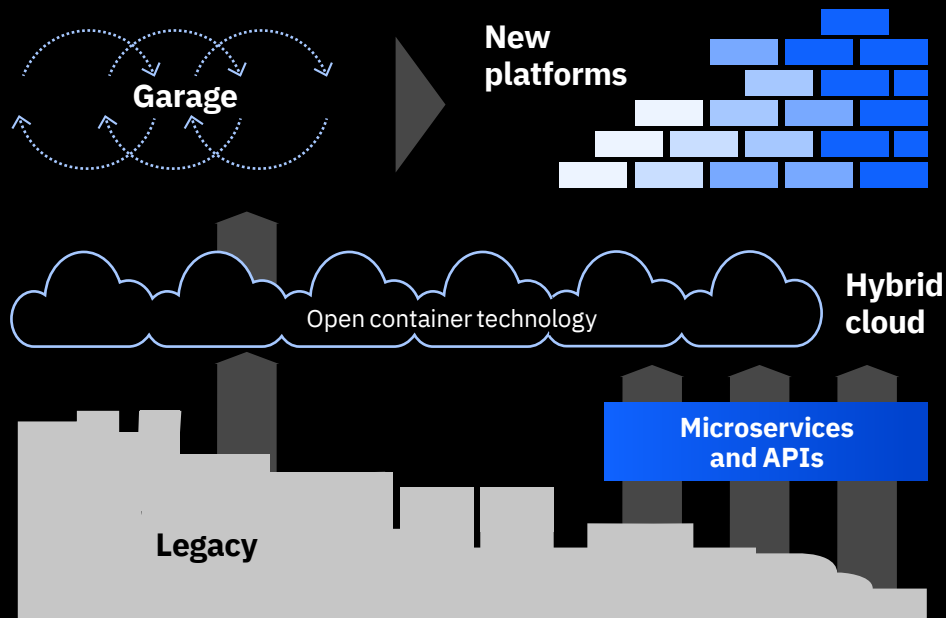
The success of the market-making platforms will depend upon the quality and differentiation of the Intelligent Workflows that underpin them. It is also possible for Cognitive Enterprise journeys to begin with the targeting of opportunity in a specific workflow that opens up the potential for a platform play.

We do see that the choice of which value pools to go after, and the related workflows to tackle, is critically important. These workflows need to appropriately leverage exponential technologies at scale. Then the data strategy to underpin the workflow redesign can be appropriately targeted, as well as the right application and hybrid cloud architectural choices. We see situations where organizations may start their journey with an enabling, broad-based data fabric or a definitive journey-to-cloud strategy. Soon, though, the need to define what the data and cloud is going to be used for becomes key.

The human-technology partnership and use of new skills and culture must underpin platform and workflow transformation, and cannot be started too soon. At the same time, these aspects are some of the hardest to durably change.

Figure 3:

Enterprise transition from legacy to new



A sense of direction and a North Star for the required shifts is essential. As the platform and workflow priorities become clearer—and the scale of the human, team and leadership step changes evolve—more and more focus can be brought to the very difficult and complex interventions. Once we understand where the critical interfaces between human and machine will be, we can orchestrate our leadership and skills-building activities accordingly. Agility, too, can both be developed as a general “foundational” capability in teams and ecosystems and find focus and purpose in light of the other building blocks of the Cognitive Enterprise (see Figure 3).

A sense of direction and a North Star for the required shifts is essential.

Action Areas to build Market-making Business Platforms

1. Double down on “Big Bets”

The choices that organizations are making about which market-making business platforms to major on are existential in nature—they are the means through which organizations shape markets to their advantage. They are not experimental, nor are they peripheral plays that reside at the edge of the company. We are seeing organizations commit their future to these new markets and to exploiting them by applying data, technology, and new expertise at scale. The focus of these new platforms is anchored in the core of the company. They take advantage of traditional sources of differentiation and channels, as well as the organization’s unique access to data, then evolve and scale those capabilities over time.

As such, any bet made on platforms needs to become the holistic and explicit strategic intent of the organization. The CEO, Board, and leadership need to espouse the North Star that the fresh direction represents and draws upon the organization’s legacy values to create a compelling mission and vision. We see leaders setting out on these

new directions and making substantive investments to support their plays. Frequently, merger and acquisition activity reinforces the bets they are making, as does the overall allocation of capital.

Most importantly, the external narrative of the company needs to reflect the new areas of focus and the value proposition of their business platforms to create the right multiyear focus for sustained activity and development. For platforms that extend beyond the organization, credibility in the eyes of ecosystem members and buy-in from them are make-or-break conditions (see Figure 4).

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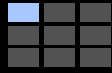
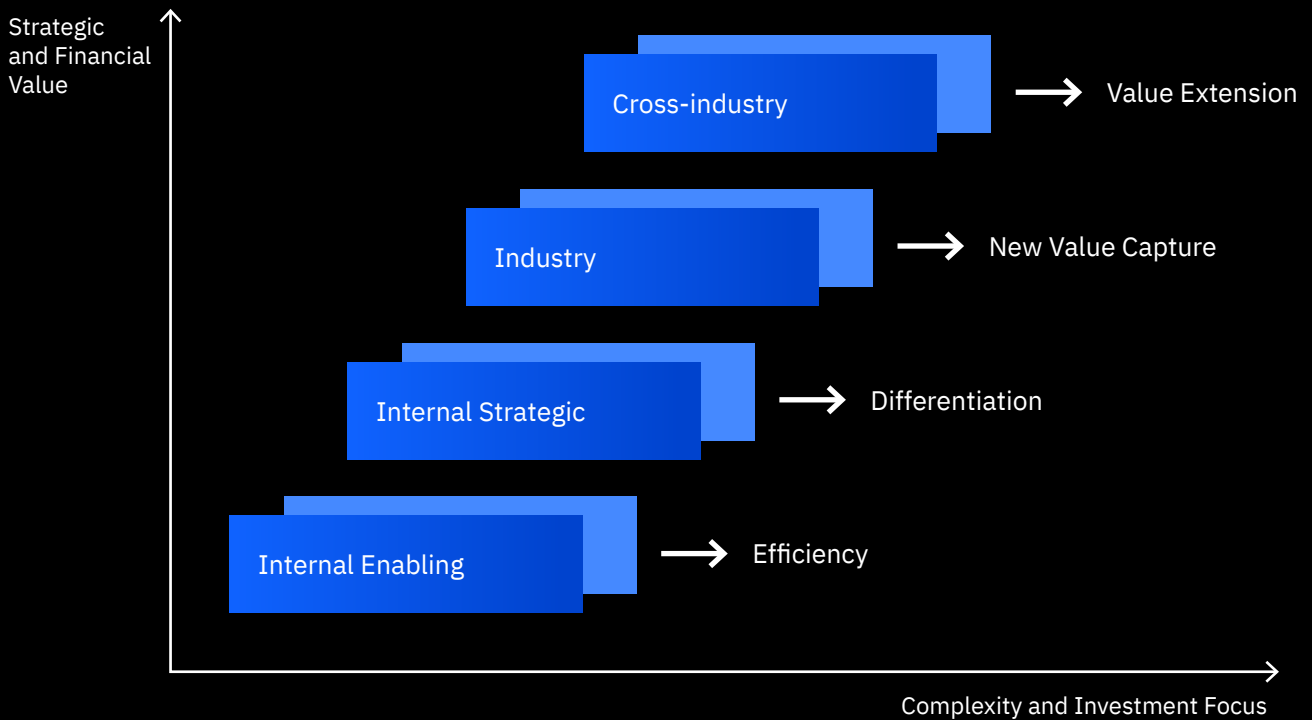


Figure 4:

Double down on big bets to build out competitive advantage



As every company becomes a platform and technology company, the relationship between technology competence and business strategy changes, reinforcing the need for the talent and capability agenda to be reimagined, too. This means that the whole ecosystem of partners and joint venture collaboration is on the table. It is rare that a new market-making business platform will be created entirely from existing internal componentry.

