White Paper 2026

Human cognition: The next frontier?

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Opening the debate: Human cognition at a crossroads

In a moment when artificial intelligence (AI) dominates discussions—about future opportunities, future economies, future power—it is tempting to declare the arrival of a new era akin to the Industrial or Information Age. Regardless of whether the adoption of this advanced technology qualifies as a genuinely new age, one thing is clear: A profound shift is underway.

Some forecasts are dystopian, others utopian. We hear warnings of humankind's demise through the so-called singularity—the hypothetical scenario of artificial intelligence surpassing human intelligence—and less dramatic but still troubling concerns about widespread job loss as knowledge work becomes increasingly automated. Others envision a future in which AI serves as a catalyst for progress, driving breakthroughs in science and innovation while freeing people from the drudgery of mundane tasks so they can focus on creativity and purpose.

These scenarios deserve attention and debate, but they are not the focus of this white paper.

Instead, we ask a different question: As machines increasingly process, predict, and automate, what will become of the uniquely human capacity to think, adapt, and create meaning? Is it plausible to consider that, far from being made obsolete, human cognition will become the "superskill" of the future—the defining advantage in a world of human-machine collaboration? Are we correct in thinking that our ability to reason critically, imagine boldly, and synthesize complex and abstract concepts has the potential to drive progress that technology alone cannot?

This isn't the first time humanity has encountered a massive technological change that disrupted patterns of economy, culture, and even thought. Each prior revolution—whether the invention of the printing press, the steam engine, or the internet—has unleashed human productivity, imagination, and progress.

Whether we choose to call this a new age or not, now is the time to rethink how individuals and organizations can develop, nurture, and protect their cognitive capabilities as intelligent systems reshape work, society, and the world.

Success will hinge not just on technology, but on how well we cultivate and safeguard the power of the human mind.

This white paper is not a treatise or prescription, but an invitation to dialogue. Our goal is to spark an informed conversation about the opportunities and dilemmas of a cognition-centric future.

How can we build a future in which human and artificial intelligence work productively in tandem? How can we measure, nurture, and protect human cognitive capacity in the workplace? What new forms of value and risk arise when human cognitive skills become a vital differentiating asset for a company or other organization?

We invite leaders in business, policy, academia, and beyond to join us in exploring these questions.

PMI viewpoint

A legitimate question for any reader might be: Why does Philip Morris International (PMI) care about the future of human cognition? The answer is rooted in our experience.

To progress toward our vision of a smoke-free future—a future in which cigarettes are made obsolete—we have had to rethink not just our product lines but our entire business model. This has meant reskilling our workforce over the past decade and adopting entirely new ways of working in pursuit of a path many thought impossible.

A decade ago, we were a cigarette company. By the end of September 2025, smoke-free products such as heated tobacco, nicotine pouches, and e-vapor products accounted for 41 percent of our total net revenues and were available in 100 markets worldwide. These products, while addictive and not risk-free, are helping millions of adults who would otherwise smoke switch to a less harmful alternative and leave cigarettes behind. Our ambition is to be a substantially smoke-free business by 2030.

This experience has taught us something fundamental: Change is not just about scientific and technological advances; it's about vision and ambition, and about people and how they apply these advances. The human element has been central to our smoke-free progress, from understanding adult consumer choices to building new capabilities for new domains and investing in continuous learning for our people.

Now, as we move forward in an increasingly AI-driven world, we recognize that our ability to learn, adapt, and lead will depend on how well we equip our people and our organization to meet rising cognitive demands. The shifts this new era will bring are not optional—and harnessing them in positive ways will be a business imperative for any company that aspires to remain relevant and resilient.

