In collaboration with the
McKinsey Health Institute

WORLD ECONOMIC FORUM

The Human Advantage:
Stronger Brains in the Age of AI

INSIGHT REPORT

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Foreword



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As artificial intelligence continues to transform the way we live and work, it's natural to wonder what this will mean for us. Will machines replace what we do best or will they help us create new levels of creativity, productivity and impact? The truth is, the future isn't about humans *vs.* AI – it's about how we can bring out the best in both.

In order to harness the full potential of both human and artificial intelligence, each enhancing the other, we must invest accordingly. By doing so, we will shape a smarter, healthier future. In this new report, *The Human Advantage: Stronger Brains in the Age of AI*, we build on a simple premise: stronger brains build stronger businesses, economies and societies.

The World Economic Forum's *The Future of Jobs Report*[1] highlights a clear shift around AI, but it also elevates the importance of brain capabilities such as adaptability, empathy and complex problem-solving. Those capabilities, coupled with healthy brain function, are what is known as *brain capital*.

Building brain capital starts with protecting and promoting brain health across the lifespan. Scaling proven brain health interventions globally could reclaim more than 260 million disability-adjusted life years (DALYs) and generate an estimated $6.2 trillion in cumulative gross domestic product (GDP) gains.[2]

Developed by the McKinsey Health Institute in collaboration with the World Economic Forum, this report lays out a roadmap for investing in our brains through five levers: safeguarding brain health; fostering brain skills; studying brain capital through better research and measurement; investing in brain capital with innovative finance; and mobilizing a coordinated, cross-sector movement.

Building brain capital is a shared endeavour. Everyone has a role to play. Educators and health leaders can lay the foundation for brain health and skills from childhood through to old age; CEOs can embed brain capital into talent and organizational culture; investors can channel capital towards brain-positive innovation.

The brain economy represents a new frontier where human intelligence and artificial intelligence work in partnership, allowing for greater productivity and resilience. If we commit to building the brain economy, we can create healthier lives and stronger institutions, with a goal of sustained, shared prosperity for generations ahead.

Executive summary

Stronger brains strengthen resilience, productivity and shared prosperity – it is time to invest accordingly.

The brain is the body's most complex and vital organ, regulating everything from basic life functions to complex decision-making. It is also the foundation of how people live, work and connect, making it central to individual well-being, high-performing organizations and resilient economies. Despite rapid technological advances, nothing yet replicates the brain's capacity to contribute to society.

AI will reshape work, and competitiveness will hinge on combining human and machine strengths. Countries and companies must evolve their strategies to enable collaboration and harness the complementary strengths of human intelligence and technology, or risk slower growth and being left behind in the next era of the global economy. And while the stakes are high, if we fail to invest in the health of our brains and the skills that make us uniquely human, the potential gains – individually, socially, economically – are even greater if we do.

In this report, *brain health* is defined as a state of optimal brain functioning, supported by the promotion of healthy brain development and the prevention or treatment of mental, neurological and substance use disorders in people of all ages. But health alone is not enough. *Brain skills* – the foundational cognitive, interpersonal, self-leadership and technological literacy abilities that enable people to adapt, relate and contribute meaningfully – are equally critical to societal progress. Together, these form what is called *brain capital*.

Underinvestment in the brain has a substantial cost. The global disease burden of brain health conditions is rising, driven by an ageing population, increased stressors and elevated uncertainty about the future. When societies overlook the brain's central role in health and productivity, the impact is felt in disrupted lives, lost potential and a heavy toll on families and caregivers. Scaling cost-effective interventions to prevent, treat and help people recover from brain health conditions could avert 267 million disability-adjusted life years (DALYs) globally by 2050, generating up to $6.2 trillion in cumulative GDP gains.[3] Investing early can create even greater returns – quality early childhood programmes have demonstrated annual returns of 7–13% and delivered up to 9:1 benefit-to-cost ratios in low- and middle-income countries.[4,5]

In this report by the McKinsey Health Institute, in collaboration with the World Economic Forum, the authors make the case for investing in the brain, introduce five levers for action and offer a roadmap for next steps. While specific actions may vary by stakeholder, region or sector, there is a need for a shared aspiration and framework for change. This report aims to fill that gap.

Introduction

Building brain capital means valuing and investing in the brain health and brain skills of people of all ages.



The brain is the body's most complex and vital organ, governing everything from basic life functions, such as breathing, to advanced cognition, emotional regulation and complex decision-making. Strengthening brain health has benefits beyond the brain, with positive associations across multiple dimensions of health, including metabolic, cardiovascular, social, emotional and spiritual health. For example, a five-point higher Brain Care Score – a measure evaluating modifiable brain health factors – is associated with a 43% lower risk of developing cardiovascular disease and 31% lower incidence of lung, colorectal and breast cancer.[6] Proactively building positive brain health and strengthening brain skills can improve social cohesion, enhance holistic health, strengthen societal stability and promote inclusive economic growth.[7,8] Anyone who has experienced depression, watched a child struggle in school, taken care of a loved one with Alzheimer's or seen co-workers struggle with cognitive overload can grasp the benefits of investing in stronger brains.

Despite its central importance, the brain has long been underprioritized in global policy and investment. This is not for lack of effort; researchers, advocates and practitioners have been making the case for decades,[9] but until recently, fragmented definitions, limited measurement tools and prejudice and discrimination around mental, neurological and substance use (MNS) disorders have made it difficult to unify action or elevate brain health and brain skills as economic priorities. Today, advances in science, a clearer understanding of the brain's role in productivity and resilience and growing global attention to disruption related to artificial intelligence (AI) are creating a moment where coordinated investment in the brain has become an economic imperative.

Just as the Industrial Revolution transformed societies from agrarian to machine-focused, reframing investments, driving innovation and catalysing global progress, a similar shift is needed to maximize human potential. This is where brain capital enters the conversation.

Brain capital combines two elements: *brain health* – a state of optimal brain functioning supported by the promotion of healthy brain development and prevention or treatment of MNS disorders – and *brain skills*, which are the foundational cognitive, interpersonal, self-leadership and technological literacy abilities that enable people to adapt, relate and contribute meaningfully. These two elements are a natural pairing, with emerging science highlighting the interrelationship between brain health conditions and brain skills. For example, common modifiable risk and protective factors such as stress, sleep and community engagement have proven benefits across brain health and brain skills, suggesting that interventions targeting brain health can have cascading benefits across brain skills and vice versa.[10]

BOX 1

The brain and skills

While nearly all human abilities are mediated by the brain, *brain skills* in this report do not refer to everything that the brain does but rather focuses on the capabilities that draw heavily on higher-order cognitive, emotional and adaptive functions, such as metacognition and complex decision-making. There is a difference between using the brain to follow a "known recipe" vs. using it to invent a new one while under pressure. For example, knowing a particular workflow is becoming less valuable in the workplace than the ability to rethink the approach when circumstances change. The latter ability refers to the term *brain skills* within the context of this report. This term is used as shorthand to indicate the non-technical skills that are often overlooked in formal education and training but have an outsized impact on human performance. These include skills such as creative and analytical thinking, resilience and flexibility, which give individuals the capacity to respond to change with agility and sustainable practices, and are aligned with recent research by the World Economic Forum and others on the future of skills in the workplace.[11,12]

This report offers a roadmap for stakeholders in building brain capital and draws from a year of global convenings and dialogues facilitated by the World Economic Forum's Brain Economy Action Forum, which identified five levers to build brain capital:

1. **Safeguard brain health** by ensuring access to effective care for brain health conditions and promoting brain health across the life course
2. **Foster brain skills** for the next generation, current workers and those in later life
3. **Study brain capital** by defining brain capital as an interdisciplinary field, developing robust measures and expanding research and development to drive progress
4. **Invest in brain capital** by funding products, services and systems that improve brain capital, using both traditional and innovative financial instruments
5. **Mobilize for brain capital** by forging a coordinated global movement that aligns stakeholders around a shared vision and roadmap to build brain capital

The following sections offer more detail on each lever, as well as actions for stakeholders to consider.