The focus on new platforms is anchored in the core of the company.

Action Areas to build Market-making Business Platforms

2. Create a new business blueprint

Market-making business platforms straddle the heart of the organization. They represent a wholesale change to both the nature of work and relationships with business functions and partners. As such, they must drive a fresh look at the target operating model of the company. The business needs to be aligned and synchronized along the platform architecture to drive the outcomes that are thus desired. This applies to the core differentiation of business platforms on the front lines, as well as the interaction with enabling platforms that support the vision. Existing functional roles will be redistributed; where and how decisions are made will also shift.

This new business blueprint addresses the target operating model, decision framework, culture and skills, roles and responsibilities, as well as how humans and AI work together in a business platform context. The blueprint helps organizations identify and execute strategic priorities, anticipate how each change will ripple across the organization, and relocate resources accordingly (see Figure 5).

The business architecture needs to be defined and must also set the tone for the other architectures that will underpin it—including process, technology, and data. The business platforms need to be extremely visible and drive the architectures. These architectures will provide the guide-bars within which innovation and agile co-creation can thrive.

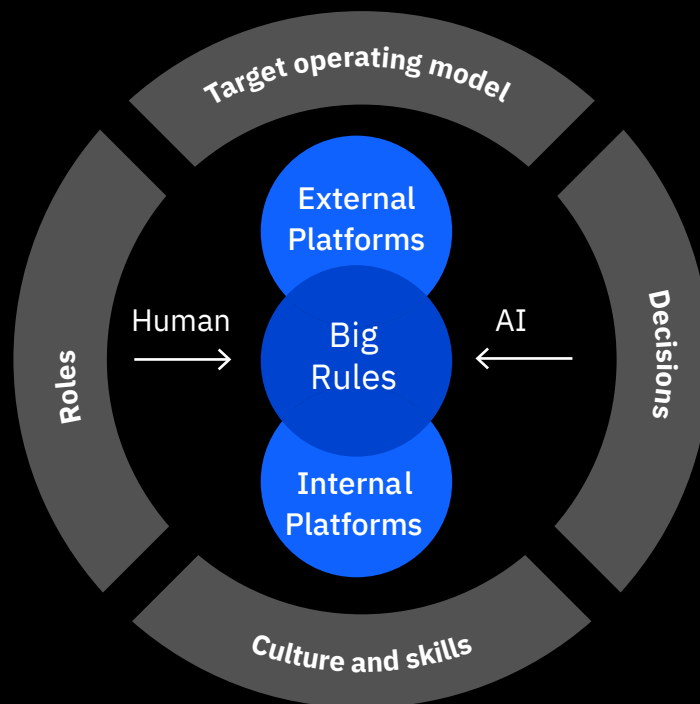
A further key principle here is the need for “openness” in the architectural thinking. All business platforms and workflows must be designed for seamless external connectivity. As organizations embark upon building platforms, whether inside their four walls or at an industry level, they cannot know what the final potential for extension or new modular capability might be.

Organizations need a set of “big rules,” guiding principles that define the core accountabilities across the matrices that inevitably exist. Ideas such as “freedom within a framework” need to have clear definitions on two dimensions: what decisions participants are free to make on their own and what is constrained by a framework set elsewhere.⁴ The exponential technologies, together with greater reliance on data-led decision-making and automation, will need to have these rules embedded in their business logic and algorithms.



Figure 5:

Business architecture sets the frame for the Cognitive Enterprise blueprint



The new business platforms will also be subject to continuous improvement and learning from the feedback loops that are embedded in intelligent workflows. Traditional hierarchical decision-making and information flows—up and down the organization chart—will therefore be disrupted. Governance processes and meeting architectures that determine where, how, and by whom decisions are made, as well as delegated accountabilities, need to be adapted to this new world as part of a wider shift in management culture and systems.

Organizations need a set of “big rules,” guiding principles that define the core accountabilities across the matrices that inevitably exist.

Action Areas to build Market-making Business Platforms

3. Orchestrate compelling change

We are describing wholesale change at multiple levels from business strategy through core platform execution, intelligent workflow build-out, and massive technology enablement. This demands “change management on steroids.” For many, the disciplines in this space have atrophied over the years. In any case, historic techniques are not fit-for-purpose in the environment of the Cognitive Enterprise.

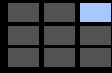
The speed of change, exponential learning, complexity, and the fragmentation of solution components, together with the underpinning concepts of agile ways of working (such as squads, scrums, and sprints), raises the bar for the level of orchestration required. A world of countless sensors, bots, algorithms, microservices, and APIs—underpinned by new workflow and sub-workflow reinventions at enterprise scale—massively heightens the challenge to understand the status of change at all times. The same goes for a solid understanding of the organization’s performance and its ability to predict challenges and future opportunities in real-time.

We have developed the “Control Tower” concept as a vehicle to lift the historic disciplines of “program management” and “dashboards” to a new level. This fresh approach is massively technologically

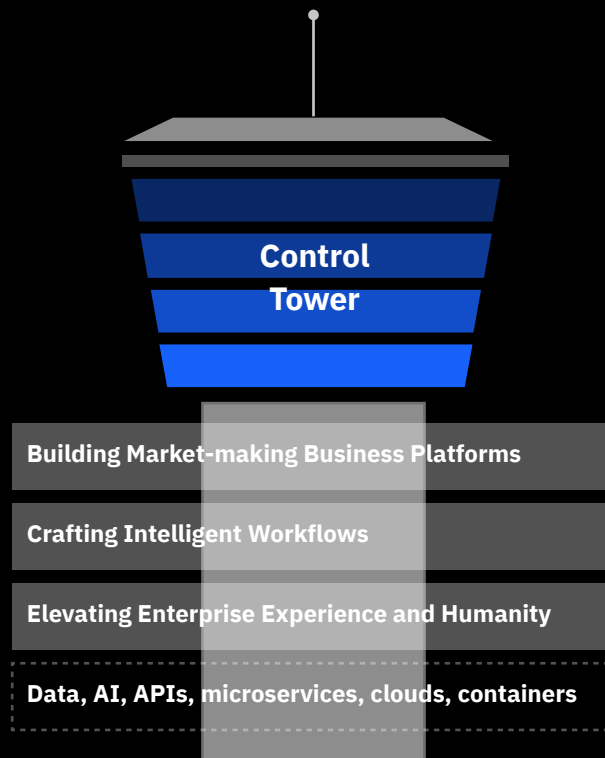
enabled and leverages automated data feeds and analytics. A control tower monitors environmental conditions in real time, increasing visibility and communications, and allows for speedy and intelligent responses. It provides alerts and tracks the moving parts of change initiatives, as well as the underlying business performance and outcomes. It recognizes the dynamic and fast-changing nature of the transformation we are describing. As a fundamental part of the instantiation of the Cognitive Enterprise, it effectively becomes the “brain” of the company (see Figure 6).

We see the control tower operating across multiple levels of the organization from overall enterprise performance to key business platforms, critical intelligent workflows, and major enabling technology platforms. It encompasses people, process, and systems activities.

