The New Fundamentals

Seizing opportunities with AI in the cognitive economy

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Citizens increasingly expect that they own their own data. They also expect heightened service standards and stewardship from Government. Yes, most discussions around AI center around the “potentially devastating negative use cases and unintended consequences” but leaders recognize that technology-inspired, society-scale innovation now fueled by data is (again) changing life as we know it.

Leaders also see similar patterns from the early internet days and not only want to transform the business of government, but to also enable citizens to navigate the transition well and position to seize the exponential opportunities of the new era. All are now asking critical questions regarding data and its nascent foundations:

- Who owns the ‘data’ in big data?
- Where does big data stop and privacy start?
We are in a new Era of Exponential Learning.

All—organizations, industries, governments, individuals—are learning, interacting in dynamic ecosystems and augmenting intelligence at increasing scales.

Disruptive forces are reshaping societies and economies (Figure 1). The impact of technology is especially profound, driving new economics while influencing other patterns. Data, emerging technologies and cyber-turbulence will continue to fuel disruption into the future.

In the face of the evolving cognitive economy, leaders will also need to become agile visionary doers. Government will play a critical role in establishing the foundation of a knowledge-based, learning society. New fundamentals are needed.

Figure 1
DISRUPTIVE FORCES, NEW ERA PATTERNS
Four key disruptive forces compelling new economics—a cognitive economy

1. Pervasive global connections and flows
   • 2016: Total foreign investments were $132 trillion, up 28% from 2007, despite the financial crisis
   • 2016: Cross-border bandwidth used grew 45X since 2005
   • Developing countries produce at least as many skilled professionals as developed ones

2. Economic fragility
   • China is expected to generate 25% of digital information by 2020, up from today’s 13%
   • In 2017, sixty-two individuals had as much wealth as 3.5 billion people
   • Global inequality is trending downward, however it is still very high

3. Data explosion, cloudy decisions
   • By 2025, global data subject to data analysis will grow 50X, but 60% of decision makers are not too confident in data insights
   • 23% of US adults shared ‘fake news’ knowingly or unknowingly clouding decision-making

4. New intelligent technologies
   • Digital adoption by individuals outpaces government and business
   • Technologies, propelled by standardization, modularization, automation and low prices are driving deep learning at scale
Inflection point

Leaders are increasingly aware of the interactive nature of the disruptive forces propelling the new era. New economics are emerging from heightened interactions and synergies—a cognitive economy—as well as citizen expectations for good government and heightened stewardship. Citizens also increasingly expect that they own their own data.

Four key technological advances—ubiquitous high-speed mobile internet, greater adoption of big data analytics and cloud and artificial intelligence—are driving exponential change. More exponential technologies such as blockchain and quantum computing are on the way.

The proliferation of connectivity, data and systems of engagement has set conditions—intelligent engagement and learning at scale—for society’s next inflection point.

Data has become the “edge” of most value propositions. Leaders recognize its tremendous potential to not only transform the business of government, but to also enable citizens to navigate the transition well and position to seize the opportunities of the new era.

All are now asking critical questions about data such as, “Who owns the data in ‘big data’?” and “Where does big data stop and privacy start?” There are also a few other critical questions: “What does data ownership mean?” “How does one assume and manage ownership?” “Should they be an ‘owner’?” Consider what it took to answer those questions for land or private property. In the era of exponential learning, they must be answered for the strategic asset of the 21st century—data.

Organizations and whole industries have built up their business intelligence and analytics capabilities over the last 2 decades. These ‘smart’ capabilities generated new and deeper insights from data for better interactions, complex decision making and new learning. They were also setting conditions for the next generation of AI.

Two facets of Artificial Intelligence

As a system, AI is designed by humans to (given a complex goal) act / interact in the human, physical or digital world to interpret and reason; determine best action(s); and learn to adapt behaviour by analysing how the environment is affected by previous actions.

As a scientific discipline, AI includes several approaches and techniques—i.e., machine learning, machine reasoning, robotics (incl. its integration into cyber-physical systems).