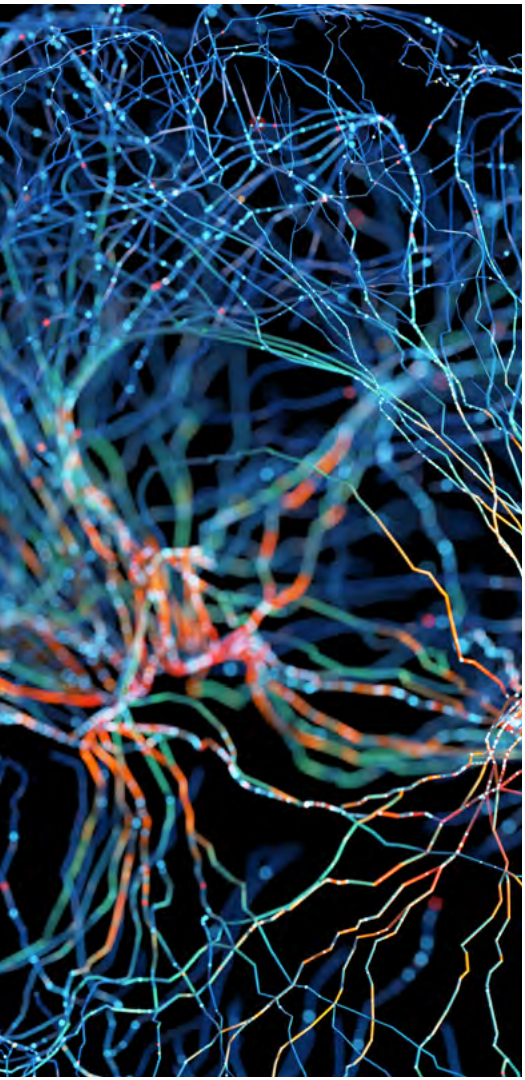
Doing the unexpected, developing new skills, and adapting to new realities—these are not just what great organizations do; they are human capabilities that will define success in the years ahead. That is why, as a company, we are committed to promoting the kinds of discussions we consider essential to optimizing humanity's ability to flourish in an era of hyper-accelerated change.

Progress through disruption

Throughout history, humankind has invented ways for machines to do what humans (and animals) once did.

Emerging in the mid-18th century and continuing through the 19th century, the Industrial Age saw steam and later electricity harnessed to mechanize physical labor, triggering one of the most profound societal shifts in history. The resulting surge in productivity revolutionized economies but also dismantled centuries-old traditions, such as family-based craft production and agrarian lifestyles. Work became centralized in factories, driving millions away from rural communities and accelerating urbanization on an unprecedented scale. While industrialization created immense wealth and global trade networks, it also deepened inequality, challenged social cohesion, and redefined cultural norms—from family life to labor relations.

The Information Age, emerging in the mid-20th century, shifted economic power from machinery to data. Driven by advances in computing, the innovations of this



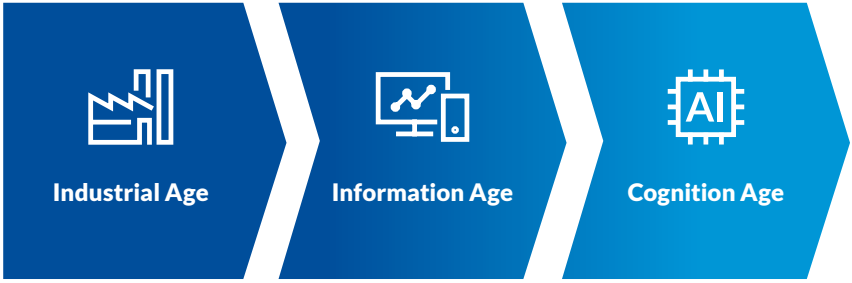
era enabled systems to replicate basic cognitive functions—processing, storing, and retrieving information—at speed and scale. The rise of the internet in the 1990s marked a critical inflection point, transforming global communication, commerce, and culture by making information instantly accessible and networked. While these advances democratized access to knowledge, they also introduced new challenges—from the digital divide to the commodification of attention—reshaping economies and cultural norms alike. This age also saw a shift in economic value—from physical goods to intangible assets like intellectual property and digital platforms—creating new forms of wealth and influence rivaling those of the industrial titans of the previous era.

Each revolution redefined what mattered most, with physical strength becoming less valuable than technical skill, which then gave way to mastery of information. Now, with AI able to perform many cognitive tasks at a scale and speed previously unimaginable, the premium is shifting again—this time to higher-order thinking.

To date, AI's most powerful applications have involved processing vast amounts of information and generating outputs almost instantly, automating tasks—searching, sorting, synthesizing, and even creating—that once required significant human effort. Analysts suggest generative AI could add trillions of dollars in annual value to the global economy, potentially signaling a shift as consequential as past technological revolutions. Others caution against overstatement: MIT economist Daron Acemoglu predicts AI will have a "nontrivial but modest" impact on GDP over the next decade, far less than the transformative impact of past technological revolutions. Still, the social and economic implications could be substantial, as underscored by the World Economic Forum in its projection that AI will create 170 million jobs while displacing 92 million by 2030.