Control towers are just one aspect of the heightened level of the new change management that we expect to see. As new capability is continually fed into the organization, continuous learning becomes a prerequisite to leverage this evolving collection of capabilities.

**Figure 6:**

The Control Tower provides new levels of insight and coordination



A set of approaches that mirrors the world of DevSecOps in IT will need to be transferred into the wider business. Agile and “Garage” techniques, which have been employed to drive fast cross-functional innovation, will need to be scaled and repurposed to deal with an ever-changing business-as-usual picture. Connecting all of this to the evolution of the skills, culture, leadership, and mindset of the organization will be critical.

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Yara

Cultivating a high-yielding platform for growth

Yara, one of the world's leading fertilizer companies and a provider of environmental solutions, have created an industry-wide business platform to connect and empower independent farmers.⁵ It will use IoT sensors and AI and TWC to provide hyperlocal weather forecasting, crop damage prediction and real-time recommendations.⁶

Already downloaded by over 1,300,000 farmers, this platform is transforming existing supplier relationships and expanding its value.

Yara built a digital farming platform that connects and empowers independent farmers, expanding its business model as a first-of-a-kind, competitive differentiator in the industry.

Results

The platform aims to cover **7 percent** of all arable land and provides two initial services: weather data and crop yield

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





Action Areas to create Intelligent Workflows

1. Embed exponential technologies

The key building blocks of the new market-making business platforms and the Cognitive Enterprise itself are intelligent workflows. When augmented by exponential technologies, such workflows radically change how work gets done and how new value is realized (see Figure 7).

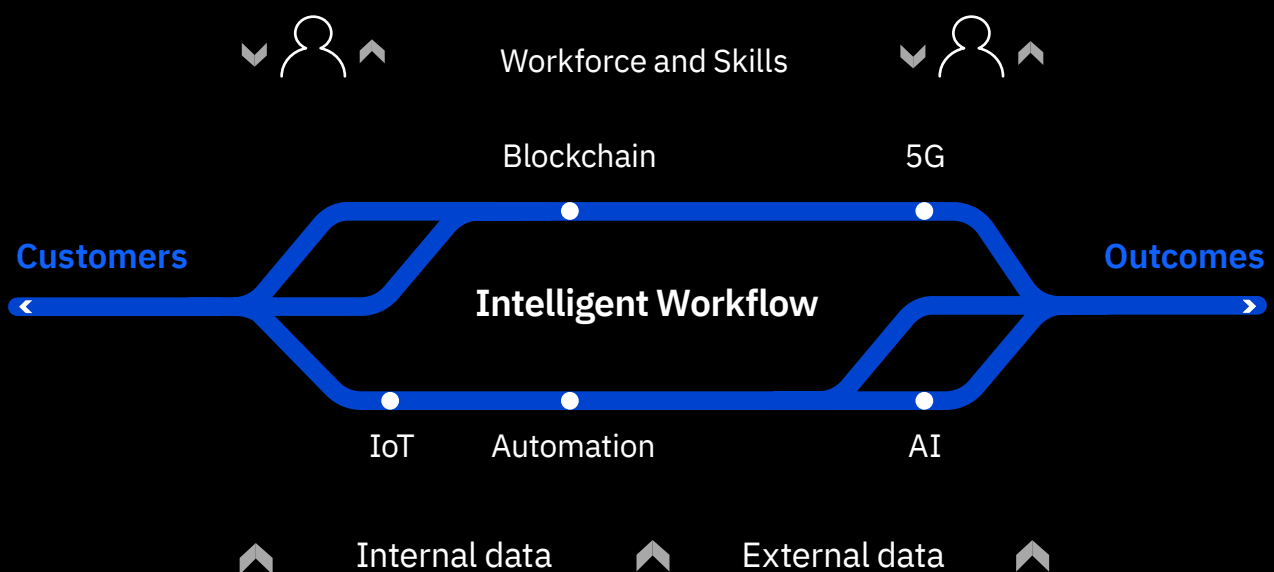
These workflows need to be identified and prioritized based upon the business platform intent and the workflows' potential for differentiation. Intelligent workflows will be defined as widely as possible to exploit the full end-to-end and front-to-back potential of

the workflow. They are bigger than traditional processes—which often have been left independent of one another, limiting their efficacy—and straddle existing functional siloes. They are driven by customer (internal or external) demands and deliver economic and experiential outcomes.

We live in an age where exponential technologies such as AI, IoT, automation, blockchain, and 5G can be leveraged at scale and in combination to truly change the nature of workflows and deliver vastly superior effectiveness and efficiency. This means that the critical requirement is to work out how and where these technologies can have the most impact and drive the biggest returns.

Figure 7:

Exponential technologies embed intelligence into workflows





Having a critical workflow in mind is a vital starting point for experimenting with multiple approaches to identify new value pools and uncover sensitive pain points. Using targeted agile approaches, such as the IBM Garage approach, we can experiment at pace with the application of technologies to exploit opportunities and solve issues. Tapping into different pools of expertise on the business and the technology sides of the organization—as well as into those of partner organizations—will surface new answers from best practices, reusable assets, and the latest research insights.

The value pools and pain points provide vital direction and focus to the data science tasks involved. In a world where exponential technologies depend upon the raw material of data, data availability and quality are key to the design of intelligent workflows. The difference between “hunting” for the right data to meet a workflow need and “fishing” for it in hope of finding some insight is an important distinction. Recognizing this can vastly reduce the wasted effort of collating and cleansing non-value-added data sources.

Another major facet of embedding exponential technologies is the relative impact they have on the workforces and skills that sit along the workflows. In some cases, correcting the imbalance in these aspects will, in fact, be the value pool to be exploited or bottleneck to be removed.

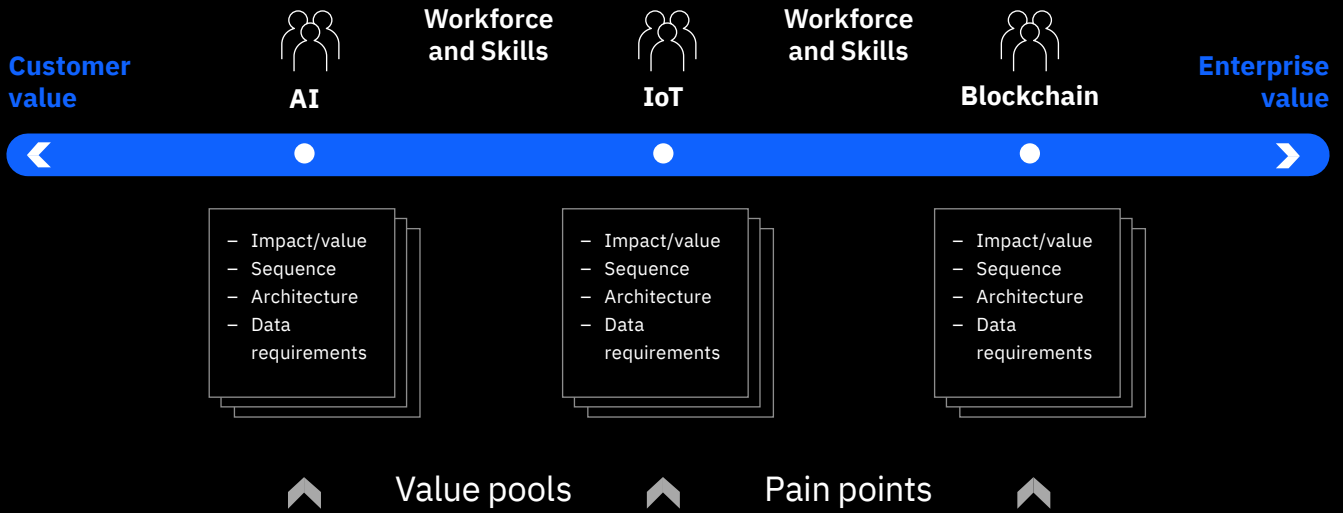
Organizations need to understand the effects that a combination of technologies will have on the scale and complexity of the human tasks that are not “automated.” At that point, they can devise the agenda for the upskilling and reskilling that full-scale implementation requires. IBM’s analysis of over 200 intelligent workflow implementations suggests that, compared to strong traditional execution, strong execution with AI and exponential technologies typically yields three times more benefits.