1 Safeguard brain health

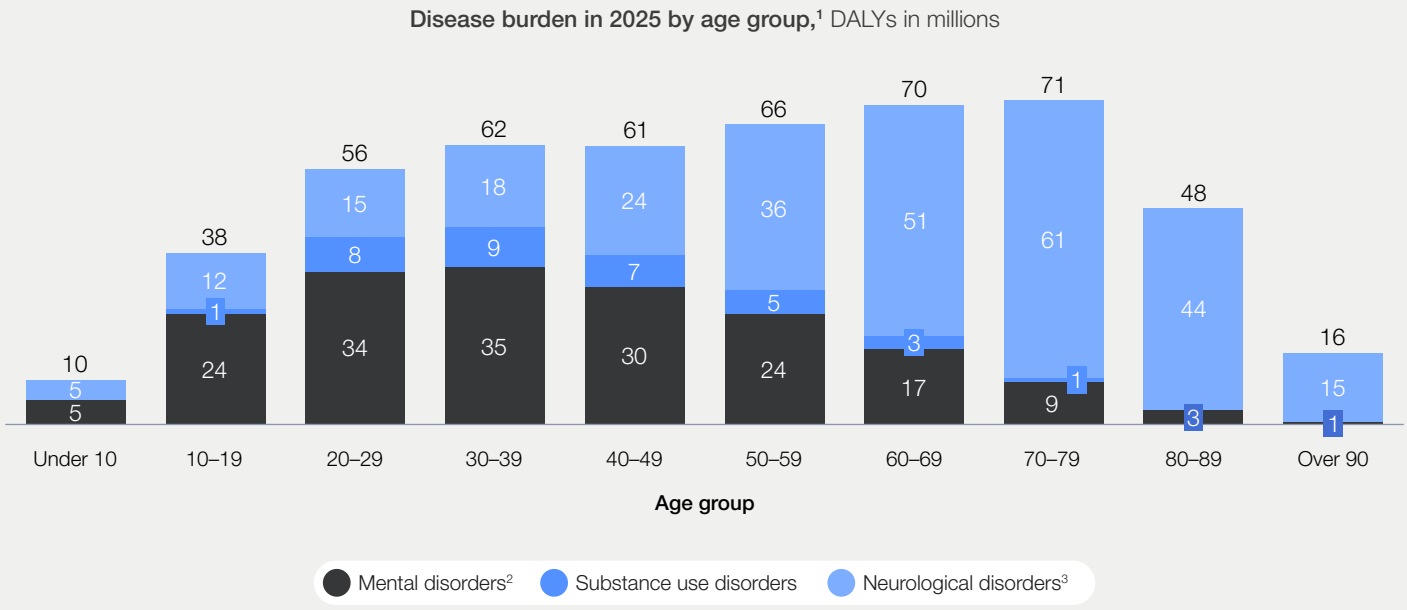
Strong brain health lays the foundation for resilient individuals, organizations and communities.

Underinvestment in the brain carries a profound opportunity cost. Based on 2025 burden projections, brain health conditions (including the primary and associated burden for MNS disorders, stroke and self-harm) account for 24% of the total global disease burden.[13] Safeguarding brain health requires action across the life course, as different risks and opportunities emerge from early childhood to old age. Half of all mental health conditions appear by the age of 14, and three-quarters by the age of 24.[14] Neurodevelopmental conditions, such as autism spectrum disorder or attention-deficit hyperactivity disorder, emerge in young children while other neurological conditions, such as epilepsy or migraine, may occur at any age. Neurodegenerative conditions, such as Alzheimer's disease (AD) and related dementias, are overwhelmingly conditions of older age, with the number of adults over 65 living with dementia rising globally by 160% in the past three decades – from 18.7 million in 1991 to 49 million in 2021.[15]

Behind these numbers are more than 1 billion disrupted lives, from children unable to reach their full potential to older adults losing their independence (see Figure 1).

Safeguarding brain health means: 1) supporting promotion of healthy brain function and prevention of brain health conditions across the life course; 2) scaling access to evidence-based treatment and services; and 3) innovating to advance promotion of brain health and treatment for brain health conditions.

FIGURE 1 **Estimated global burden of brain health conditions**



Note: Due to rounding, some values may not sum precisely to the stated total

1. Only includes primary burden; excludes associated burden
2. Mental disorders include depressive disorders, anxiety disorders, schizophrenia, autism spectrum disorders, bipolar disorder, conduct disorder, idiopathic developmental intellectual disability, eating disorders, attention-deficit hyperactivity disorder, other mental disorders and self-harm
3. Neurological disorders include Alzheimer's disease and other dementias, migraine, Parkinson's disease, idiopathic epilepsy, tension-type headache, motor neurone disease, multiple sclerosis, other neurological disorders and stroke

Source: IHME, *Global burden of disease* (2021); McKinsey Health Institute analysis

BOX 2 | **Behind the data:** Women's brain health

Certain brain-related conditions – including depression, anxiety, dementias and migraines – disproportionately affect women. For example, two-thirds of people living with Alzheimer's disease globally are women.[16] Many of the conditions that shorten women's healthspan (for example, endometriosis) or lifespan (for example, breast cancer) also have close links with mental health challenges, compounding the overall burden. Even natural biological transitions can introduce brain health challenges. During menopause, the precipitous decline of oestrogen can increase the risk of cognitive decline, a symptom associated with mild cognitive impairment and dementia.[17] Research is still nascent in many areas of women's brain health, with the first comprehensive mapping of the maternal brain from preconception through the post-partum period only published in 2024.[18] Mental and neurological disorders account for nearly 25% of the $1 trillion GDP gains that could be realized annually by 2040 by closing the women's health gap.[19] Incorporating sex-based approaches in care and intervention can address gaps in efficacy, adoption and uptake that could affect both men and women.

1 Support promotion of healthy brain function and prevention of brain health conditions across the life course

Brain health is shaped across the life course. From conception onwards, multiple windows of vulnerability and opportunity determine brain development, function and resilience. Yet many health systems are designed to treat acute symptoms in adulthood, missing opportunities to strengthen brain health earlier and more effectively.

Proactive age- and sex-appropriate interventions can protect brain health before problems arise. For example, access to quality prenatal and perinatal care promotes healthy brain development before birth.[20] In early childhood, ensuring adequate nutrition,[21] reducing toxic stress[22] and providing timely screening[23] can improve a child's neurodevelopment.[24] Proactive interventions are also critical later in life. About 85% of the global health impact of stroke is causally linked to one or more of 23 modifiable risk factors that include high blood pressure, air pollution, unhealthy diets, lack of physical activity and alcohol use.[25] For brain health in older adults, the US POINTER study highlights the benefits of combined lifestyle interventions, such as neuroprotective diets, exercise and cognitive training.[26] These interventions also drive healthy longevity, reinforcing the links between brain health, metabolic health and cardiovascular resilience.[27]

Early detection also plays a critical role. Cognitive and behavioural assessment tools, with emerging evidence around digital and biological biomarkers, can establish a baseline and identify issues early, supporting behavioural changes or early intervention when needed.[28]

Promoting brain health across the life course, within and beyond health systems, is essential to building population-level brain capital and reducing the compounding effects of untreated conditions.