Whatever the scope of its promise, AI comes with caveats: Adoption may be uneven across industries and regions, and ethical concerns—from algorithmic bias to the misuse of synthetic content*—pose challenges that could slow or distort its impact.

So, will this era rival the Industrial and Information Ages in scale and consequence? Or will it prove less transformative than its hype suggests? One thing is certain: Like past revolutions, this too will bring opportunity and disruption, concentrating benefits among those who adapt quickly and putting those who do not at a disadvantage.



* *Synthetic content is any media (text, images, audio, video) created or significantly altered by artificial intelligence or machine learning, rather than through traditional human capture or creation, often mimicking reality so closely it's difficult to distinguish from authentic content.*

Superskills for the cognition age

If the Industrial Age harnessed energy for human needs and the Information Age harnessed data, what will this new era harness?

Some suggest it will be intelligence—human and artificial, working in tandem. Already, AI is a high-value co-worker for many knowledge tasks, from drafting and summarizing to coding, classifying, and pattern-finding. While headlines often warn of sweeping job displacement, emerging research points to a more nuanced reality: Automation may affect a significant share of work activities, but experts expect augmentation—not wholesale replacement—as humans and machines increasingly collaborate.

Still, AI has limits. As Dr. Fei-Fei Li observes: "That ability that humans have, it's the combination of creativity and abstraction. I do not see today's AI or tomorrow's AI being able to do that yet." (*Yet* may be the operative word here.) AI models falter when problems demand grounded understanding, causal reasoning, or robust social cognition. AI can mimic insight on some tests yet fail under pragmatic nuance, excelling at associations but struggling when context shifts. And it cannot carry moral responsibility for the choices it enables.

We can therefore assume that as machines take on more cognitive tasks, human capabilities such as critical thinking, creativity, and moral judgment will become even more valuable. This view is supported by research from the World Economic Forum, which shows that 83 percent of employees believe AI will make human capabilities—especially creativity and leadership—more critical than ever. Others emphasize that human decision-making, imagination, and moral judgment are irreplaceable and must be actively cultivated rather than passively replaced. Even landmark AI-powered breakthroughs, such as AlphaGo's victory over a human Go grandmaster in the ancient board game a decade ago, have shown that while machines can surpass humans, they also can prompt humans to rethink traditional ideas and strategies.

Whether it's understanding nuance, delivering an original idea, making ethical or moral judgments, expressing a concept or emotion in a creative and unexpected way, or applying doubt, these cognitive capabilities aren't just skills—they're superskills.

AlphaGo and the spark of creativity

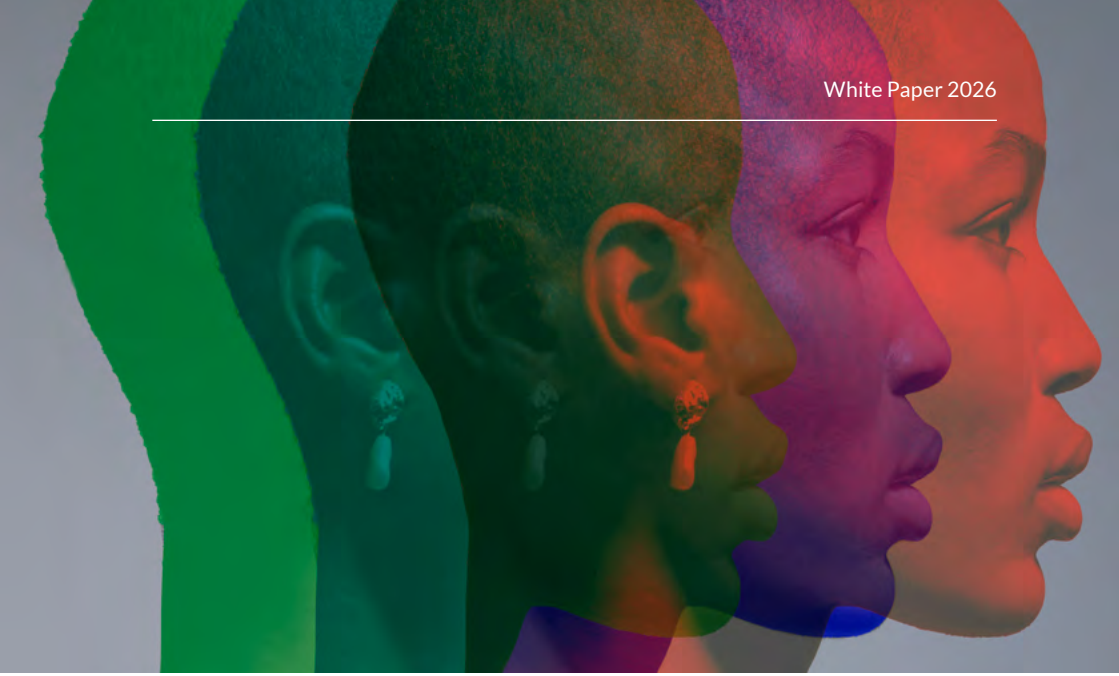
In 2016, we witnessed a landmark moment in the evolution of artificial intelligence. In a five-game match of the ancient board game Go, master Lee Sedol faced AlphaGo, a computer program developed by DeepMind. AlphaGo won the series 4–1, but what stood out most was its unconventional strategy. In a crucial moment of the second game match, AlphaGo pursued a move initially dismissed by observers as a mistake. This move later proved to be a strategic masterstroke, leading Sedol into a sequence of moves with declining value and forcing his ultimate surrender. This moment reshaped how many professionals conceive gameplay strategy. "I thought AlphaGo was based on probability calculations and that it was merely a machine," Sedol said. "But when I saw this move, I changed my mind. Surely, AlphaGo is creative. This move was really creative and beautiful … It made me think about Go in a new light."