We live in an age where exponential technologies such as AI, IoT, automation, blockchain, and 5G can be leveraged at scale and in combination to truly change the nature of workflows, and deliver vastly superior effectiveness and efficiency.



Figure 8:

An Intelligent Workflow blueprint defines key areas to build the Cognitive Enterprise



All of this activity results in the creation of an intelligent workflow blueprint (see Figure 8). The blueprint acts as a business case, defines prioritization, and is used as a planning tool to go after the opportunities in a particular workflow. It can be used to sequence the building blocks of value, and the “modules” of intelligent workflow build-out so that they are open, extensible, scalable, and portable.

Then, the building blocks can be deployed to a wide variety of environments and on the cloud without modification. The business cases for next-generation enterprise applications, such as SAP S/4HANA, Salesforce, and Workday will be enhanced by intelligent workflow thinking, which adds color, differentiation, and higher value to the core process functionality of these software solutions.

Action Areas to create Intelligent Workflows

2. Drive value from data

Data is the raw material of the Cognitive Enterprise. It helps define the market-making business platform focus and enables the mission-critical intelligent workflows. The data that lies within the four walls of the enterprise is a valuable source of differentiation. This is especially true when combined with targeted external or partner data sources that can have a dramatic impact on business models and value.

Not all data, however, is created equal—nor is it of equal value. Having the right data for the right purpose is critical. There is a clear reciprocal relationship, therefore, between the choices made in terms of market-making business platforms and intelligent workflows, and the data needed to bring them to life. This relationship helps target the data focus, as well as surface opportunities to exploit the data at hand. Organizations need an information architecture to underpin their business and workflow architectures.

Data readiness is a pre-condition for value—and readiness includes attributes like accuracy, cleanliness, standards, openness, and permission. These are hard things to certify across all of the data in an organization and even harder given the proliferation in quantity and granularity of available data. While tools such as AI can help organizations see patterns and the forest from the trees, it remains important to know where to focus vital data curation efforts. It's estimated that 80 percent of the effort in deploying AI is getting data ready for use (see Figure 9).⁷

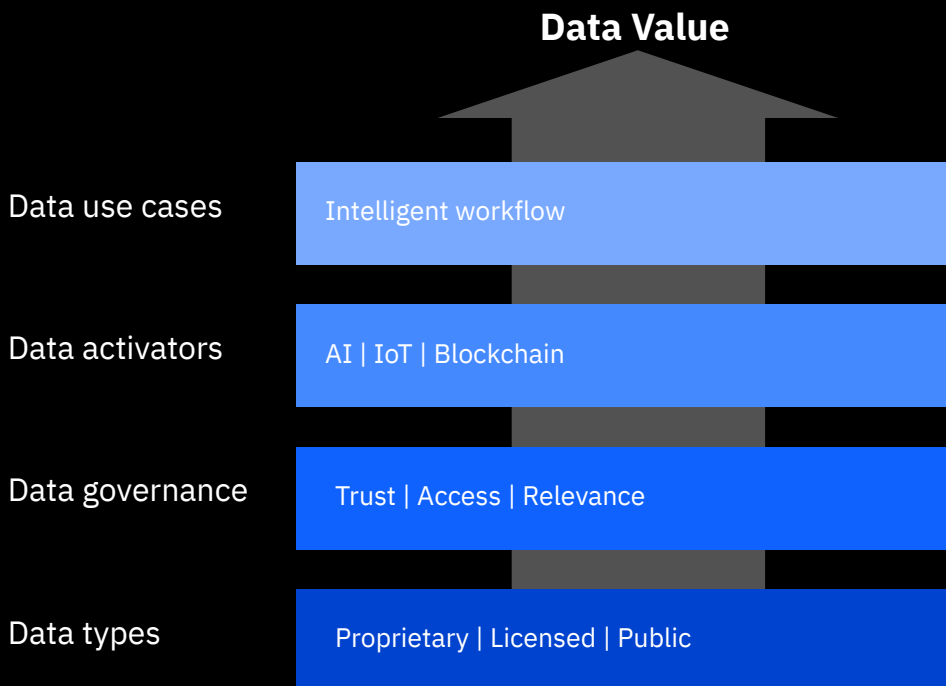
A key attribute of the Cognitive Enterprise is creating a culture of data trust. Recent research we have completed has highlighted that organizations that have truly learned to trust their data drive better business outcomes.⁸ Clearly, when important processes, decisions, and customer and stakeholder interactions rely on automation and algorithms, the requirement for trust is heightened. We see a growing focus, therefore, on finding and reducing as much bias as possible from data sources, algorithms, and human decision-making in order to move ahead with these technologies at scale.

The use of externally accessed data—especially data from customers—is also under scrutiny, as many business platform and intelligent workflow improvement ideas rely on such data. Our research shows that the principles of transparency, reciprocity (that is, receiving value back for data that is shared), and accountability are essential in the creation of the new business platform business models.

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.⁹ Organizations that abuse the trust of stakeholders in their use of data will increasingly risk coming under regulatory scrutiny. Ultimately, they could even lose their “license to operate.”

**Figure 9:**

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



Openness, a key principle of the Cognitive Enterprise, also applies to data strategy. Many business platform and intelligent workflow opportunities will derive greater benefits from sharing data with ecosystem partners than in keeping it for their own use. This sharing can enhance the value of incumbents' data and have a multiplier effect. As a source of value, however, organizations need to exercise care to prevent control points in a value chain from inadvertently being ceded. In addition, data sourced from others must match the quality and trust levels of their internal sources.

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Action Areas to create Intelligent Workflows

3. Deploy through hybrid multicloud

Cognitive Enterprises, with their business platforms and intelligent workflows, will be fundamentally enabled by hybrid multicloud applications and infrastructure. At heart, these new business models are what the cloud is for. This differs from the purely technology architecture-based thinking that we see in some organizations hellbent on “going to the cloud.”

Hybrid cloud architectures straddle the worlds of on-premise systems (such as mainframes), private clouds, and public clouds. Many organizations already have multiple environments in play as individual components of their legacy are renewed (see Figure 10). To date, this has often happened in a relatively piecemeal and limited way.

The enablement of intelligent workflows at scale is the primary driver to a more wholesale architectural change. A hybrid strategy, by our estimates, adds up to 2.5 times more value than a public-cloud-only strategy.¹⁰ That value runs the gamut from migrating more applications to removing duplicative processes, enhancing cyber security, and reducing regulatory risks.

Intelligent workflows will have an assortment of underpinning enterprise applications, varying implementations of embedded exponential technologies, and evolving data architecture needs. Each of these has the potential to be enabled by different components of a hybrid cloud environment. Applying a fit-for-purpose cloud architecture that meets workflow technology demands defines mission-critical enterprise change.

