In collaboration with Boston Consulting Group

WORLD ECONOMIC FORUM

Transformation of Industries in the Age of AI

The Future of AI-Enabled Health: Leading the Way

WHITE PAPER

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Images: Midjourney, Getty Images

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Reading guide

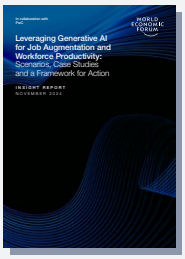
The World Economic Forum's AI Transformation of Industries initiative seeks to catalyse responsible industry transformation by exploring the strategic implications, opportunities and challenges of promoting artificial intelligence (AI)-driven innovation across business and operating models.

This white paper series explores the transformative role of AI across industries. It provides insights through both broad analyses and in-depth explorations of industry-specific and regional deep dives. The series includes:

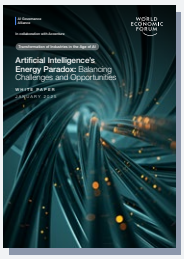
Cross industry

Impact on industrial ecosystems

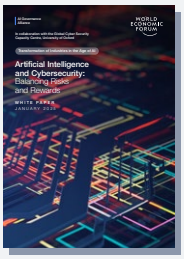
AI in Action: Beyond Experimentation to Transform Industry



Leveraging Generative AI for Job Augmentation and Workforce Productivity



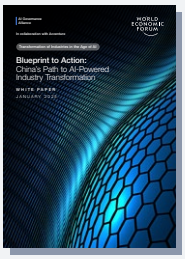
Artificial Intelligence's Energy Paradox: Balancing Challenges and Opportunities



Artificial Intelligence and Cybersecurity: Balancing Risks and Rewards

Regional specific

Impact on regions



Blueprint to Action: China's Path to AI-Powered Industry Transformation

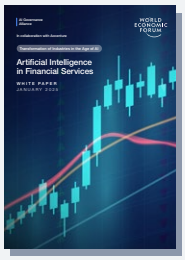
Industry or function specific

Impact on industries, sectors and functions

Advanced manufacturing and supply chains

Frontier Technologies in Industrial Operations: The Rise of Artificial Intelligence Agents

Financial services



Artificial Intelligence in Financial Services

Media, entertainment and sport

Artificial Intelligence in Media, Entertainment and Sport

Healthcare

The Future of AI-Enabled Health: Leading the Way

Transport

Intelligent Transport, Greener Future: AI as a Catalyst to Decarbonize Global Logistics

Telecommunications

Upcoming industry report: Telecommunications

Consumer goods

Upcoming industry report: Consumer goods

Additional reports to be announced.

As AI continues to evolve at an unprecedented pace, each paper in this series captures a unique perspective on AI – including a detailed snapshot of the landscape at the time of writing. Recognizing that ongoing shifts and advancements are already in motion, the aim is to continuously deepen and update the understanding of AI's implications and applications through collaboration with the community of World Economic Forum partners and stakeholders engaged in AI strategy and implementation across organizations.

Together, these papers offer a comprehensive view of AI's current development and adoption, as well as a view of its future potential impact. Each paper can be read stand-alone or alongside the others, with common themes emerging across industries.

Foreword

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The global health landscape is on the cusp of a significant transformation, driven by the rapid integration of digital technologies and artificial intelligence (AI). In healthcare, medtech and pharma, an inflection point has been reached: the choice now lies between transforming systems or continuing down the road of incremental improvement. As this transformation unfolds, it is crucial for addressing the urgency for real, impactful change rather than small, marginal advances.

AI transformation goes beyond adopting new tools; it involves rethinking the fundamentals of how health is delivered and accessed. AI digital health solutions – including AI to improve operations such as note-taking or resource-scheduling but also telemedicine, remote monitoring and AI-driven diagnostics – hold the potential to enhance efficiency, reduce costs and improve health outcomes globally.[1]

Compared to other industries, healthcare exhibits digital maturity and disruption below the global average, indicating that these sectors have yet to make full use of digital technologies to create significant value. It is not yet clear whether AI will drive transformation or continue down the current path, with a sole focus on marginal efficiency. So far, many AI developments have been experimental, with more than 70% of US Food and Drug Administration (FDA) approvals centred on imaging applications, most of which have yet to be implemented at scale.