Human superskills show up in many forms. Consider:

- **Nuance and context:** Language offers a simple example. Humans effortlessly interpret words in context: "I need to go to the bank" versus "I sat on the bank and considered my future." AI can guess, but often stumbles when meaning depends on culture, metaphor, or tone. These gaps are closing, but they remind us that context is not just data, it's lived experience.

- **Design and intuition:** AI can produce technically perfect solutions, but real life is rarely perfect. One developer asked ChatGPT to design a customer interface system for an online store. The result looked flawless on paper. Then the team lead spotted the problem: It didn't account for real-world quirks such as partial orders or unusual payment issues. The AI followed the rules; the human anticipated reality. That difference is intuition mixed with experience—and that matters.

- **Discernment and moral reasoning:** Some experts note that the proliferation of "cheap intelligence"



(more code, text, and images than ever before) means that the skills of discernment, evaluation, judgment, thoughtful planning, and reflection are even more crucial today. Machines can calculate outcomes, but they do not ask "should we?" Moral reasoning—knowing right from wrong and weighing consequences—is uniquely human. A machine-produced moral judgment on any given issue may well mirror a broad sense of human morality, but it will be at best an aggregation of thought rather than an original one deduced from principles, a specific set of experiences, or some other uniquely human basis for decision-making. In a world of algorithmic decisions, humans remain the guardians of fairness, ethics, and moral purpose.

- **Humor, empathy, and social intelligence:** Humor and sarcasm represent another chasm. Jokes rely on timing, tone, and shared cultural understanding—skills and context gained through human interaction. Similarly, "reading the room" is second nature to us but elusive for machines. Humans can glance at two people and sense agreement or tension; AI struggles without explicit inputs.

> ***Adaptability is emerging as the defining human capability in an AI-mediated world.***
>
> ***—Vivienne Ming***

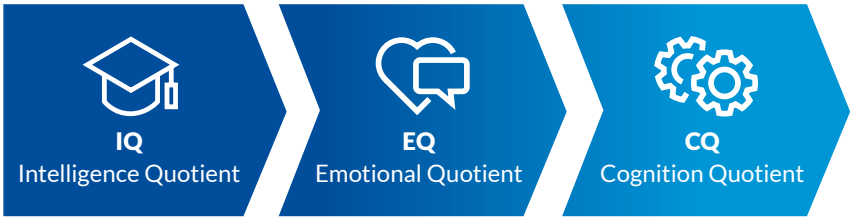
These abilities—empathy, intuition, social awareness—are not just social niceties; they are critical in leadership, negotiation, and collaboration.

As neuroscientist and entrepreneur Vivienne Ming observes: "Adaptability is emerging as the defining human capability in an AI-mediated world. As systems take on more cognitive work, the enduring value of human contribution will come from the ability to learn, reinterpret, and respond to changing contexts."