Business platforms will evolve their scope to include new partners, and intelligent workflows will extend platform reach. As such, the principles of openness and flexibility are vital in the enabling application and infrastructure architectures. Open source solutions and container technologies (such as Red Hat OpenShift) will allow for the ongoing connectivity of future modules of capability and new ecosystem components. What’s more, architectural choices can be de-risked through “build once, deploy anywhere” approaches.

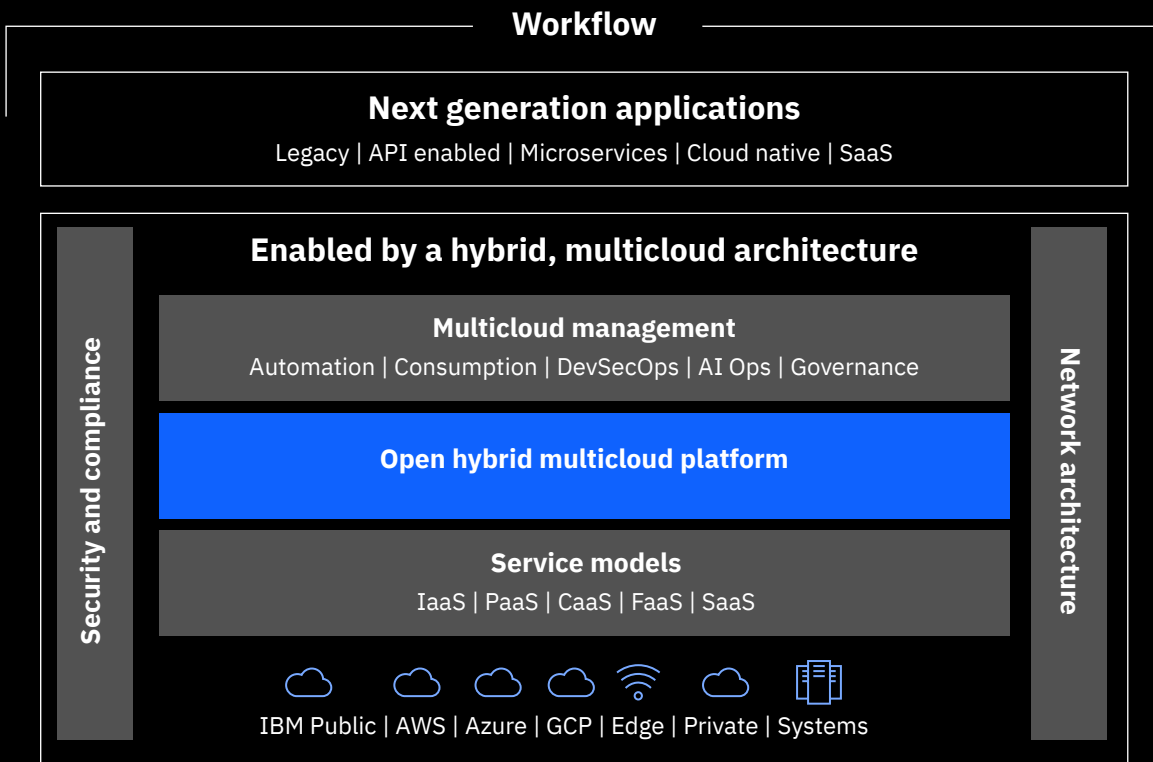
One of the biggest impediments to the creation of Cognitive Enterprises is legacy systems and their complexity. Hybrid cloud architectures can release the value of trapped data and functionality, along with handling the transition between old and new applications. Part of the solution will be the creation of abstraction layers that can help to insulate the reinvented workflows from the “spaghetti code” of the past. Inevitably, however, organizations are moving into a world where the wholesale rewriting of selected core systems will be necessary to enable intelligent workflows.

As all companies become technology companies, the concept of enabling IT and the role of the IT department is changing. At a very basic level, IT and the business are coming together through more agile and extended teaming models, while new centers of excellence supporting evolving exponential technologies are arising inside and outside of IT groups.



Figure 10:

Dynamic orchestration with hybrid multicloud drives flexibility and speed



The business platform and intelligent workflow framework can be helpful in organizing these new alignments and in establishing more fit-for-purpose governance models. We already see new coalitions of the C-suite coming together to drive these initiatives. However, as both “enabling IT” and “technology as the business” merge, whole new constructs will need to be invented, led from the top of the organization.

One of the biggest impediments to the creation of Cognitive Enterprises will be legacy systems and their complexity.

Crédit Mutuel

AI helping smarter agents make happier customers

Crédit Mutuel, one of France's leading banks, set a bold strategy to infuse AI across all lines of business, positioning itself as the benchmark for relational banking in a digital world.¹¹

Crédit Mutuel has over 5,000 branches that receive more than 350,000 online inquiries a day. To consolidate its position as number one in customer relations for the banking sector, it continued to reinvent the role of client advisor by empowering them with AI to free up time.¹²

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. Crédit Mutuel also established a cognitive factory that provides an environment for identifying, building, and deploying new AI solutions.

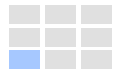
Results

Crédit Mutuel launched **15** cognitive assistants across various businesses, including one able to provide **15,000** different answers

A cognitive email solution allows the bank to reassign **200,000** working days annually toward training

The company is aiming to expand cognitive solutions to **100 percent** of the business line of the company





Action Areas to advance Enterprise Experience and Humanity

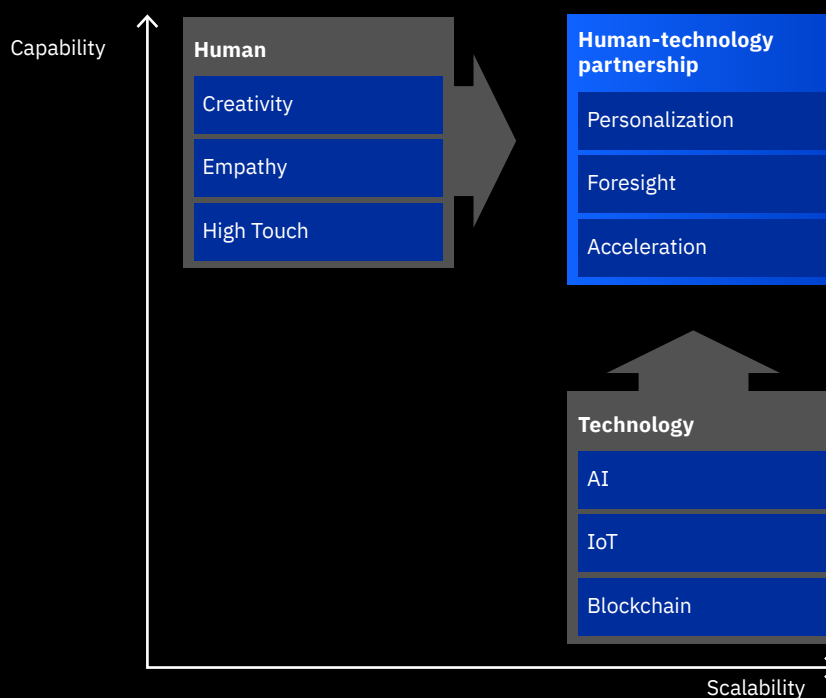
1. Elevate human-technology partnerships

The Cognitive Enterprise, with its smart business platforms and intelligent workflows, is massively technology enabled. But for all the value created by technology, it is apparent that the most successful organizations will be the ones that are able to fuse the power of technology with an enhanced human performance and enterprise experience (see Figure 11).