The World Economic Forum is committed to exploring AI's impact in various sectors. This white paper is part of a series focusing on scaling AI across industries and is a contribution to the Forum's broader AI Governance Alliance report *Transformation of Industries in the Age of AI*, which aims to transform how AI shapes the modern world. This initiative uses diverse expertise to address multifaceted issues.

Healthcare is facing fundamental challenges that require its transformation: rising demand due to ageing populations and constrained supply of resources, leading to wide inequalities of outcome. Recent global events, particularly the COVID-19 pandemic, have underscored the urgency of this transformation by accelerating the adoption of digital health technologies. The shift to digital health can be a powerful force in achieving health equity, enabling access to quality healthcare for underserved communities, and addressing the chronic disease burden affecting millions worldwide.

AI in health faces dual challenges. First, the inherently sensitive nature of health, where the protection of individuals is paramount, leads to a highly risk-averse environment. Second, societal scepticism towards AI, as highlighted by consumer sentiment surveys, presents a hurdle.

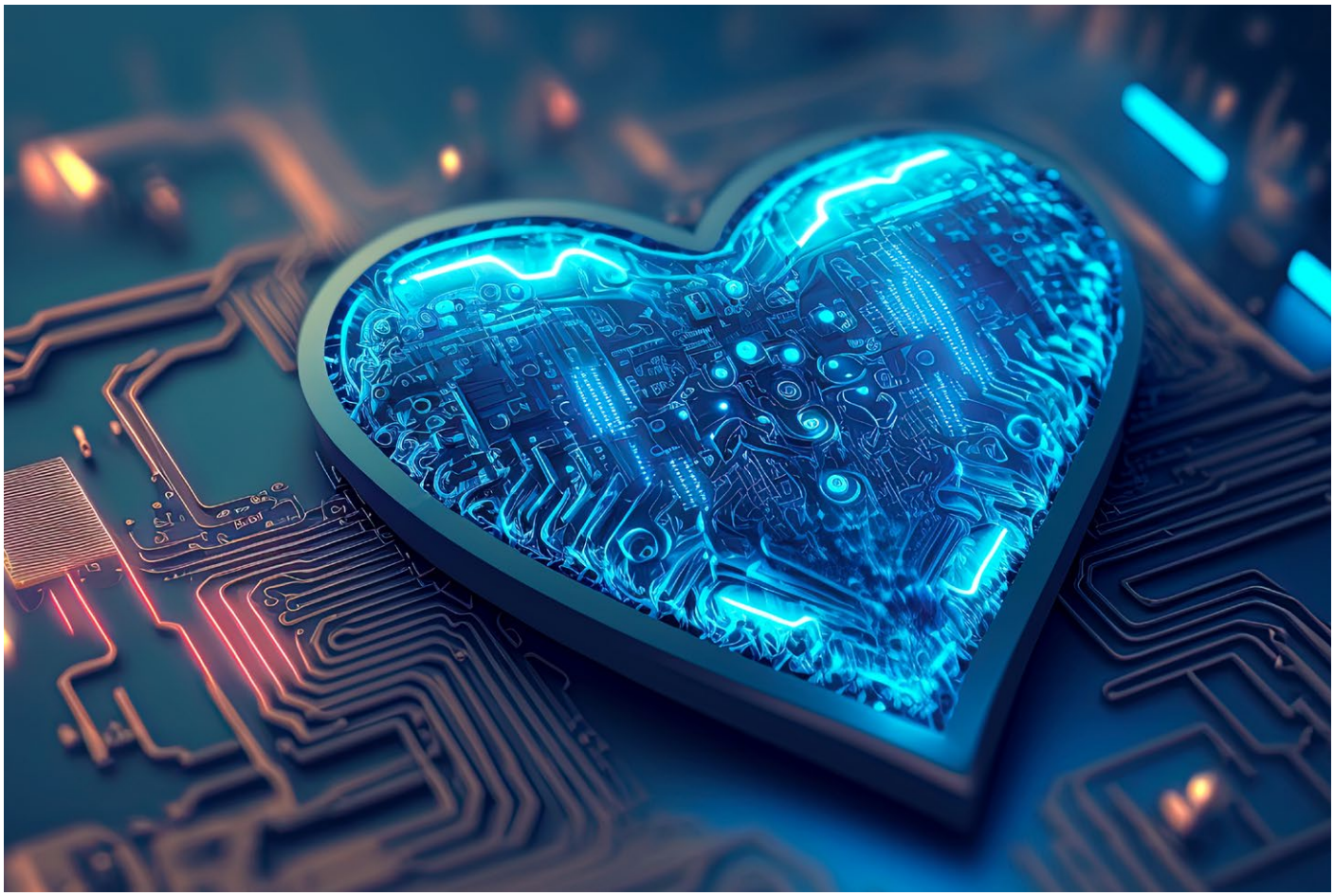
Realizing the full potential of AI in health requires concerted efforts and collaboration among various stakeholders. The World Economic Forum's Digital Healthcare Transformation (DHT) Initiative aims to harness the power of digital solutions to tackle pressing health challenges. This initiative emphasizes the importance of public–private partnerships in driving the adoption and scaling of digital health technologies.