This perspective points to a critical truth: Technology may set the pace, but human adaptability will determine whether organizations thrive or stagnate.

Of course, none of these human "superskills" can be taken for granted. They must be developed deliberately, not assumed to endure simply because they have always been part of our nature. At the same time, there is potential for AI and other machine-driven tools to open new paths to creative discovery, productivity, and human flourishing.

All of this raises essential questions: As machines provide the predictable, how will we define the value of the unpredictable? Are organizations investing as much in cultivating their people's cognitive capabilities as they are in technology? What kind of leadership will thrive when human and artificial intelligence join forces? And what other uniquely human strengths might matter most in the years ahead?



From IQ to EQ to ...?

For much of the last century, professional achievement was typically associated with intelligence quotient (IQ)—the ability to analyze, calculate, and master knowledge. Later, as work became more collaborative and global, emotional intelligence (EQ) emerged as a critical differentiator, shaping how leaders connect, influence, and inspire.

Now, as AI reshapes work, we may be entering a new frontier. If machines can handle routine analysis and even mimic aspects of empathy, what becomes the next source of human advantage? Could it be something we might call CQ—a "cognition quotient" that reflects features such as contextual judgment, abstraction, and creativity? Or will it involve qualities we haven't yet discerned? What will matter most when human and artificial intelligence work side by side? These questions are not theoretical; their answers will shape how organizations think about talent, leadership, and value in the years ahead.

Are our brains keeping up?

As machines take on more of the cognitive heavy lifting, the true measure of progress may not be in what technology can do, but in how we nurture and protect the human superskills that enrich and empower us. Yet these abilities are under intensifying pressure.

The very conditions that make work and life more frictionless can quietly undermine the habits that once defined deep thinking and creative risk-taking.

Forces such as information overload, automation, and the spread of synthetic content are reshaping how we learn, decide, and trust.

As we rediscover and cultivate our superskills, it becomes equally important to explore the challenges that may threaten human cognition—and to ask what it will take to keep our minds not just relevant, but indispensable.

Cognitive atrophy—when convenience blunts our thinking

Generative tools are extraordinary at accelerating first drafts and compressing research time. But as friction disappears, do we risk investing less effort in forming ideas, interrogating assumptions, and wrestling our way to insight?

Scholars of literacy and cognition highlight that intellectual rigor often depends on the "productive struggle" of analyzing and evaluating arguments, processes that convenience can short-circuit. When machines supply fluent answers instantly, the temptation is to accept them as sufficient, even when nuance is lost. Over time, this can lead to homogenized thinking and language, as outputs converge on patterns optimized for plausibility rather than originality.

Experts also warn of another dimension of this homogenization: the erosion of cultural nuance and local knowledge. As generative systems draw primarily on dominant data sources, they risk sidelining non-Western traditions and context-rich wisdom, creating a world where human reasoning leans on algorithmic sameness rather than the richness of varied perspectives.

Attention under siege—abundance without clarity

Nobel economist Herbert Simon's prescient observation still applies:

Your brain on AI: A long-term drain?

An MIT Media Lab study tracked three groups of essay writers: One used a large language model (LLM), another relied on search engines, and a third wrote unaided. Those using the LLM showed lower brain engagement (EEG connectivity), weaker recall of their own text, and more homogenized language patterns across sessions. Over four months, the LLM group underperformed at neural, linguistic, and behavioral levels compared with "brain-only" writers. While the study was small and not peer-reviewed, it raised important questions about deep learning, originality, and long-term skill formation—especially if AI shifts effort from thinking to copy-pasting. The takeaway for employers: Encourage balanced use, so teams gain speed without sacrificing cognitive depth. This can take all manner of forms; for instance, unaided human ideation followed by AI editing or critique, and then the reverse—with AI ideation followed by human editing, which a study by New York University suggests may be ideal for certain creative applications, such as advertising.*

"What information consumes is … the attention of its recipients. Hence, a wealth of information creates a poverty of attention." In an era of constant notifications, feeds, and dashboards, managing attention has become a strategic resource.

As AI accelerates the flow of data, the challenge intensifies: The scale and speed of inputs outpace human capacity to digest, prioritize, and contextualize. Evidence suggests this is not a minor inconvenience; it's a structural challenge. Average screen focus has collapsed to just 47 seconds, and interruptions can impose "resumption lags" of up to 25 minutes before concentration is fully restored. Cognitive science deepens the concern: Effortful, deliberative thinking depends on sustained attention; when overloaded with information, we default to fast, fluent heuristics that feel right but may be wrong.