2 Scale access to evidence-based treatment and services for brain health conditions

While many brain health conditions may not have a known cure, they are treatable. Scaling access to proven brain health interventions could reduce the global burden of disease by more than 260 million DALYs – a measure that captures both years lost to early death and years lived with illness or disability.[29] This could result in up to $6.2 trillion in cumulative GDP gains, with more people able to live fully, contribute meaningfully and sustain their roles as parents, partners and community members.[30]

Timely access to effective care matters across the life course. For example, a child who is neurodivergent needs timely support to learn and thrive; a mother experiencing depression needs care to regain stability for herself and her child; and an older adult facing dementia deserves early identification and respectful care. Treatment gaps remain widespread across all settings and are particularly stark in low- and middle-income countries (LMICs), where more than 75% of people with MNS disorders go without access to adequate services and support.[31] When care is available, it is often fragmented, outdated or not adapted to the cultural and practical realities of local communities. Without consistent quality, patients are less likely to improve, and governments and health systems lose the opportunity to achieve meaningful returns on their investments.

This gap comes at a high human and economic cost, including lost productivity and premature death. It also places a substantial burden on caregivers, who often face lost income, reduced workforce participation and increased health risks themselves. Yet many countries lack the financing, workforce and basic infrastructure to deliver consistent care. Investment remains low, with only 2% of global government health budgets allocated to mental health.[32] Many communities lack an adequate brain health workforce. For example, in sub-Saharan Africa, there is, on average, only one psychiatrist for every million people.[33] Globally, there are an estimated 0.93 neurosurgeons per 100,000 population, with only half of high-income countries meeting the target of one per 100,000 and no low-income countries reaching this bar.[34] Yet neurosurgical conditions such as hydrocephalus, stroke, epilepsy and traumatic brain or spinal cord injuries affect millions worldwide, and without surgical intervention can lead to preventable cognitive decline and long-term disability.

Even where proven interventions and a trained workforce are available, access can be limited by other barriers, such as weak supply chains that limit the availability of medications. Essential medicine to treat epilepsy, Parkinson's disease, schizophrenia and other MNS disorders remains low across primary healthcare settings, particularly in regions of Africa and South-East Asia and in other LMICs.[35,36] An example of a government addressing this is Tanzania's Ministry of Health, which worked with the WHO to conduct special procurements and update the National Health Insurance Fund to include coverage for essential medicines.[37] While initiatives such as this demonstrate progress in expanding access, challenges persist globally.

To close the treatment gap, proven solutions should be brought to scale through innovation that enables large-scale delivery across the globe. For example, one scalable approach to alleviating workforce challenges is to expand the role of technology and non-specialist providers. This includes at-scale deployment of proven strategies such as training and empowering individuals (for example, community health workers and peer counsellors) to deliver basic care for MNS disorders. Community-level care and non-specialist workers can provide some care to more than 90% of the patients who do not receive care today in LMICs.[38] There is also potential to harness the power of technology and AI to extend where and how care can be delivered, focusing on AI solutions that are designed to support care providers rather than directly interacting with patients.[39]

Evidence from life-course modelling[40] and the WHO[41] shows that there is sufficient evidence today to innovate and implement interventions that promote brain health across the lifespan. When patients, clinicians and the public are engaged, interventions are more culturally appropriate, sustainable and effective.

3 Innovate to advance promotion of brain health and treatment for brain health conditions

To truly safeguard brain health, consider moving beyond scaling existing strategies and interventions by innovating to better promote brain health, prevent disease and treat brain health conditions across the life course. Prior analyses have generally concluded that too little is spent on mental health research as a proportion of global health research relative to the morbidity, mortality and economic burden attributable to mental disorders globally.[42] Additionally, most mental health research funding comes from high-income countries (HICs), potentially limiting the applicability of findings to a wider share of the global population.[43] In aggregate, the landscape looks different when it comes to neurological research. Particularly in HICs, funding levels for neurological research are relatively high. However, when compared to the burden of neurological disorders globally, investment gaps remain – notably in translational research to adapt and scale interventions in lower-resource settings.[44]

When it comes to safeguarding brain health, advances in breakthrough technologies are opening new frontiers in the understanding and monitoring of brain function, with major implications for diagnosis and innovation that can positively impact large swaths of the global population. For example, more than 55 million people currently live with dementia globally, primarily with Alzheimer's disease (AD), and this number is expected to double every 20 years.[45,46] Research suggests that in the United States alone, by 2050 the number of individuals aged over 70 with AD will increase to 9.1 million.[47] In this context, medical advances that delay the onset of AD for five years could result in 41% lower prevalence and 40% lower cost of AD in 2050.[48]

The innovation potential for AD is just one example among many. Overall, innovation to address even 10% of today's unaddressed global brain health burden could yield an additional estimated 54 million DALYs by 2050.[49]

2 Foster brain skills

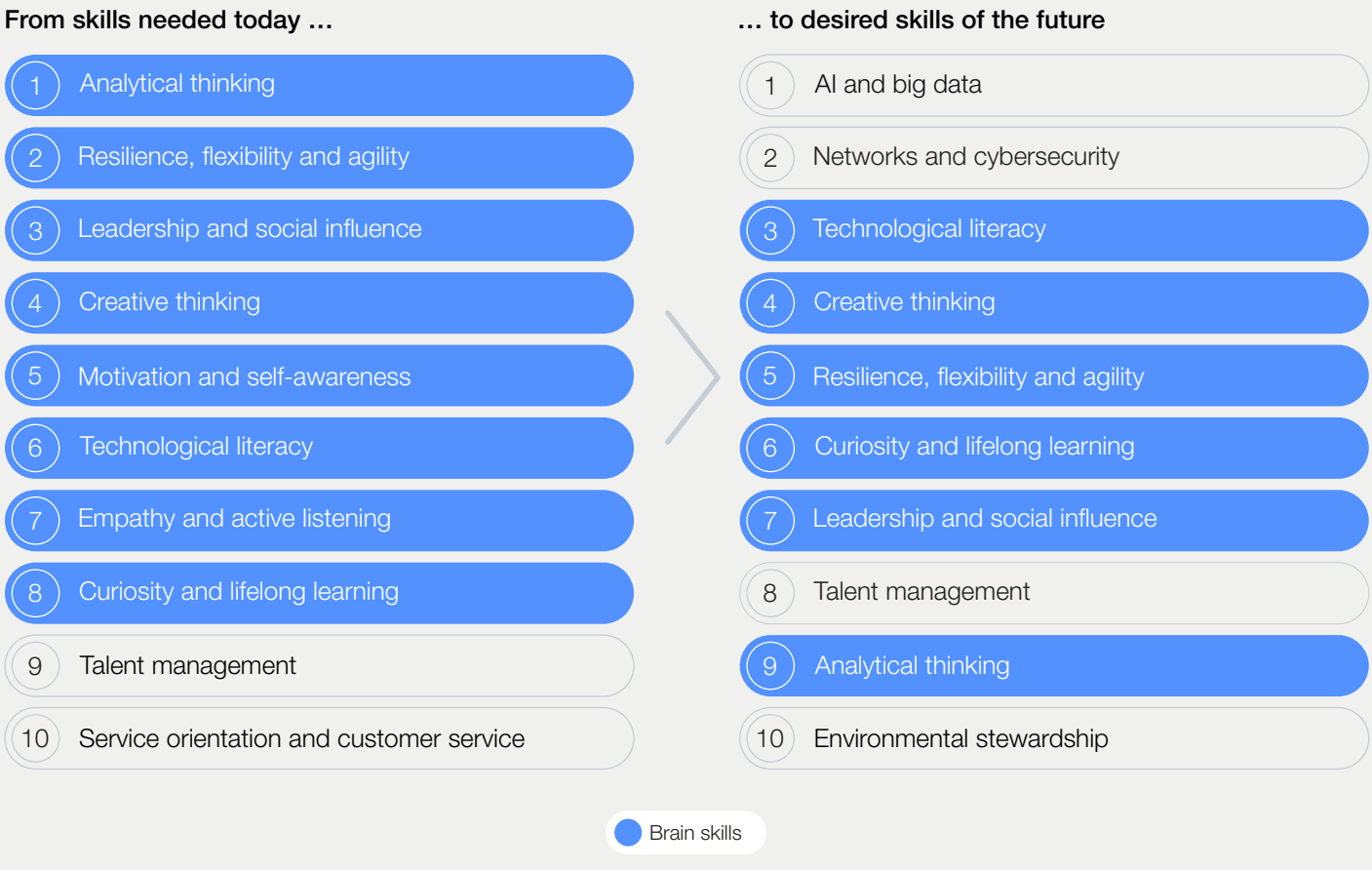
Brain skills fuel adaptability, creativity and performance amid accelerating change.