The Forum wishes to use its unique position to address and overcome AI challenges in health through its ability to convene diverse stakeholders from the private and public sectors, international bodies and civil society organizations. Facilitating dialogue and collaboration among these groups ensures that multiple perspectives contribute to finding sustainable solutions.

Throughout this journey, it is imperative to remain focused on the ultimate goal: improving health outcomes for all, irrespective of geographical, socioeconomic or cultural barriers. The path forward requires innovation, collaboration and a steadfast commitment to using technology for the greater good.

Executive summary

AI in healthcare can be transformative, but if action is not taken on six pivotal transitions, the health sector is at risk of not reaching its full potential and falling behind.



Artificial intelligence (AI) is part of a broader digital revolution[2] that has the potential to transform healthcare in many ways. At the front end, AI-enabled tools can improve care, from enhancing clinicians' capabilities and freeing up time for them to focus on patient relationships to enabling patients to take greater control of their own health; at the back end, augmenting non-patient-facing elements improves the efficiency of all facets of healthcare delivery and life sciences by optimizing system-wide operations. However, the adoption of AI at scale remains slow, and there is a risk that its transformative potential in healthcare may not be fully realized.

The World Economic Forum Digital Healthcare Transformation (DHT) initiative has conducted research on AI adoption in healthcare through interviews with experts. Three major challenges were identified that hinder the scaling of AI in healthcare:

1. **Complexity of AI in health deterring policy-makers and business leaders:** Despite the perception that AI in health receives significant attention and energy, it struggles to gain traction on political and strategic agendas.

2. **Misalignment of technical choices with strategic visions:** Health leaders often delegate technical decisions, missing opportunities to align technology with their strategic goals. Additionally, misaligned incentives often hinder decisions from supporting shared goals and collective ideals.[3]

3. **Low confidence in AI within a fragmented regulatory and governance framework:** Rising public distrust in AI and industry scepticism could hinder its adoption in health.

Six pivotal transitions are needed to enable AI-driven healthcare to reach systemic and global scale:

1. **From dreaming of breakthroughs to delivering near-term benefits that accelerate a long-term vision:** Focus on operational applications of AI in health and collaborate with private-sector leaders to demonstrate returns, leading to long-term investments.

2. **From the private sector progressing technology independently to public–private ecosystems driving shared objectives and benefits:** Align public and private leaders on priorities, recognize the potential value of AI in medical applications and agree on how to share this value.

3. **From fighting on infrastructure to winning on services:** Prioritize shared infrastructure such as digital public infrastructures (DPIs) at the forefront of technical choices. Where feasible, seek shared investments for public-good solutions that would align with private-sector service offerings.