* *LLMs are very large deep learning models that are pre-trained on vast amounts of data (e.g., ChatGPT, Gemini, Claude).*

Some organizational communication experts underscore the cost: Information overload erodes decision quality and engagement, with employees reporting exhaustion from "always-on" communication streams.

The implication is clear: Attention is no longer just a personal discipline; it is an organizational design challenge. Companies that design for focus—treating attention as a strategic resource rather than an individual virtue—will gain a decisive edge. That means rethinking workflows for clarity over volume, instituting quiet hours, and creating decision rituals that separate exploration from commitment.

The emerging cognitive divide—access to focus and growth

As advanced thinking becomes the currency of progress, who gets the time, coaching, and cognitive support that elevate judgment? Socioeconomic inequalities in education, income, job type, and digital access limit access to upskilling and reskilling, leaving lower-income and lower-educated groups with limited ability to keep pace with the shift toward higher-order cognitive and technology-mediated roles.

The stakes extend far beyond the workplace. Some commentators warn that constant connectivity and algorithmic shortcuts chip away at deep literacy and sustained reasoning—skills that require time and mental space to develop. When uninterrupted focus becomes rare and environments for deep learning turn into privileges, thinking itself risks becoming a luxury item. If advanced cognitive abilities concentrate among those who can afford to disconnect and invest in lifelong learning, the result could be a widening of divides—not only economic, but also societal and cultural.

The challenge is stark: Will cognitive growth remain a shared foundation for progress, or will it become a privilege reserved for the few? How can organizations and societies turn that question into action, ensuring access to education, training, and lifelong learning for all?

Trust in a synthetic world—calibrating skepticism without collapsing confidence

As synthetic content floods our feeds, the ability to separate fact from fabrication becomes a critical life skill. But what happens when perception

itself becomes uncertain? If our brains are tricked into believing what is false, how does that affect judgment—and the social trust on which communities depend?

Deepfakes intensify this challenge. Researchers warn that hyperrealistic manipulations—faces, voices, gestures—are not just entertainment gimmicks but tools for misinformation, identity theft, and malign influence. Their sophistication exploits cognitive shortcuts: Humans tend to trust visual fluency and familiar cues, which can make fabricated content feel authentic. As detection of fake content struggles to keep pace, the threat is systemic: Trust in digital media—and by extension, institutions and social discourse—becomes fragile.

In this environment, will cognitive skills—habits of verification, lateral reading, and calibrated skepticism—become the real differentiator?

History suggests adaptation is possible: Every wave of media disruption has forced societies to relearn the art of skepticism. The questions now are: How do we teach doubt without eroding confidence? How do we design cultures that reward questioning and evidence, not just speed and fluency?

As we consider these challenges, the following questions become urgent: Are we building teams that use AI as a coach and tool to sharpen ideas—or teams that start with prompts and accept

War of the Worlds and the "uncanny valley" effect

In 1938, Orson Welles' radio dramatization of War of the Worlds *blurred fiction and fact so convincingly that some listeners panicked, calling police in fear of a Martian invasion. The episode sparked debate over media ethics and public gullibility, ultimately teaching a lasting lesson: New information technologies demand new norms of doubt.*

That event can offer perspective on today's synthetic media. Humanity has adapted before, learning to question what once seemed unquestionably real. Can we do it again at the speed and scale AI demands? Cognitive science suggests we have a starting point: the "uncanny valley" effect. Our brains can subconsciously detect anomalies in near-real images, triggering discomfort before conscious recognition. That instinct—paired with critical thinking and verification habits—may become one of the most valuable cognitive tools of the future.

whatever comes back? How much of our work is designed for focus rather than output and speed? And how do we make habits such as verification and provenance checks as routine as running spellcheck?

The stakes are practical, not philosophical. If convenience blunts judgment, abundance erodes attention, and access to deep work determines opportunity—while synthetic content accelerates beyond our verification norms—the future will be efficient but shallow and likely built on falsehoods or partial truths.

Only by restoring productive friction, protecting focus, democratizing cognitive opportunity, and normalizing constructive skepticism can we give our minds the time and tools they need to do what only they can.