Stakeholders can foster brain skills across the life course, from childhood through older adulthood. These skills can be strengthened in many ways, including: 1) providing children and young people with access to safe, enriching environments that support the development of future-ready brain skills; and 2) promoting brain skills through workplace interventions.[50]

Brain health provides a foundation for acquiring, developing and using what are termed brain skills – the foundational and higher-order cognitive, interpersonal, self-leadership and technological literacy abilities that enable people to adapt, relate and contribute meaningfully. The returns on investing in brain skills are substantial, particularly when investments begin early, with quality early childhood programmes generating 7–13% annual returns and delivering up to 9:1 benefit-to-cost ratios in LMICs.[51,52] These returns translate to better equipped workforces and societies.

In the age of AI, fostering brain skills is more critical than ever. Every year, the World Economic Forum surveys over 1,000 employers across 55 economies and 22 industry clusters to understand how the needs of employers are evolving. In 2025, they found that, on average, 59% of employees will need additional training to meet evolving skill demands by 2030.[53] When employers are asked what skills are most critical for the workplace of today and what skills are most critical for the future, skills that are defined as "brain skills" are overrepresented in both categories (see Figure 2).

FIGURE 2 **Brain skills are vital for the future of productivity and societal well-being**



Source: World Economic Forum. (2025, January 7). *The future of jobs report 2025*

While not the focus of this section, the importance of brain skills does not diminish as individuals age. Building and maintaining strong brain skills later in life enables individuals to work longer if they choose, protects against elder fraud and supports continued independence and meaningful engagement with others.

There is research from multiple disciplines – including education,[54] economics,[55] psychology,[56,57,58] adult learning,[59,60] neuroscience,[61,62] sociology[63] and organizational behaviour[64,65] – to guide understanding and development of brain skills across the life course. Despite compelling evidence from these fields, brain skills development remains undervalued and underexplored. These skills can be strengthened by: 1) providing children and young people with access to safe, enriching environments that support the development of future-ready brain skills; and 2) promoting brain skills through workplace interventions.



1 Provide children and young people with access to safe, enriching environments that support the development of future-ready brain skills

Children and young people worldwide are navigating increasing complexity and uncertainty. Yet their core environments can remain disconnected from what science tells us about how young brains develop. Broad scientific consensus exists that brain development and skill formation are deeply shaped by experiences, including the development of resilience and hope.[66,67] Organizations that rely on people with complex problem-solving skills, emotional intelligence and cognitive flexibility have a vested interest in ensuring that brain skills are nurtured before young people reach the workforce. As technology continues to reshape work, the gap between what education systems teach and what workplaces need is widening, making strategic alignment between brain skill development and evolving workforce demands increasingly urgent.

Early learning programmes are particularly critical, especially when they combine education with health, nutrition support and family engagement. The Heckman Curve indicates that investing early in children yields the greatest economic returns: the HighScope Perry Preschool programme generated 7–10% annual returns, while the Carolina Abecedarian Project and Carolina Approach to Responsive Education averaged 13.7%.[68,69] In LMICs, quality early childhood care and education for all children could deliver a 9:1 benefit-to-cost ratio,[70] while Jamaica's 20-year study showed 25% higher wages for those receiving high-quality early stimulation.[71]

In addition to early childhood development programmes, education systems have opportunities for creating near-term impact in brain skill development. Daily experiences across outdoor and sports programmes can build teamwork and executive function through movement,[72,73] digital environments can prioritize age-appropriate content that strengthens self-regulation and attention[74] and workforce preparation programmes[75,76] can offer mentorship and project-based learning to strengthen persistence and self-direction. This is particularly critical given the rapid rise of AI exposure among youth. Just as employees are undergoing brain skills training, children and young people will require support to develop the skills to thrive in an AI-driven world. Prioritizing brain skills today will shape the workforce of tomorrow.

Brain skills are fostered across the life course. This means recognizing that early childhood and adolescent development is part of the talent pipeline.



2 Promote brain skills through workplace interventions

Adults spend a third of their lives at work,[77,78] making the workplace a powerful environment for strengthening or eroding brain capital. More than one in five employees globally experience symptoms of burn-out.[79] Proactive investment in employee health, inclusive of brain health, could increase global GDP by up to 12% and generate up to $11.7 trillion in economic value.[80] As populations live and work longer, supporting the workforce – from new entrants to those in the later stages of their careers – through stronger brain health and brain skills will become increasingly important for sustaining productive working lives.

AI is amplifying the urgency and the opportunity. The ability to use and manage AI tools strategically and effectively has grown sevenfold in just two years.[81] Workplaces will want to consider how AI affects employees' cognitive demands, as well as how human judgement, creativity and communication will continue to shape AI's evolution. AI-enabled changes should be paired with deliberate investment in brain skills and integrated into emerging workflows. Without this, organizations risk losing their competitive edge and driving preventable costs through declining employee well-being.

Brain skills training and workflow integration can make AI adoption more effective by enabling employees to adapt, solve problems and work together in hybrid intelligence environments. For example, an organization may encourage the use of AI for scheduling, translations or administrative tasks, while ensuring employees maintain the human capabilities such as communication, mentoring and critical thinking that drive trust and performance. Brain skills such as resilience, self-efficacy[82,83] and adaptability have emerged as top drivers of self-rated performance and innovative behaviour.[84,85] A 30-country study of global workers found adaptability and self-efficacy to be the leading determinants of whether employees felt they were thriving, not just performing.[86]

Prioritizing employee health can lead to substantial return on investment (ROI).[87] For example, the sportswear company On implemented a programme that included access to a self-care library, coaching sessions, internal well-being (including brain skills) workshops and interpersonal skills training for managers.[88] These efforts delivered an 11.6x increase in ROI.[89]

Paradoxically, the uncertain conditions that make adapting so important – specifically the rise of AI tools – can result in some leaders resisting change and defaulting to reactive behaviour.[90] In the face of sustained cognitive and emotional demands, executives will need to demonstrate critical brain skills such as self-regulation, clarity and mental stamina. There are organizational changes that can be made to integrate brain skills into culture, workflows, skills taxonomies, learning programmes, performance management and employee development. For example, employee training focused on work-related psychological flexibility has been associated with improved stress resilience, reduced exhaustion and increased personal accomplishment.[91] Additionally, tools such as wearables or digital trackers that monitor sleep or fitness may be helpful: leaders can benefit from managing their mental and emotional energy as rigorously as athletes manage their mental and physical performance.[92]