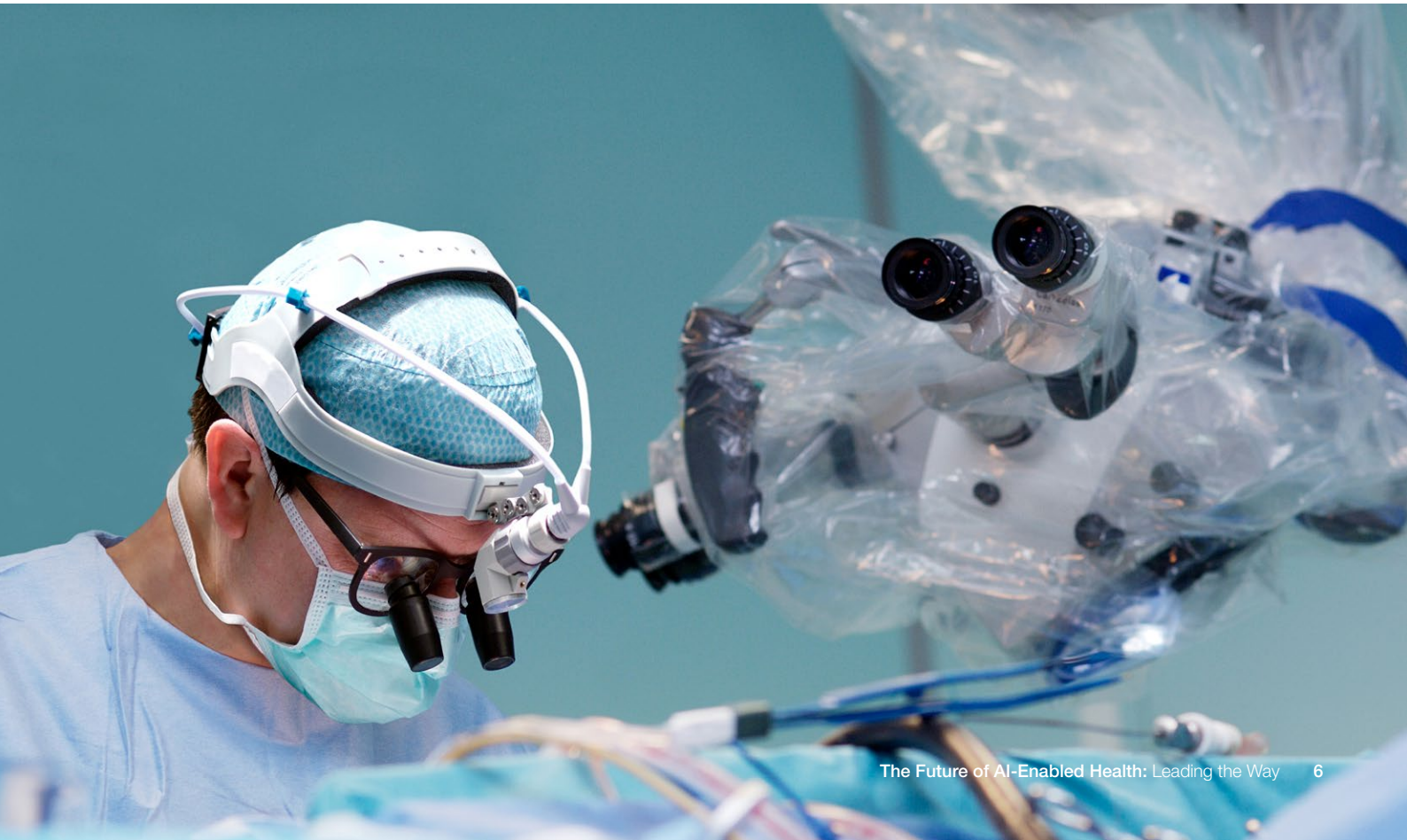
4. **From leaders with good intentions to leaders who make responsible technical decisions:** Upskill and engage leaders at all levels to make strategic decisions with full awareness of the technical aspects.

5. **From waiting for guidelines to proactively building trust:** Actively engage in improving post-market surveillance to detect early AI-related risks with speed and transparency, as well as considering AI ethical committees and principles.

6. **From dispersed data to deliberate integration:** Advocate for local control of data within a globally connected and patient-centred system to both ensure patient privacy and safety and drive innovation.

These shifts will drive deployments of AI in healthcare that deliver truly transformative improvements in well-being, continuous access to personalized AI health assistants, enhanced operational excellence for healthcare systems and leapfrogging by low- or middle-income countries (LMICs). Realizing this vision necessitates overcoming risks and challenges related to privacy, cybersecurity, upskilling clinicians and patients, equitable access and regulation.

AI presents an opportunity for the private sector to build businesses that promote better health worldwide and for the public sector to reinvent approaches for managing population health. It also enables the public and private sectors to join forces to address the enduring healthcare challenges facing the world. The collaborative efforts required will vary by country, depending on digital maturity and specific issues. In LMICs, the focus will be on establishing foundational technology and expanding access to quality care in order to address ongoing challenges such as high disease burden and weak health information systems. In advanced economies, however, interoperability will be essential for improving efficiency and outcomes to meet the needs of increasingly strained healthcare systems.