The distinguishing characteristics of the new era—intelligent engagement with humans and other systems and learning at scale—are reflected in its definition.
AI adoption is growing

AI seems to have reached an inflection point too. AI adoption is up, organizations are rethinking the direction of their cognitive journeys and governments are taking AI seriously.

Successful organizations are moving beyond just testing and experimenting with proofs of concept to focus on practical value creation (Figure 2). Leaders have shifted their attention from worrying about whether to adopt AI to struggling with how to adopt, accelerate and scale AI adoption. Shortages, regulatory and ethical issues related to data and uncertainty about the trustworthiness of AI solutions are key barriers (Figure 3).

In October 2017, government leaders and innovators came together at the United Nations to discuss the benefits and risks of AI as well as role in advancing UN Sustainable Development Goals. That same year, the UAE appointed the world’s first Minister for Artificial Intelligence to look at AI at a practical level across 9 sectors—Health, Transport, Space, Water, Renewable energy, Technology, Education, Environment, Traffic. Recent estimates on AI contribution to economic growth suggest significant potential to:

- Deliver additional global economic activity of $13 trillion by 2030, or about 16% higher cumulative GDP compared with today
- Create annual value between $3.5 to $5.8 trillion across sectors
- Impact Middle East GDP by 2030 by $320 billion
- Help boost United Arab Emirates’ GDP by 35% by 2031 and reduce government costs by 50%

AI is a societal shift in the making and we’re just getting started.
Four leadership imperatives and new fundamentals

In the Era of Exponential Learning, governments will lead with learning to activate new opportunity, promote greater understanding, steward public resources and protect from harm in new ways.

1. Build the public trust and public confidence

2. Prioritize skills and talent

3. Orchestrate inclusive ecosystems and markets for new prosperity

4. Manage systemic risk and resilience at scale

Government leaders must embrace four imperatives and new fundamentals while fostering a culture of partnership to best position for realizing data-fueled, AI-powered possibilities.

New Fundamentals

- Statement of values on data responsibility; and, corresponding principles that engender transparency and accountability into AI design and use
- Explicit acknowledgement that citizens’ data is their own balanced by transparent regulatory mechanisms to remediate data ownership and other issues while facilitating ethical evolution of AI within and across jurisdictions

New Fundamentals

- System for promoting citizen data awareness and literacy and the systematic inclusion of diverse perspectives and cultural contexts
- A learning workforce with the ability to design, apply / leverage AI to augment human intelligence that can reshape the future of public service and the future of the economy and society

New Fundamentals

- Agile evolution of trusted exchanges—leveraging the best methods and integrating exponential technologies—within and beyond government
- Transparent mechanisms for fostering representation of diverse perspectives (e.g., registries for self-identification; community platforms with built-in accessible knowledge bases and resources; relevant incentives)

New Fundamentals

- Relevant, effective structures (i.e., fair, equitable data policies that prioritize openness and integrity) so people truly understand how an AI system came to a given conclusion or recommendation
- Data governance that includes the proactive identification and resolution of issues relating to bias, privacy, security (among others) in algorithms
- Mechanisms and means of engagement to share and evolve the body of humanities and social sciences applied to our interconnected world

Foundational imperatives, provocative opportunities

AI adoption is accelerating even as many discussions on AI revolve around the hype or potentially devastating negative use cases and unintended consequences. Leaders recognize that technology-inspired, society-scale innovation now fueled by data is (again) changing life as we know it.

The creative tension is both important and necessary. Many leaders across all sectors are already taking action across all imperatives in varying degrees. For government, a strong foundation will make all the difference in its ability to responsibly apply and drive AI-enabled transformation across many areas, i.e., policy, citizen service delivery, workforce transformation.

We focus on the first two imperatives which are foundational—build the public trust and prioritize skills and talent—and provocative opportunities to materialize them.

To build the public trust and further public confidence in AI, articulate human-centered data responsibility principles and embed them into the design of AI capabilities and their integration into cognitive systems and processes (see Table 2).

Begin with discourse, debate and ultimately agree on core values regarding data responsibility and principles that will engender trust.