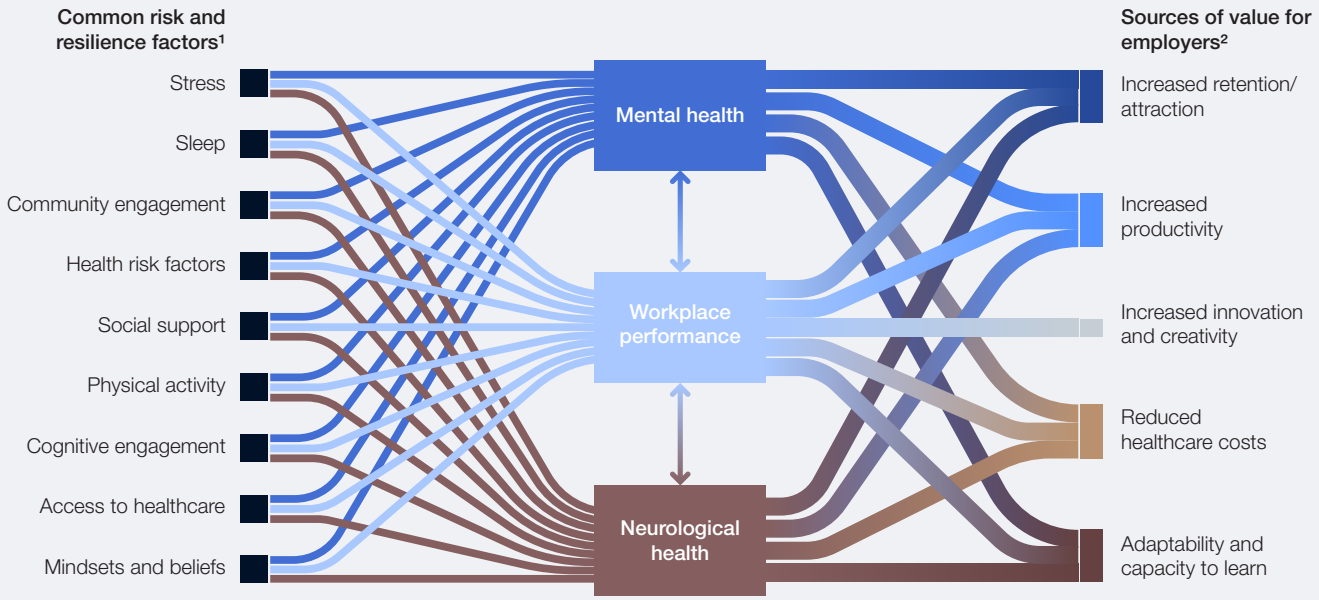
Ongoing research now clarifies where employers should focus for the greatest impact. Tools such as the unified model of brain health are helping guide smart and strategic investments.[93] Organizations that invest in building brain skills from the inside out will be better equipped to innovate, retain top talent and thrive amid constant change.

BOX 3 | Data deep dive: Cross-cutting factors that also drive workplace well-being and performance

Developed by UsAgainstAlzheimer's in collaboration with the Davos Alzheimer's Collaborative and McKinsey Health Institute, the unified model of brain health provides a common framework for understanding how the brain influences mental well-being, cognitive function and workplace performance.

Employers can use this model to assess where their current policies and practices support or hinder brain health, identify high-impact opportunities for interventions and align strategies with business goals. It offers a clear, evidence-informed way to illustrate how common modifiable risk and protective factors such as stress, sleep and community engagement can have cascading benefits across brain health and workplace performance.

Unifying mental health, neurological health and performance drivers to achieve better business outcomes



McKinsey Health Institute

Davos Alzheimer's Collaborative

BUSINESS COLLABORATIVE FOR BRAIN HEALTH
UsAgainstAlzheimer's

Note:

1. Top risk and resilience factors were identified through a literature search using scite (a GenAI tool trained on peer-reviewed academic literature) and were validated with experts
2. Connections to mental health, workplace performance, and neurological health are based on evidence found in peer-reviewed literature

Source: Davos Alzheimer's Collaborative, UsAgainstAlzheimer's, & McKinsey Health Institute. (2025, January 16). *Nine levers to build brain capital in the workplace*. https://businessforbrainhealth.org/resources/unifiedmodelbrainhealth

3 Study brain capital

Studying brain capital reveals critical gaps and directs innovation towards what people need most.

The concept of brain capital remains nascent. While relevant work is taking place across many disciplines, there is no single interdisciplinary agenda that could drive strategic investment, standard-setting or collective action. To study brain capital, three strands of inquiry are important. First, a need for deeper knowledge of brain health itself, including how to prevent and treat brain health conditions as well as achieve optimal brain health across the life course. Second, a need to expand the evidence base on brain skills, particularly their impact on productivity and organizational performance. Third, research to support communities, organizations and systems seeking to structure themselves to promote brain health and positive brain skills at scale.

Together, these strands of inquiry form the backbone of a research agenda to advance brain capital. Current investments are not aligned with the scale or structure of the brain capital challenge, and without a shared research and measurement framework, progress is difficult to define, compare or scale.[94] By deepening knowledge and tracking what matters, stakeholders can be equipped with the insights they need to make informed policy, funding and programmatic decisions around brain capital.

Studying brain capital includes: 1) establishing brain capital as an interdisciplinary area of study; 2) measuring brain capital; and 3) accelerating R&D to build brain capital.



1 Establish brain capital as an interdisciplinary area of study

Establishing a framework for interdisciplinary study can accelerate progress in cross-cutting areas that span multiple fields, sectors and geographies, enabling the design of scalable interventions. In other areas, such as geroscience, an interdisciplinary perspective has provided the shared priorities and measurement systems needed to mobilize investment, attract top talent and accelerate innovation.

To bring this to life, research institutions could establish dedicated brain capital centres or programmes that explicitly span these areas and unite them through shared data and measurement. Policy-makers could recognize brain capital research as a priority area in national strategies, incentivizing interdisciplinary grants and translational partnerships. Innovators and industry leaders could co-invest in public–private initiatives to accelerate tools and interventions. Funders could adopt the framework as a portfolio-structuring tool. By creating a framework for interdisciplinary work on brain capital within the research agenda, tracking global investment and returns becomes possible, positioning societies and companies alike to thrive in an increasingly brain-based economy.[95]

FIGURE 3 | **Example framework for an interdisciplinary approach to brain capital**

Core components of brain capital

Brain health	Brain skills
Neurological disorders (e.g. ADHD, migraine, Alzheimer's disease)	Cognitive skills (e.g. mental flexibility, critical thinking, communication, planning)
Mental disorders (e.g. anxiety, depression, schizophrenia)	Interpersonal skills (e.g. teamwork effectiveness, developing relationships, mobilizing systems)
Substance use disorders (e.g. alcohol use disorder)	Self-leadership (e.g. entrepreneurship, goals achievement, self-awareness and self-management)
Prevention and promotion (e.g. early childhood, nutrition)	Technological literacy (e.g. technical fluency, digital problem solving, collaboration)

Example enablers

Education and training system design
Public policy

Workplace and organizational design
Place-based design

Example disciplines

Biomedical and clinical sciences
- Epidemiology
- Medicine
- Neurology
- Neuropsychology
- Nutrition
- Neuroscience
- Psychology
- Psychiatry
- Public health

Design and technology
- Architecture
- Biomedical engineering
- Computer science and AI

Education and social sciences
- Economics
- Education
- Occupational science
- Organizational science
- Political science
- Public policy
- Sociology

Creative arts
- Literary
- Media
- Performance
- Visual

Source: World Economic Forum, & McKinsey Health Institute (2025)



2 Measure brain capital

As brain capital gains traction globally, measurement should lead the way. There is no widely adopted framework to define success, benchmark progress or compare outcomes. The creation of metrics, principles and frameworks can support resource alignment, make the case for sustained investment and unlock catalytic funding. For example, in 2007 the European Investment Bank issued the world's first green use of proceeds bonds, the Climate Awareness Bond. This has now grown into more than $1 trillion in total issued value and has informed the creation of third-party standards.[96,97] In other areas, the creation of the Human Capital Index and associated accounting frameworks quantified the contribution of health and education to workforce productivity, helping countries understand the cost of inaction.[98]

Existing tools, such as the Euro-Mediterranean Economists Association (EMEA)'s Brain Capital Dashboard, lay the groundwork for what is possible.[99]

BOX 4 **Tool spotlight:** Global Brain Capital Dashboard

The Brain Capital Dashboard (BCD) shows the "brain capital index" for more than 100 countries. Each country's score is broken down into component metrics that enable users to assess strengths and vulnerabilities across domains.