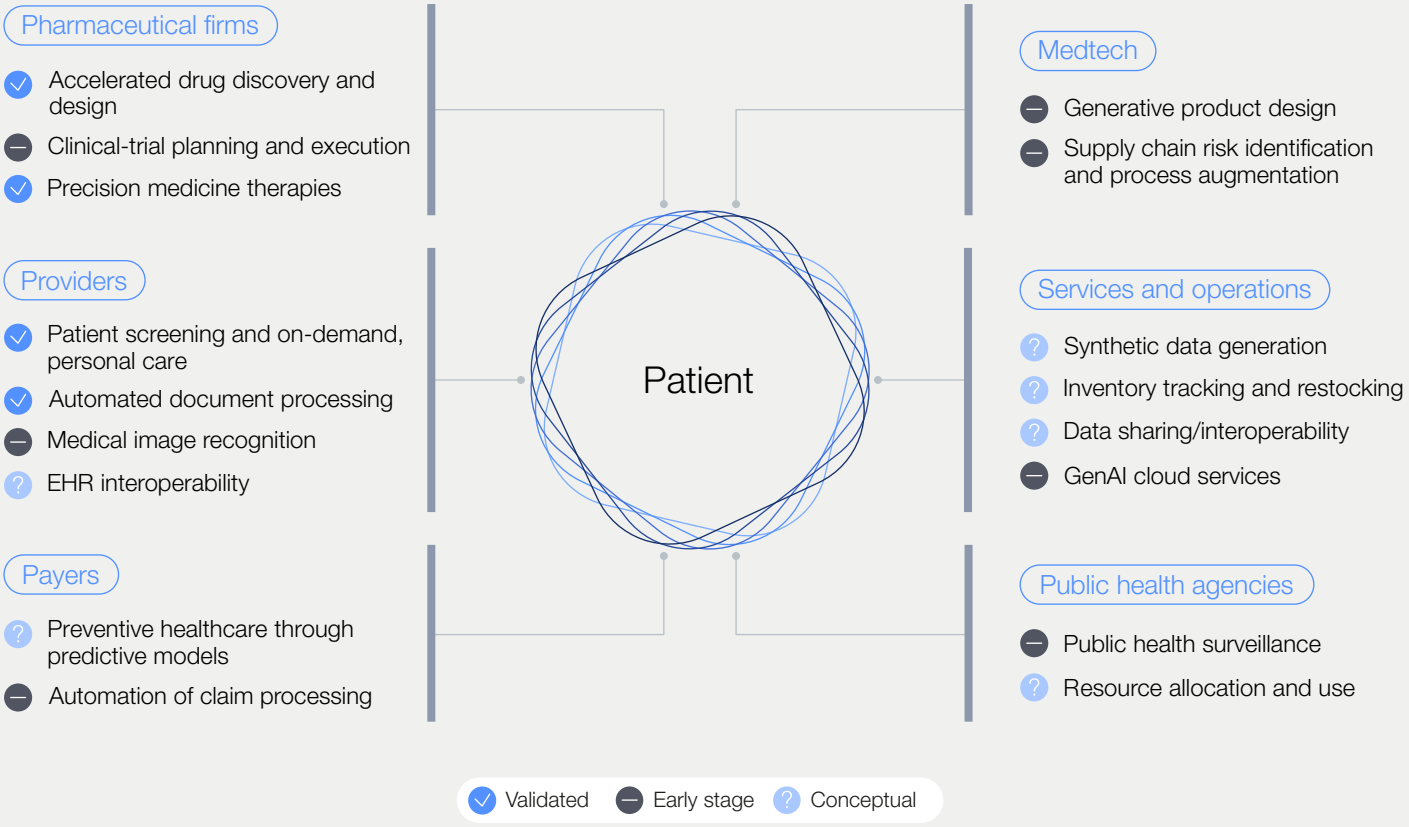
1 Context: AI in the health sector

AI is being deployed throughout the health industry, yet obstacles prevent it being adopted at scale and realizing its transformative potential.

1.1 Trends and use cases

Healthcare is a vast industry encompassing sectors that provide goods and services for patient care. AI has the potential to power a health revolution and so transform the entire ecosystem. **Care providers** will benefit from a range of AI solutions, from diagnostics and care provision to patient monitoring, all aimed at improving clinical outcomes. Augmented clinicians will have greater capacity to focus on patient relationships thanks to improved **services and operations**. **Pharmaceutical firms** can use AI to accelerate drug discovery and improve operations and supply chains. **Healthcare payers and insurance providers** are using AI to reduce costs and improve risk management, with the overall goal of offering higher-quality coverage at a lower cost to consumers. **Medtechs** can develop more efficient, personalized and patient-centred devices, e.g. by incorporating features such as AI-enabled preventive maintenance into their product life cycles. **Public health agencies** can improve resource planning and allocation, anticipate public health needs and execute programmes more effectively thanks to AI.