Expertise is a critical driver of the market-making business platforms that organizations choose for competitive advantage.

For this, incumbents can leverage their deep legacy expertise while also multiplying and adapting that expertise to make new markets. Workflows already encompass large numbers of skilled people—who are infused with an organization’s culture—and ever-evolving workforces of different scales and competencies. As exponential technologies are applied to create intelligent workflows, roles and jobs will change, but also much of this capability will be critical to the next instantiation of an organization’s end-to-end and front-to-back processes.

Figure 11:
The human-technology partnership will “up the human game”





Automation will take over repetitive tasks. AI will undertake instant analysis. IoT and 5G will allow organizations to gather information remotely. Blockchain will alleviate administrative burdens and the need to manually check processes.

All of this will change the roles and activities in organizations. New platforms and workflows will surface new spaces for insight, create new areas for humans to add value, and continue to require empathy, relationships, and other soft skills to differentiate them.

The concept of enterprise experience is rising just as quickly as the evolution of the “hard”—or technological—components of the Cognitive Enterprise. Customer experiences remain a fundamental driver of change. They are increasingly linked to the experiences of the employees who serve customers.

Whole enterprises are realizing that the way stakeholders experience the enterprise every day is at the heart of what we traditionally call values and behaviors. Also, in a world of ecosystems and networks, organizations see the need for this consistency of experience to extend beyond enterprise boundaries.

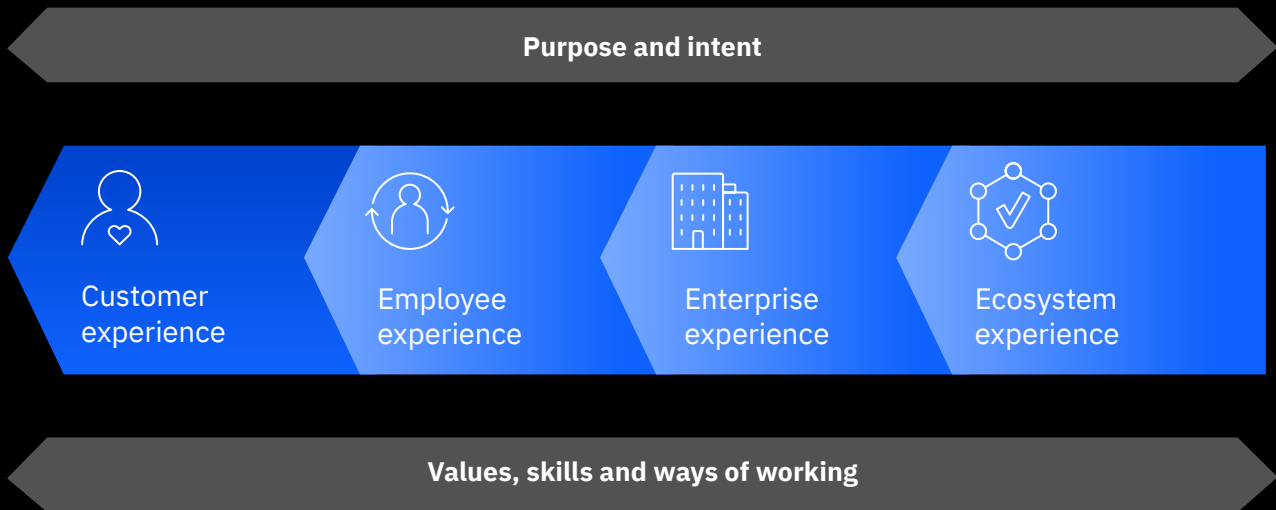
Experience in the Cognitive Enterprise will be delivered by humans and technology in partnership. As humans adopt better tools, they will “up their game;” as the technology becomes even more intuitive, they will increase their adoption of it. New technology solutions and their application to platforms and workflows will set a higher and higher bar for professionals who work with them, driving upskilling and reskilling. In turn, people will demand ever better design and functionality from their tools.

Design thinking, experiential learning, co-creational models that incorporate agile feedback loops, and continuous learning and improvement will all need to become embedded in the Cognitive Enterprise. These will drive the ongoing evolution of business platforms and intelligent workflows. Human-centered design approaches—that engage wide bodies of stakeholders to understand and evolve needs and expectations—will become the default for such transformations.

As humans adopt better tools, they will “up their game” and as the technology becomes more intuitive, their adoption of it will increase.

**Figure 12:**

Customer experience: built upon underlying experiences, defined by purpose, and driven by values.



An organization's purpose and intent will also be important drivers of the human-technology partnership in the Cognitive Enterprise (see Figure 12). The ethical application of technology to do good and the transparency of an organization's positive impact on a wide range of stakeholders are becoming more and more important. Issues such as sustainability, inclusion, and trust demand attention. How people align behind the technology potential of the new models and approaches will be as important as, if not more important than, the technology's robustness.

Action Areas to advance Enterprise Experience and Humanity

2. Cultivate smart leadership, skills, and culture

Leading in the world of the Cognitive Enterprise is very different, in terms of the demands it places both on leaders' skills and approach to leadership. As more companies become technology companies and exponential technologies scale to open up more strategic opportunities—as well as threats—all business leaders will need to move beyond being merely tech-savvy.

If leaders are going to bet their business on new massively technology-enabled business platforms, then they need to understand the range of technologies involved, along with their likely future potential and development path. This involves deeper awareness of an extended ecosystem of fast-evolving concepts and solutions, and the ability to apply that knowledge both offensively to seize opportunity and defensively to manage disruption.

As business platforms straddle industry boundaries, leaders will need to look outside traditional industry networks to seek insights, build relationships in diverse sectors, and learn new ways to monetize ideas. This includes participating in the worlds of technology organizations and start-ups and finding ways to incubate fresh co-creational environments in the organization.

Courage, purpose, and clarity of intent continue to be the hallmarks of leadership. But as the nature of big bets stretches away from traditional areas and into new territory, the ability to set a North Star

and communicate unambiguously about the organization's intent and the journey underway is more critical than ever. It is vital for leaders to set guide-bars for the wider organization and reinforce prioritization of platform and workflow choices.

Alongside clarity and frameworks, however, organizations need to “let go” more as the innovation around platforms and workflows moves to the edge of the organization. This is when empowered and agile teams can come together to exploit data, find ways to apply technology, and innovate key experiences.

It is also important to recognize that new coalitions of leaders will need to be brought together across the executive team to make substantive progress in these new areas. Functional leads, CIOs, Chief Digital Officers, Chief Transformation Officers, and the line need to be synchronized with the platform and workflow transformation intent—including appropriate shared metrics and incentives.

Culture change is complex in the Cognitive Enterprise and needs to be accelerated in a way that takes traditional approaches off the table. Exposing the wider organization to the ideas and potential of new technologies and ideas is part of the answer. So is encouraging learning by doing.

Ultimately, though, culture change requires a more proactive skills agenda. And as more and more employees gain confidence in understanding and applying new technologies, they become change advocates. In turn, upskilling and reskilling at scale becomes critical.



Figure 13:

An empowered workforce is driven by inspired leadership and a culture of continuous learning



As new business platforms are built and intelligent workflows are developed, the need for the workforce skills transformation will become more evident. Companies can get ahead of the curve by making deliberate moves to support affected populations. 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.¹³

It is almost as if every company needs to apply the “practice” disciplines of a professional services company on their pools of expertise. These disciplines enable the ability to accelerate the growth of certain bodies of skills, upskill target populations, and over time, sunset capabilities that

are less in demand. We have learned that employees are more concerned about clear plans with deliberate, proactive actions to address the impact of these technologies, than they are with the technologies' potential consequences.