Created by the Euro-Mediterranean Economists Association and the Brain Capital Alliance,[100] this interactive dashboard was developed by integrating open data sources from international agencies such as the WHO, the World Bank and the Organisation for Economic Co-operation and Development (OECD). The tool includes component metrics across four areas – brain health, brain skills, brain-friendly environments and policy and innovation enablers – and enables analysis of cross-country variations in indicators, policy strengths and gaps relevant to brain capital development, and progress over time. Some example indicators include suicide rates, participation rate in organized learning, access to social services, research investment and health system readiness.

The BCD builds on the Institute for Health Metric and Evaluation (IHME)'s Brain Health pillar data. The IHME also provides additional country-level health detail, including COVID-19 era data and a broader set of disorders and metrics (for example, DALYs).[101]

Building on these efforts, broader adoption, coordination and refinement will be essential. For example, the field could define the domain and measurements for a brain capital "satellite account" to provide detail on brain capital that GDP may underrepresent. Like satellites orbiting Earth, satellite accounts typically orbit a country's core economic statistics (such as GDP and industry data) but are separate from the core accounts.[102] This could feed into national statistical systems to help estimate costs of inaction as well as positive impact of brain capital investments.

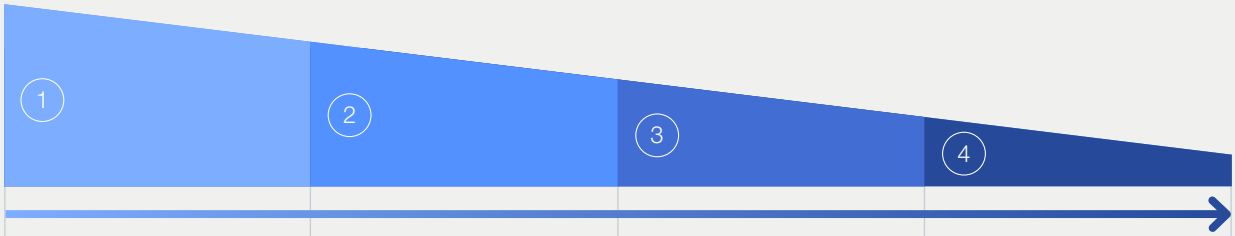
Making brain capital measurable enables leaders to assess what is working, reallocate towards high-impact efforts and communicate value to investors, funders and the public.

3 Accelerate R&D to support the development of brain capital

R&D is a powerful tool for advancing brain capital. Today, most R&D funding related to the brain focuses on late-stage treatment, leaving prevention, early detection and the science of developing positive brain skills underexplored.[103] A more strategic approach could guide investment in brain capital across the highest impact areas within each stage of the R&D pipeline.

Centring brain capital as an interdisciplinary area of study is a necessary first step to integrating strategically across relevant R&D pipelines. Brain capital R&D efforts can be anchored across four stages of progress: foundational research; translation and adaptation; adoption and implementation; and scaling. Figure 4 highlights key questions to address at each stage of the R&D process and identifies specific actions that can accelerate progress.

FIGURE 4 | **Strategic investment across the R&D pipeline can unlock the full potential of brain capital**



	Foundational research	Translation and adaptation	Adoption and implementation	Scaling
Key question to address	How can we attract new investment in foundational brain capital research?	How can we translate innovations to real-world applications and settings?	How do we enable organizations to adopt brain capital innovations?	How do we build sustainable infrastructure and systems for scale?
Example actions	— Designate brain capital as a priority for public research funding — Invest in breakthrough technologies to expand our understanding of brain function and potential	— Build multi-site, sex-disaggregated specialized trial networks and protocols — Tailor proven approaches for deployment to the environments where people live, learn and work	— Engage funders, employers and policy-makers to remove barriers and enable early uptake — Provide technical assistance to help organizations adopt innovations and integrate new practices and tools effectively	— Launch innovation hubs for scale-up of newly developed interventions and workplace strategies — Establish long-term funding mechanisms and infrastructure

Source: World Economic Forum, & McKinsey Health Institute (2025)

Realizing the full potential requires sustained investment along the pipeline. Advances in breakthrough technologies such as brain–computer interfaces, precision medicine and next-generation brain mapping are opening new frontiers in how to understand and monitor brain function. Increased focus on the science of ageing is transforming the understanding of how workplace and community design can support high cognitive function in ageing populations. Across the lifespan, large-scale, sex-stratified studies and the inclusion of hormonal status and modifiers can unlock insights specific to sex and life stage. These examples underscore the need to establish a brain capital R&D agenda that addresses emerging needs and creates new markets.

4 Invest in brain capital

Strategic investment in the brain delivers high returns across health, productivity and long-term growth.

Capital deployment to sustain and grow brain capital is limited in scope and instruments. Maturing the brain capital investment landscape may involve public, commercial and philanthropic capital to mobilize resources and direct them where they can have the greatest impact. This could require a mix of traditional (e.g. grants, public budgets) and innovative financing mechanisms (e.g. blended finance, public–private partnerships) to de-risk innovation, support capacity-building and resource the infrastructure needed to safeguard, foster and study brain capital at scale.[104]

Stakeholders can act to invest in brain capital by employing a range of financing mechanisms to drive fit-for-purpose investment.



1 Employ a range of financing mechanisms to drive fit-for-purpose investment

Driving meaningful investment in brain capital requires financial innovation that matches the unique characteristics of this domain. Across the value chain this area experiences underinvestment relative to costs and potential benefits to individuals, organizations and societies, with a portfolio overweighted towards use of specific non-return-seeking financial instruments. Investors often perceive long-time horizons, fragmented markets or uncertain returns as deterrents to investing in otherwise high-potential opportunities. Brain health interventions often carry long payback periods, as benefits such as improved cognitive functioning, reduced healthcare costs and enhanced productivity accumulate over decades. To bridge this gap, innovative financing could reduce risk for potential investors.

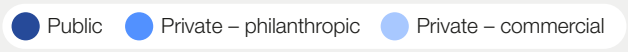
This is not the first time a new economic frontier has faced these hurdles. The Coalition for Mental Health Investment (CMHI) is among one organization that is creating financing guidance that is applicable broadly across the field of brain health. Figure 5 outlines examples of investment barriers, drawing on a more detailed body of work done by CMHI.[105]

FIGURE 5 | **Financing mechanisms across the brain capital R&D pipeline**

Brain capital R&D pipeline	Foundational research	Translation and adaptation	Adoption and implementation	Scaling
	Developing new strategies and interventions; conducting basic discovery science and research	Moving from research to practical implementation and (pre-)clinical testing	Developing infrastructure, workforce and knowledge to implement; integrating into service delivery and clinical practice	Scaling up and integrating into broader systems to enable access globally
Investment barriers[1]	High upfront investment cost across uncertain returns and high requirements for risk capital	Long payback periods before seeing measurable results	Misaligned incentives and limited coordination across key players in the value chain	Fragmented demand; lack of physical and technological infrastructure to scale

Potential financing mechanisms that can be deployed across the pipeline to de-risk and spur investment

Market context is important in this space, given policy and social constraints, creating need for investment to be paired with market-shaping efforts



Capital preservation or market return	— Angel investing — Debt financing — Funds of funds	— Growth funding — Long-term funding — Public markets — Royalty financing	— Retained earnings — Seed funding
No return expected	— Crowdfunding — Debt swaps — Development loans — End or milestone-based prizes — Forgivable loans	— Government budget allocation — Government incentives and subsidies — Grants — Guarantees — Impact bonds	— Microinsurance models — Overseas development assistance — Solidarity levies — Tax credits

Note:
1. Non-exhaustive and can apply to more than one part of the value chain

Source: Adapted from Coalition for Mental Health Investment. (2025, September 19). *Keeping investment in mind: Challenges, strategies, and solutions for financing mental health*

Brain health investors can look to history, where they would find that early clean energy markets encountered similar barriers. It was not until public and private actors coordinated to deploy tools such as blended finance, catalytic philanthropy, loan guarantees and public–private partnerships that markets for solar and wind matured and drew in commercial capital.[106] A comparable financing approach is needed to develop and scale solutions for safeguarding brain health, fostering brain skills and studying brain capital. Flexible financing models can help bridge this gap.[107] Public and philanthropic funding can support early-stage research. Blended finance can reduce risk and crowd in private capital. Outcome-based mechanisms, such as social impact bonds, can tie funding to long-term results.