Table 1: Leadership Imperatives and the new fundamentals

Table 2: Data responsibility and principles for trust and transparency @IBM

Data Responsibility @IBM

The values that underpin IBM’s Data Responsibility Policy are data ownership and privacy; data flows and access; data security and trust; AI and data; and data skills and new collar jobs.

“We will work to help people—students, workers and citizens—to acquire the skills and knowledge to engage safely, securely and effectively in a relationship with cognitive systems, and to perform the new kinds of work and jobs that will emerge in a cognitive economy.”

The principles10 derived from IBM’s data responsibility policy are:

1. Purpose: The purpose of AI is to augment human intelligence.
2. Ownership: Data and insights belong to their creator.
3. Transparency: New technology, including AI systems, must be transparent and explainable.

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Once in place, this will go a long way to help explain how AI-enabled decisions are reached and also mitigate risks related to bias. Regulation should facilitate the deliberate and ethical evolution of data ownership and use of AI while remediating issues along the way.

Explicitly acknowledging citizens’ data as their own would be a key milestone so long as transparent regulatory mechanisms are there to provide sufficient and responsive guardrails, learn and adapt.

One technology-inspired idea to evolve the concept of data ownership is citizen-centered self-sovereign digital identity (CCSSDI for short). CCSSDI is a lifetime portable “smart” identity for a citizen that s/he can use and feel good about. A self-sovereign identity can allow citizens to present verifiable credentials in a privacy-safe way.

A CCSSDI could streamline digital identity networks for the fluid exchange of identity data with integrity and confidentiality. CCSSDI is based on one maxim: Citizens’ data is their own.

Governments can both participate in and facilitate ever-evolving digital identity exchanges in collective impact ecosystems by playing specific roles. Much like how the internet evolved, early government roles are enabling to allow the market to evolve. They include “facilitator / coordinator”, “rule maker” and “adjudicator” (Figure 4).

Over time, solutions will be provided by those who best meet service needs and engender trust. In the process, governments may very well also realize added benefits such as reduced burden and risk.

A trusted identity platform to enable the ecosystem can foster trusted interactions so that participants have the confidence to do more. In the process, governments may very well also realize added benefits such as reduced burden and risk.

Figure 4
EXAMPLE ROLES AND BENEFITS IN A CITIZEN-CENTERED SELF-SOVEREIGN DIGITAL IDENTITY ECOSYSTEM

Public or Private Sector
- New innovation and growth opportunities
- Decreases burden
- Increases efficiency

Identity Registry
- Identity Owners and Users
  - Reduced risk of inappropriate use
  - Increased confidence
  - Increased trust
- Identity Owners and Users
  - More opportunities to differentiate

Citizens
- Reduced burden
- Reduced liability risk
- Increased public trust
- Optimized public resources
- Greater political capital

Value-Add Service Provider
- New innovation and growth opportunities
- Decreases burden
- Increases efficiency

Government
- Reduced burden
- Reduced liability risk
- Increased public trust
- Optimized public resources
- Greater political capital

Facilitator / Coordinator
- New innovation and growth opportunities
- Decreases burden
- Increases efficiency

Other Authorities
- New innovation and growth opportunities
- Decreases burden
- Increases efficiency

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People—their skills, diversity of thought and talent—are the lynchpins of progress as the cognitive economy develops. It is imperative to prioritize skills and talent. Skills and talent in areas that foster human-centered AI design and application in practice will be critical as more leaders in government and industry make decisions to leverage AI.

Yet, few leaders feel equipped to take advantage of AI’s potential. Having already accounted for business shifts associated with market factors, leaders feel they are at a tipping point regarding skills and talent (Figure 5).

According to new research from IBM, as many as 120 million workers in the world’s 10 largest economies may need to be retrained or reskilled in the next three years.15

Figure 5
CONCERNS ON MARKET FACTORS AND PEOPLE SKILLS ARE ON THE RISE

Percentages represent the number of respondents who selected each external factor.
Q. What are the most important external factors that will impact your enterprise in 2-3 years?
[Select up to five]

We firmly believe that AI systems cannot and will not replace human decision-making, judgment, intuition or ethical choices.