The lifecycle of many skills and their relevance is diminishing all the time. The Cognitive Enterprise needs to create a continuous learning culture and set of approaches: a culture that values the propensity to learn and embraces soft skills (such as collaboration) more than specific technical or business capabilities. As part of a wider push to enhance the employee experience, it is becoming more common to leverage AI and other tools to help direct and support continuous learning across the human resource lifecycle (see Figure 13).

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.

The company realized its enterprise transformation must begin with its leaders, so it started with 80 of its top executives to create a robust development program launching new digital approaches under the campaign "Being Digital." CEMEX established a Digital Academy and learning and development platform to provide common vocabulary, assets, and delivery channels.

In 2019, CEMEX expanded the platform with "Digital Foundations Program" to target senior leaders, managers, and the front-line to learn how to grow, lead, and work effectively.¹⁴

Results

CEMEX pioneered a robust **development program** and learning environment with its top 80 executives

The company launched the Monterrey Digital Hub, an **innovation ecosystem** connecting CEMEX with entrepreneurs

It introduces its leaders to new **concepts and skills**, including business model innovation and emerging technologies





Action Areas to advance Enterprise Experience and Humanity

3. Perform with purposeful agility

The world is embracing the concept of “agile,” and most organizations are somewhere on the journey to create agile squads and embrace sprints, scrums, and standups. This has been valuable in opening up organizational siloes, breaking down barriers, unfreezing organizations, and spurring bottom-up innovation. The challenge with many of these activities, however, has often been identifying a clear outcome or impact. In some cases, “agile chaos” has resulted.

Agile ways of working can have huge value, but they need to be made more purposeful for greater effectiveness and efficiency. The Cognitive Enterprise framework, with its focus on business platforms and intelligent workflows, provides a clear context and delivers the guide-bars within which all this innovation can take place and scale.

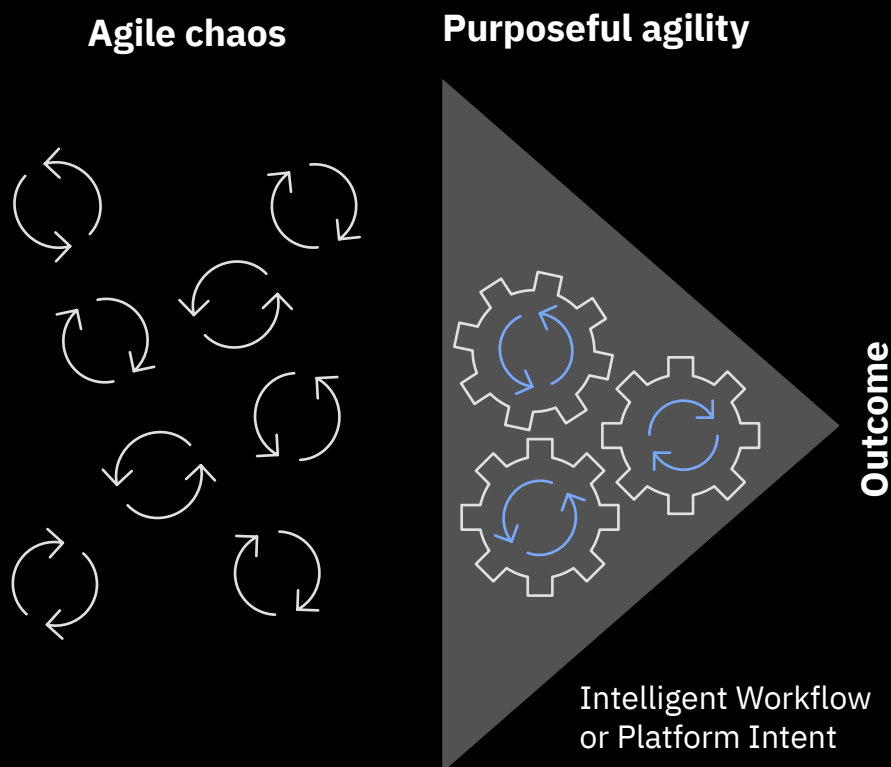
By pulling teams together from inside and outside the organization and aligning them to the core platform or workflow intent, organizations help reduce the risk of Brownian motion and concentrate the energy of these groups around clearer outcomes. As team sprints put in place the building blocks of the platforms or deliver modules of workflow enhancement, it is possible to direct the backlog of innovation ideas in a way that optimizes both returns and strategic alignment.

The Cognitive Enterprise therefore provides “grown-up” governance for agile activities. It can more readily connect those activities to major capital allocation and business case decision-making while still driving near-term progress and value.

Agile ways of working can have huge value, but they need to be made more purposeful by aligning teams with the business platforms and intelligent workflow intent.



Figure 14:
Purposeful agility drives orchestrated teams through clearly defined outcomes



In addition, this approach—purposeful agility— helps define the business architecture and other underpinning architectural choices. This means that if an idea that has been incubated is deemed “ready for prime time,” then it should be more readily scalable. One of the biggest challenges we see with agile innovation is how to bridge the chasm from pilot to scale-up. Purposeful agility de-risks this activity (see Figure 14).

This approach is also very important for bridging the divide between the business and IT in the evolution of solutions. It jumpstarts the process of blurring the lines between these groups as technology becomes the business. Done in the right way, it can also be a huge accelerator of the reskilling, upskilling, and culture change agenda as players are exposed to the potential of the new technologies and learn by doing.

New way of building: Garage

In becoming a Cognitive Enterprise, how a company transforms its business platforms and reengineers its workflows can make the difference between coherence and chaos. The IBM Garage approach is the perfect vehicle to initiate, execute and reinforce the journey.

Organizational agility is essential, but implementing “agile” is not enough, and rapidly multiplying decentralized iterations can spiral out of control. To help mitigate the risks of rapid change, organizations need the right methods, mindset and technology to convene and unlock the power of teams across an organization.

The Garage approach is just that: a bold, in-depth approach to innovation and transformation through collaboration and execution. It enables companies to co-create, co-execute, and co-operate the business platforms and intelligent workflows of the future (see Figure 15).

The Garage approach is fundamentally purposeful. We believe that, to harness the creativity and agility of an organization, it needs to have a clear, measurable intent. As such, we recommend that a Garage is focused on either helping to build a specific business platform or that is aligned with the reinvention of a targeted workflow.

Such thinking helps to bound the breadth of participants and focus the identification of pain points, value pools, and data sources. This will also help ensure that any building blocks of enhanced capability that emerge from Garage sprints can be part of a clear bigger picture by linking each sprint or phase of activity directly to the strategic imperatives through a structured frame. This, coupled with the core tenets of user-centricity and the human experience, enables both speed and value realization and is the key to meaningful, lasting, success.

Garages provide an opportunity to access the full ecosystem of a business to help co-create the future: customers, citizens, designers, developers, architects, partners, suppliers, resellers, regulators, and all other relevant stakeholders innovate together. The Garage straddles organizational boundaries, combining business and technology and internal and external sources of insight. Open collaboration with agile squads accelerates delivery, learning and engagement. The Garage experience helps companies move faster, work smarter, access the right talent, and reconceive the way they build, innovate, and grow—and all of that in measurable, iterative ways.