> ***"What information consumes is … the attention of its recipients. Hence, a wealth of information creates a poverty of attention."***
>
> ***—Herbert Simon***

Leading in the era of human-machine collaboration

Every major historical transformation, from industrialization to digitization, has demanded a recalibration of roles, skills, and social norms.

Now, as intelligent systems become embedded in the fabric of work, leaders and organizations face a new challenge: How to design collaboration between people and machines in ways that maximize human potential and project outcomes.

Rethinking work for the human edge

Recent research underscores that the most profound impact of AI will not come from automating tasks, but from redesigning work so that the capabilities of humans and machines complement each other. This means shifting human effort from routine execution to judgment, creativity, and orchestration—areas where context, ethics, and imagination matter greatly. This change demands more than technology rollouts or adoption dashboards. It requires a vision for human capability. *Harvard Business Review* calls reskilling a strategic imperative, not an HR initiative, and MIT Sloan echoes this view, indicating that as knowledge becomes commoditized, human advantage moves from content to context, with value accruing from asking better questions, interpreting ambiguity, and making decisions for which humans remain accountable. These are not incremental adjustments; they require a fundamental rethinking of leadership and talent strategy.

Redefining roles, measures, and mindsets

To navigate this new environment, leaders must redesign roles and measures. McKinsey's work on "skill partnerships" suggests centering roles on problem framing, interpretation, and oversight, with AI absorbing preparation and routine synthesis. Intentional upskilling, thoughtful role design, coaching, and new performance measures—such as decision quality, originality, and team-level innovation—could sit alongside speed or volume to signal that originality and thoughtfulness matter as much as output.

AI as partner, not shortcut

Used wisely, AI can act as a cognitive partner, handling repetitive tasks and

freeing people to apply insight and creativity to higher-level problems. Whether organizations treat AI as a tactical shortcut or a strategic springboard, it has the potential to shape culture, capability, and competitive advantage.

As leaders navigate this shift, they must wrestle with questions that go beyond technology:

- How do we design roles that reward originality rather than automation?
- How do we ensure human judgment remains central when algorithms make confident recommendations?
- What kind of leadership thrives when human intelligence meets machine intelligence?

Preserving judgment requires treating AI outputs as inputs—not final answers. New governance frameworks and interpretive training can help managers contextualize machine-generated insights and apply ethical reasoning before making decisions.

Evolving leadership for a cognitive future

At its core, leadership itself must evolve, prioritizing cognitive agility, ethical reasoning, and digital fluency. Development programs should teach leaders to read both people and data, balancing empathy with evidence. Practices such as structured "decision rituals" can help integrate human values with machine-driven insights, ensuring that speed does not override reflection.

Emerging frameworks offer useful pointers. One example is MIT Sloan's **EPOCH** skills:

- **Empathy** and emotional intelligence—the human ability to detect emotions and create meaningful connections
- **Presence**, networking, and connectedness—with physical presence known to benefit connections, innovation, and collaboration
- **Opinion**, judgment, and ethics—the ability to navigate open-ended systems (e.g., science, law) and grasp concepts such as responsibility
- **Creativity** and imagination—including humor and the ability to visualize possibilities outside of reality
- **Hope**, vision, and leadership—harnessing the human spirit to take on seemingly impossible challenges and recruit others to the cause

These are not "soft skills"; they are strategic differentiators in a cognition-driven economy.

Ultimately, AI can amplify human potential—or diminish it. The difference will be made by leaders who design for cognition; keep judgment, creativity, and conscience at the center; invest in learning as seriously as they invest in technology; and measure success not only by speed but by the quality of choices and ideas produced.


Where do we
go from here?

Regardless of whether we are witnessing the dawn of a new age, it is clear that the shift already underway will test our assumptions about work, value, and human potential.

The future is not set; it will be shaped by the questions we ask and the choices we make, individually and collectively. Rather than offering prescriptions, this paper invites further discussion and exploration.