At the same time, innovative financing could also work within and alongside existing loan structures in low- and middle-income countries. Loan agreements with multilateral institutions, such as the IMF or World Bank, sometimes include fiscal conditions that may not yet be met in these contexts (for example, a minimum ratio for health workers per 10,000 population). Incorporating broader brain capital considerations into such agreements – for instance, through flexible spending frameworks or targeted debt restructuring – could help countries direct funds towards areas of greatest need and value.

BOX 5 | **Tool spotlight:** Mental health financing guidebook

The mental health financing guidebook *Keeping Investment in Mind: Challenges, Strategies, and Solutions for Financing Mental Health*[108] was developed by the Coalition for Mental Health Investment. The guidebook is a practical resource designed to unlock greater investment in mental health. It maps the value chain from innovation to widescale adoption and helps funders identify evidence-informed financing mechanisms for their strategic use cases. The guidebook also showcases potential "scaling journeys" for interventions, spotlights key enablers of scaling and offers case studies of innovative financing mechanisms in practice.

A group of organizations at the forefront of the brain economy movement are leading work in the area of brain investment, with plans to release a Brain Economy Action Forum affiliated resource on the topic of brain lens investing and specific investable opportunities in the coming year.



5 Mobilize for brain capital

Mobilizing stakeholders ensures brain capital becomes an organizational and societal priority.

Global organizations and institutions such as the United Nations (UN),[109] WHO,[110] G7,[111] G20[112] and the OECD[113] have elevated brain capital on the global policy agenda. Across the world, there are examples of governments, companies and specific sectors making large-scale investments. Despite this growing awareness and prioritization, these efforts remain fragmented, underfunded and often siloed from economic and policy decision-making. In other words, the scale of current efforts does not yet match the scale of the risk and opportunity. Urgent, coordinated action is needed.

While specifics may differ, stakeholders across all sectors face rising costs, performance risks and strategic blind spots if brain health remains insufficiently addressed and brain skills remain underdeveloped. For example:

- **Health sector:** Systemic and integration challenges, including escalating costs, insufficient prevention and early intervention infrastructures and workforce shortages exacerbated by strain on high-acuity services
- **Human services:** Downstream social challenges for individuals as a result of unmet brain health needs, including homelessness, unemployment, criminal justice involvement, intergenerational trauma and more
- **Public sector:** Strain on public budgets as governments navigate the challenges and health costs associated with ageing populations
- **Private sector:** Burn-out symptoms, absenteeism, attrition, presenteeism and skill mismatches can threaten workplace safety, productivity and performance
- **Civil society:** Rising disconnection, polarization and mental strain challenge community cohesion

Amid these challenges lies an opportunity for each stakeholder group to lead within its sphere of influence, driving solutions that improve brain health and skills alongside strengthening organizations, economies and societies long term.

Mobilizing to advance brain capital includes: 1) engaging stakeholders to develop a shared vision and chart a coordinated path forward; and 2) embedding brain capital into strategy, operations and culture.

1 Engage stakeholders to develop a shared vision and chart a coordinated path forward

Creating the full potential of brain capital means evolving from fragmented efforts to a more coordinated movement. Building on current momentum, the next phase of work is to unify these efforts around a shared vision: aligning priorities, accelerating action and driving towards shared goals.

Other global coalitions offer powerful lessons. The Global Coalition on Aging (GCOA) convenes business, government and civil society to position longevity as an economic opportunity.[114] Through strategic partnerships and targeted advocacy, the GCOA shapes policies on age-inclusive workforces, care of older people and healthy ageing, demonstrating how cross-sector collaboration can drive change. The *Global Cooperation Barometer 2025* underscores that cooperation is critical to brain capital, particularly innovation, climate and health.[115]

Organized by the World Economic Forum in partnership with McKinsey Health Institute, the Brain Economy Action Forum was launched in January 2025 to convene a dynamic group of stakeholders globally to put brain capital at the centre of global dialogues and drive action towards sustainable economic growth and societal well-being.

Building on this work, High Lantern Group, the Milken Institute, the Forum and McKinsey Health Institute have developed a blueprint for global coordination, grounded in a mapping that identified around 50 organizations across the world that are already engaging explicitly in brain capital work, embracing not only the substance of the work but also the terminology of the brain economy. This work was informed by a series of interviews with experts from past economic movements, industry, academia and policy.

This mapping exercise found that while the stakeholder base of those engaged in brain capital work is broad, it is currently weighted towards private commercial actors. This distribution highlights the momentum building within the private sector around this topic.

These organizations are not clustered in a single geography. Activity among engaged stakeholders spans every major global region, suggesting both the universality of brain capital challenges and the potential of global collaboration (see Figure 6).

FIGURE 6 **Organizations engaged in the brain economy – by operating region**



Note: Does not add up to a total of 50 because several organizations operate in multiple regions
* Includes ~50 identified organizations that have identified the brain economy or brain capital as a strategic priority

Source: High Lantern Group, the Milken Institute, World Economic Forum, & McKinsey Health Institute (2025)

Within the current landscape, mobilization is the most common focus area for engaged organizations. Some 38 organizations were identified as working on efforts related to mobilizing around brain capital (see Figure 7). This demonstrates that organizations recognize the need for coordination to align efforts and accelerate impact.

Global coordination is a critical foundation for the mobilization needs described throughout this report. Without a coordinated approach, brain capital initiatives risk fragmentation, duplication and missed opportunities at a time when demand for solutions has never been higher.

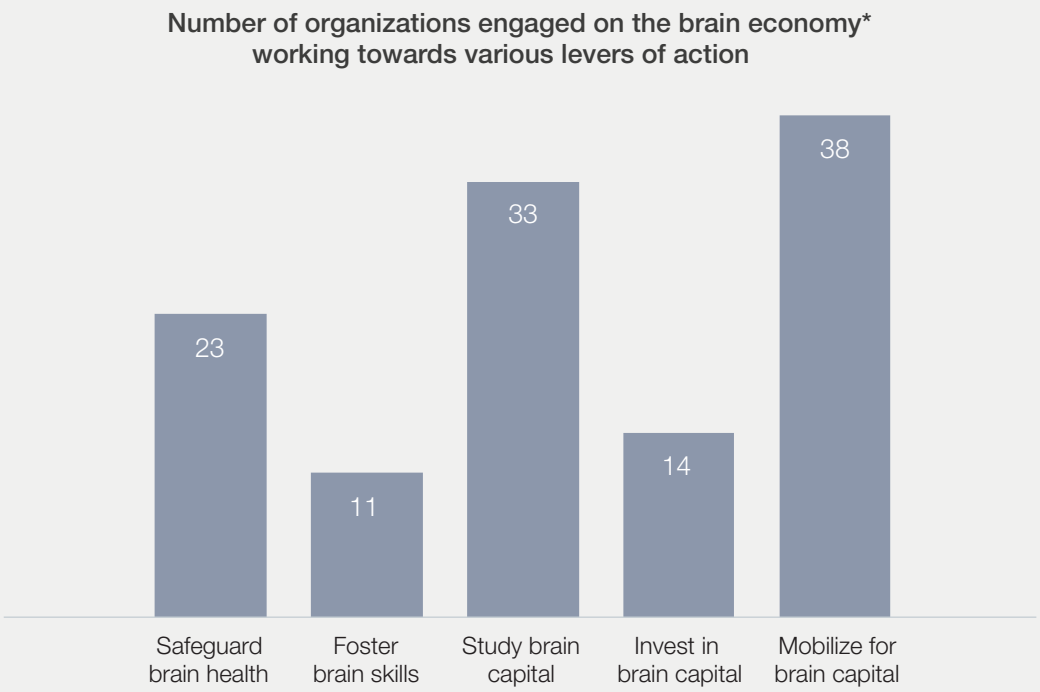
A dedicated coordinating entity is needed to accomplish four core functions:

- **Knowledge development:** Invest in generating new knowledge that advances the growth of brain capital
- **Thought leadership and communication:** Lead dissemination of knowledge and insights

- **Mobilization:** Mobilize leaders across sectors and regions towards a unifying set of goals and metrics
- **Cross-sector coordination:** Support coordination among aligned efforts globally to maximize the ROI in the brain economy

Shaped in close partnership with the stakeholders leading this movement, a dedicated entity would translate vision into sustained action, including guiding future investment, innovation and collaboration around brain capital.