Also, almost 60% of employees in the U.S. and U.K. are not confident that their company will be able to use AI for competitive advantage.16

Concerns on skills shortages are further compounded by concerns on skills imbalances. Today, the AI learning and education market is saturated with technical content written by technical people for technical audiences to create AI.17 Impressive technical tools are also available.

But, AI’s evolution is too important to be driven primarily by technologists. The landscape of talent needed to train and apply AI is diverse. They will imagine and generate the new ideas, solutions, jobs, professions and industries of the future. Hence diverse perspectives and skills in context are critical to designing and applying AI.
Other essential expertise and talent areas include policy and legal; business and management; different sciences; human-centered design; emotional intelligence and creativity; systems thinking and impact analysis; complex problem solving; critical thinking; culture and ethics; managing people and change; and, more.

Just as CCSSDs can facilitate the development and evolution of data ownership and accountability in the new era, another collective impact ecosystem—an Adaptive Learning Marketplace (ALM).

Based on shared values, an ALM is a platform-enabled, AI-powered ecosystem that can enable and scale deliberate development of vital skills and talent (Figure 6) as part of a vibrant community of AI-driven learning.

Over time, participants of can realize a virtuous circle of role-specific benefits and generative outcomes for the ecosystem.

The pool of AI-ready people must have relevant skills, qualities and pathways to not only create AI, but also design and apply it in context. Without context, AI has little chance of adoption. It would be akin to owning the latest jet but without a jet pilot’s license, the airport, the runway and ground crew to get it safely in the air!

Figure 6
ECOSYSTEM ROLES AND BENEFITS IN AN ADAPTIVE LEARNING MARKETPLACE

<table>
<thead>
<tr>
<th>Role</th>
<th>Benefits</th>
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<tbody>
<tr>
<td>Learning Content Provider</td>
<td>Increased relevance, New markets, innovation and growth opportunities</td>
</tr>
<tr>
<td>Opportunity Marketplace</td>
<td>Greater pool of credentialed candidates, Reduced time-to-hire (better matching), More innovation and growth opportunities</td>
</tr>
<tr>
<td>Public Service Learner</td>
<td>Increased access to new opportunities</td>
</tr>
<tr>
<td>Curriculum Designer</td>
<td>Increased relevance, Richer market insights</td>
</tr>
<tr>
<td>Credentials Administrator</td>
<td>Deeper insights into skills (through open badges), More innovation and growth opportunities</td>
</tr>
<tr>
<td>Credentials Public Service Worker</td>
<td>Increases qualifications and skills, Increases productivity, Increases confidence, Increases new opportunities</td>
</tr>
<tr>
<td>Evaluation Authority</td>
<td>Better insights into public sector workforce progress and dynamics, Increases ability to align policy and budget</td>
</tr>
<tr>
<td>Value-Add Service Provider</td>
<td>Reduced costs, New markets</td>
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A little AI with the new fundamentals goes a long way

Our collective AI journey in its very early stages. It has a long, multi–generational time frame. We believe, however, the economic and societal benefits of the new era will not be realized if the human side of the equation is not factored in all throughout the journey.

Governments and corporations will work to help people—students, workers and citizens—to acquire the AI skills and knowledge to engage safely, securely and effectively in a relationship with cognitive systems.

Collaboratively chart your path by embracing the leadership imperatives and the new fundamentals associated with them—this event is an excellent opportunity to do just that!

Figure 7
QUESTIONS AGAINST FOUNDATIONAL IMPERATIVES
Charting a practical, responsible path forward

Build the public trust and public confidence

• What is the purpose of this AI and who does it impact?
• How will this AI augment human intelligence in practice?
• Where can we apply AI today to improve the way we work, put in relevant foundations in place and create sensible policy?

Prioritize skills and talent

• To whom and how are we promoting data awareness and literacy?
• To what degree are we ready with the relevant engagement mechanisms and foundations?
• Where and how are we leveraging AI to understand and improve how we foster and scale relevant skills and disciplines?
References


8. Ibid.


11. Ibid.


16. Ibid.

17. AI skills market scan. Upslope research on behalf of IBM, 2018