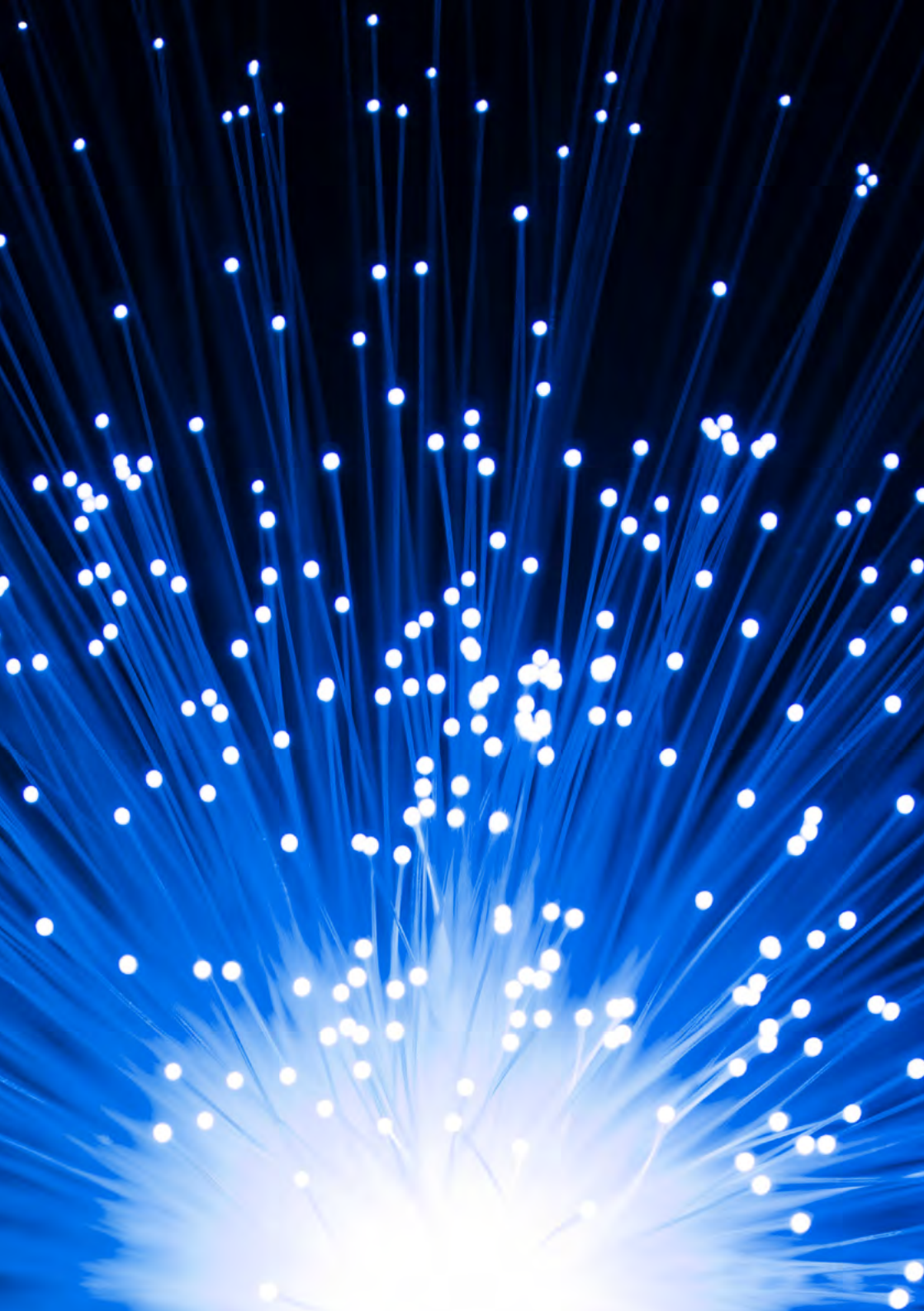
As we reflect on the opportunities and dilemmas ahead, let's consider these questions:

1. ***What will we choose to value—and how will we redesign work so that human judgment, creativity, and ethics remain at the center as machines scale execution?***
2. ***How will we safeguard and expand cognitive capacity in an always-on, AI-accelerated world?***
3. ***Can we make cognitive growth a shared foundation, closing the emerging cognitive divide rather than entrenching it?***
4. ***How will we keep trust resilient in a synthetic world, teaching skepticism without sliding into cynicism?***
5. ***What kind of leadership thrives when human intelligence meets machine intelligence—and how will we cultivate it?***

Our success may come down to whether we learn to measure progress not by technological adoption, but by the flourishing of human minds, communities, and cultures.

The journey before us demands humility, curiosity, and a willingness to learn together. This era will not be defined by technology alone, but by how we choose to cultivate, value, and safeguard the power of the human mind.

The invitation is open: **How will you contribute to shaping a future where cognition empowers all?**



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