FIGURE 7 **Organizations engaged in the brain economy – by lever**



Note: Does not add up to a total of 50 because several organizations are engaged on multiple levers of action
* Includes ~50 identified organizations that have identified the brain economy or brain capital as a strategic priority

Source: High Lantern Group, the Milken Institute, World Economic Forum, & McKinsey Health Institute (2025)

2 Embed brain capital into strategy, operations and culture

In every sector, brain capital investment is emerging as a tool for innovation and resilience alongside building long-term relevance and impact. Brain capital investments also complement AI adoption. As organizations enable digital transformation, parallel investments in brain capital ensure that technology augments rather than erodes human performance. Conversely, as societies and organizations advance brain capital, they will be better equipped to fully harness the potential of AI to drive economic and social progress.

When organizations invest in brain capital, the effects do not stop at the individual. They ripple outwards, strengthening teams, transforming organizations and shaping healthier, more resilient communities.

It begins with the individual. Investments in brain capital enhance well-being and performance across the life course. Within teams and organizations, these individual gains can lead to measurable improvements in productivity, innovation and decision-making. Brain capital strategies help attract and retain talent, especially in high-pressure and high-demand fields. They also reduce absenteeism and support a healthier, more engaged workforce. When organizations support the brain health and skills of their people, they build stronger, more agile workforces ready to meet the demands of a rapidly evolving economy.

As brain capital strategies take hold, they extend beyond organizations, contributing to healthier populations, stronger education-to-employment pipelines and reduced strain on caregivers and public services. When brain capital is a shared local priority, it can spark meaningful place-based transformation, amplifying economic opportunity and social well-being.

Translating vision into action does not come without challenges. While the case for investing in brain capital is clear, many organizations encounter barriers that can slow or stall momentum. Mobilizing around brain capital requires overcoming constraints such as:

- Limited internal awareness and siloed decision-making across human resources and strategic functions – building brain capital means moving from a human resources initiative to a CEO- and board-level priority

- Underappreciation of near-term value – resources dedicated to improving brain capital are too often seen as costs rather than investments in value creation

To move past these barriers, organizations need a disciplined, sustained approach to designing, resourcing and delivering change. The 5As Framework – Aspire, Assess, Architect, Act, Advance – offers a roadmap that any organization can adapt to its scale, sector and goals.[116]

FIGURE 8 **The 5As Framework for organizational change**

Aspire	Assess	Architect	Act	Advance
Where do we want to go? — Establish brain capital as a strategic priority owned by the CEO and board — Appoint an executive sponsor to lead the effort and engage C-suite, board members and business leaders to unite in setting ambition — Identify stakeholders critical to mobilizing investment	**How ready are we to go there?** — Analyse current data to identify needs and opportunities, including roles most exposed to AI-related workflow change — Identify gaps in support systems, particularly for roles with high cognitive or emotional demands, or those undergoing rapid transformation — Assess organizational readiness to integrate new supports	**What must we do to get there?** — Establish an organization-wide brain capital task force with C-suite sponsorship and board oversight — Prioritize strategic areas to embed brain capital support (e.g. leadership training, job design) — Build the financial and business case for investment	**How do we manage the journey?** — Launch pilot initiatives with defined KPIs and continuous feedback loops — Secure sustainable financing mechanisms to support brain capital initiatives tied to productivity, retention and risk mitigation — Continuously track data to assess outcomes and address feedback	**How do we sustain and scale impact?** — Scale successful pilots and embed proven interventions into organization-wide practices and leadership routines — Institutionalize ongoing capability building programmes that strengthen brain skills across all levels, from frontline workers to senior leaders

Source: McKinsey & Company (2025)

Whether a leader is a CEO navigating global markets, a mayor shaping early childhood programmes or a leader building the next generation of thinkers, their organization has a critical role to play. For CEOs, embedding brain capital into talent and innovation strategy ensures resilience in the era of AI. For healthcare and life sciences leaders, it could mean investing in research and care delivery innovation. For governments, it could mean building systems that support brain health and skills from early life through ageing. Taken together, these actions equip organizations not only to build brain capital internally but to lead externally, setting the pace in a competitive and fast-changing landscape.

Conclusion

Brain capital is a defining driver of prosperity. The value of brain capital is being redefined. As AI and automation transform the global economy, many traditional sources of advantage, such as low-cost labour, are eroding. Markets are moving from being tied to physical assets to being driven by ideas, algorithms and the ability to learn at an astronomical pace. On the other hand, while AI holds great promise for enhancing productivity and even supporting brain health, its growing role in daily life also raises new concerns about mental well-being and social connection. How countries and organizations evolve brain capital strategies to harness the complementary strengths of human intelligence and technological capabilities will become a defining source of resilience and value.

This report makes the case for centring brain capital as a strategic economic asset. The opportunity has never been greater. Advances in neuroscience have created the conditions for transformative progress. This paper has focused on the economic case for investing in brain capital, but the potential impact on individual lives and families must also remain front and centre in broader discussions. Scaling known brain health interventions could reclaim more than 260 million disability-adjusted life years globally.[117]

For businesses, the case is urgent. Burn-out, absenteeism and talent shortages are already hampering growth. In a world where 59% of the workforce is expected to require upskilling by 2030, strengthening brain capital is necessary as a core talent and innovation strategy. Organizations that embed brain health and brain skills into their business model will be better positioned to adapt, compete and grow.

This report outlines five levers to activate brain capital: safeguarding brain health and fostering brain skills, and studying, investing in and mobilizing around brain capital. These actions are mutually reinforcing and can be pursued at any level. They offer a pathway not just to address today's challenges but to shape a stronger, more resilient future.

First, treat brain health as foundational. No brain capital agenda will succeed without expanding access to the strategies, services and support mechanisms that safeguard brain health.

Second, foster brain skills across the life course. Developing these skills requires intentional support in a variety of systems and settings, including early childhood, formal education systems, workplaces and programmes to support healthy ageing.

Third, study brain capital. This means elevating brain capital as an area of interdisciplinary research that can connect siloed efforts, attract more strategic investment and support crucial work on measurement.

Fourth, invest in brain capital at scale. This means unlocking funding, de-risking innovation and directing resources towards the highest-impact opportunities. Governments can create enabling environments. Investors and philanthropies can expand catalytic capital. Businesses can lead by example, testing new approaches and embedding brain skills into talent pipelines.

Finally, mobilize stakeholders to turn momentum into sustained action, engaging a broader set of actors, not just within health or education but in finance, labour, technology and other sectors in order to elevate brain capital as an economic and societal priority.

The brain is a driver of human intelligence and endless possibility. As AI advances, building human capacity with comparable urgency and resources must be prioritized. Investing in brain capital is a path to more fulfilling lives, resilient economies and stronger societies.

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