Frito-Lay

Delivering snackable innovation

Frito-Lay 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, it needed to manage its complex value chain including logistics, distribution, and sales challenges.

IBM and Frito-Lay employees completed hundreds of hours of user research, interviews and field visits. By co-creating the backlog with value as the key factor, executives were able to make decisions more quickly.

The teams built and delivered proofs-of-concept focused on select verticals into pilot markets and now Frito-Lay has more than eight garage tracks and is focused on scaling its solutions to its Frontline employees.

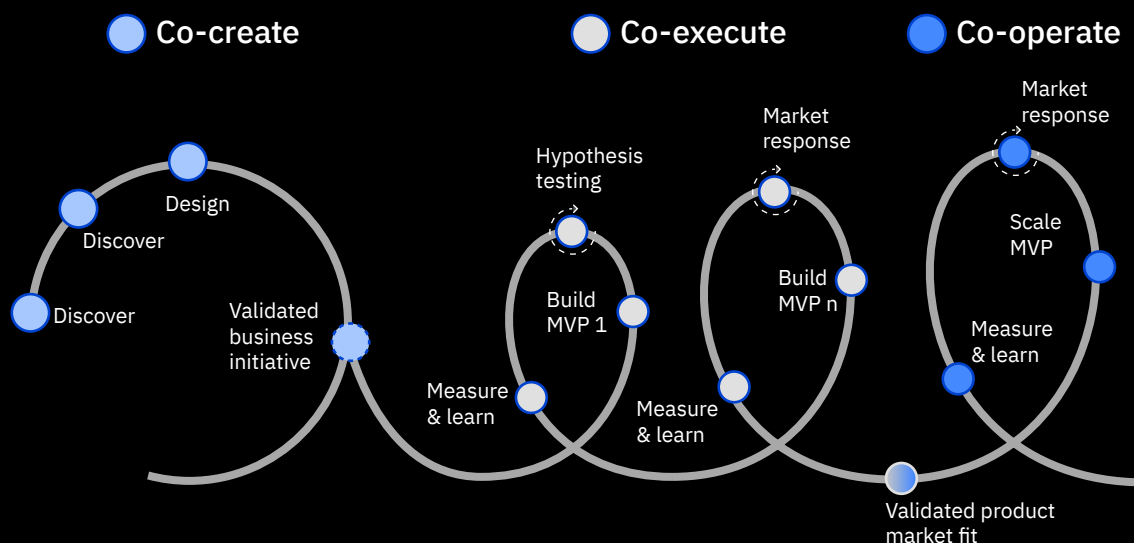
Results

Frito-Lay reduced the average duration of a request-in-market from 240 weeks to less than **30 days**

New features can now be pushed weekly

Customer-facing workflows are **increasing and driving** adoption¹⁵

Figure 15:
Creativity and practicality come together in the Garage journey



The Garage does need to be situated at the center of the organization if it is to assist with the transformation of mission-critical workflows. It needs to be visible, enabled with a clear mandate from leadership and connected to the macro governance and capital allocation disciplines of the organization. This focuses the output of innovation cycles on the most significant value realization and, if successful, can be rapidly and meaningfully scaled.

The Garage can utilize unique physical “space” in client or dedicated facilities, where design-thinking and collaborative building take place. It can act as a visible signal of culture change in the Cognitive Enterprise. It can also have a virtual instantiation and leverage Garage virtual tools, method and practices to draw upon wider expertise and straddle geographic boundaries.

Scale-up is a core concept of the Garage approach. We believe that by targeting big problems, engaging a breadth of stakeholders, and having Garages operate inside a company’s architectural “big rules,” the company can operate at the speed of a start-up and the scale of the enterprise. This thinking avoids organizations dying the death of a thousand Proofs of Concepts (POCs) or Minimum Viable Products (MVP’s).

The Garage does not just access the right teams of people. It also draws in the full breadth of exponential technologies and solution components. It is designed to enable the combinational power of multiple technologies, reusable architectural components, and Research and Development to accelerate impact and progress. As such, this approach can bring deep innovation to programs such as Digital Reinvention®, ERP replacement, shared services reengineering and outsourcing transformation.

The Garage has a durable position in the full lifecycle of business change from Co-creation, through Co-execution and into Co-operation.¹⁶

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 we 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.

The Garage therefore provides the perfect vehicle for the building of the Cognitive Enterprise. It can help to define and build the market-making business platforms, reinvent and re-engineer the Intelligent Workflows, and create the Enterprise Experience where the Humanity of the company is able to fully take advantage of the power of the exponential technologies at its heart.

Notes and sources

- 1 Rometty, Ginni. "We need a new era of data responsibility." World Economic Forum. January 21, 2018. <https://www.weforum.org/agenda/2018/01/new-era-data-responsibility>
- 2 Best Practices for Oil & Gas. "Suncor 4.0: Driving a People-Focused, Data-Informed, Technology-Enabled Business Transformation." <https://oilgas.bestpracticeconferences.com/event/suncor-4-0-driving-a-people-focused-data-informed-technology-enabled-business-transformation>
- 3 Suncor. "Suncor Energy First Quarter 2019 Financial Results Call." May 2, 2019. <https://www.suncor.com/-/media/Files/PDF/Investor-Centre/Presentations-and-Key-Dates/Webcast-transcripts/Q1-2019-financial-results-transcript-EN.pdf?modified=00010101000000&la=en-CA&hash=2CD1FF19AD2E0C6FAD0C9A5AF54796C09F492DD45>
- 4 Kossler, Michael E. "Give Your Employees Freedom Within a Framework." The Iclif Leadership and Governance Centre. <https://iclif.org/articles/give-employees-freedom-within-framework>
- 5 Yara. "Yara acquires leading crop nutrition recommendation platform to strengthen Digital Farming offering." November 6, 2017. <https://www.yara.com/corporate-releases/yara-acquires-leading-crop-nutrition-recommendation-platform-to-strengthen-digital-farming-offering>
- 6 IBM. "Yara and IBM." <https://www.ibm.com/services/client-stories/yara>
- 7 Bowne-Anderson, Hugo. "What Data Scientists Really Do, According to 35 Data Scientists." Harvard Business Review. August 15, 2018. <https://hbr.org/2018/08/what-data-scientists-really-do-according-to-35-data-scientists>
- 8 IBM Institute for Business Value. "Build Your Trust Advantage: Leadership in the era of data and AI everywhere." November 2019. <https://www.ibm.com/downloads/cas/K10GEMA9>
- 9 IBM Institute for Business Value. "Build Your Trust Advantage: Leadership in the era of data and AI everywhere." November 2019. <https://www.ibm.com/downloads/cas/K10GEMA9>

-
- 10 Jim Freeman in an interview with computer weekly. <https://www.computerweekly.com/news/252479165/How-tech-suppliers-are-easing-barriers-to-hybrid-cloud-adoption>
 - 11 1 IBM. “How a French bank built upon its strength—quality customer service.” <https://www.ibm.com/watson/stories/creditmutuel>
 - 12 IBM press release. “Crédit Mutuel and IBM Watson put technology at the service of people.” <https://newsroom.ibm.com/2017-04-19-Credit-Mutuel-and-IBM-Watson-put-technology-at-the-service-of-people>
 - 13 2018 IBM Institute for Business Value Global Country Survey; “Labor force, total by country.” The World Bank. 2017; IBM Institute for Business Value analysis and calculations. 2019.
 - 14 Based on IBM client engagements.
 - 15 Based on IBM client engagements.
 - 16 IBM Garage ibm.com/garage

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