FIGURE 1 **AI use cases for all stakeholders**

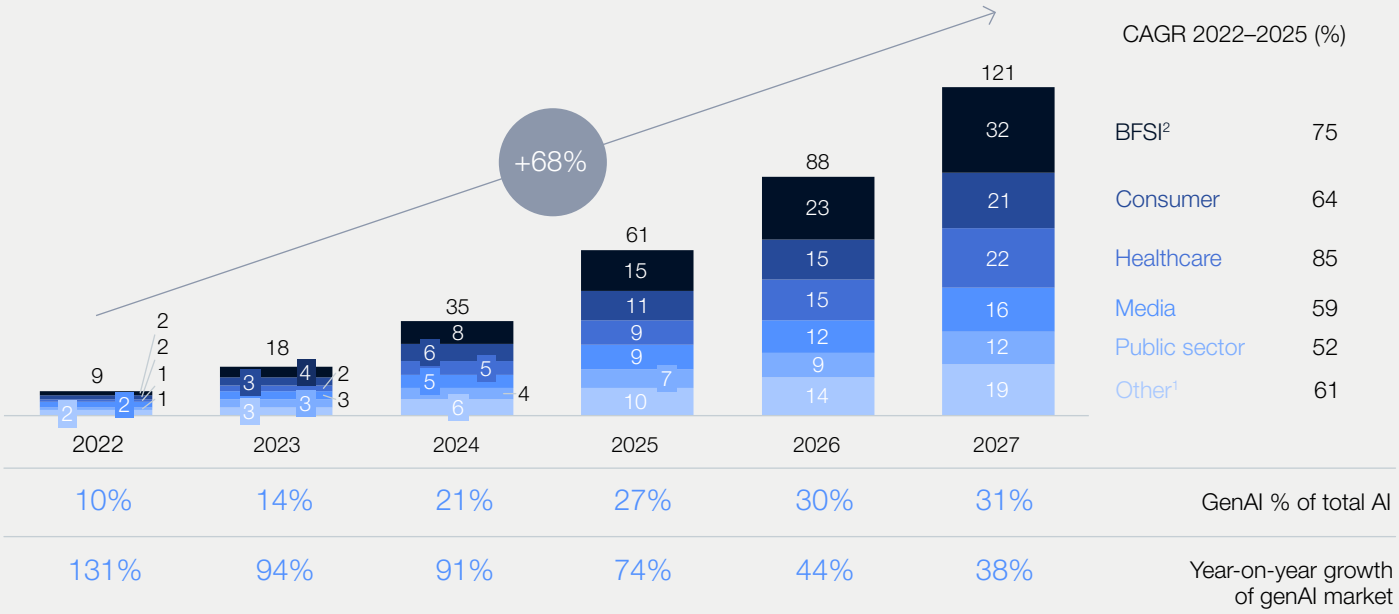


Source: Huddle, M., et al. (2023, June 22). *Generative AI will transform health care sooner than you think*. BCG. https://www.bcg.com/publications/2023/how-generative-ai-is-transforming-health-care-sooner-than-expected

AI is a major transformational force for healthcare. The market is expected to grow at a compound annual growth rate of 43% between 2024 and 2032, reaching a total value of $491 billion by the end of this period.[4] Generative artificial intelligence (genAI) alone is projected to grow faster in healthcare than any other industry. With an estimated compound annual growth rate of 85%, the market value is expected to reach $22 billion[5] by 2027 (see Figure 2).

FIGURE 2 **GenAI is projected to grow faster in healthcare than in other industries**

GenAI total accessible market ($ billions)



Notes: 1. Industries in the "other" category include industrial goods, energy, telecom and financial services (including retail and wholesale banking, asset and wealth management, insurance and private equity).

2. BFSI = banking, financial services and insurance.

Source: Schroer, D., Simon, S., & Trommer, G. (2023, May 8). *Medtech's generative AI opportunity*. BCG. https://www.bcg.com/publications/2023/generative-ai-in-medtech

Use cases have been demonstrated throughout the entire healthcare value chain (Table 1).

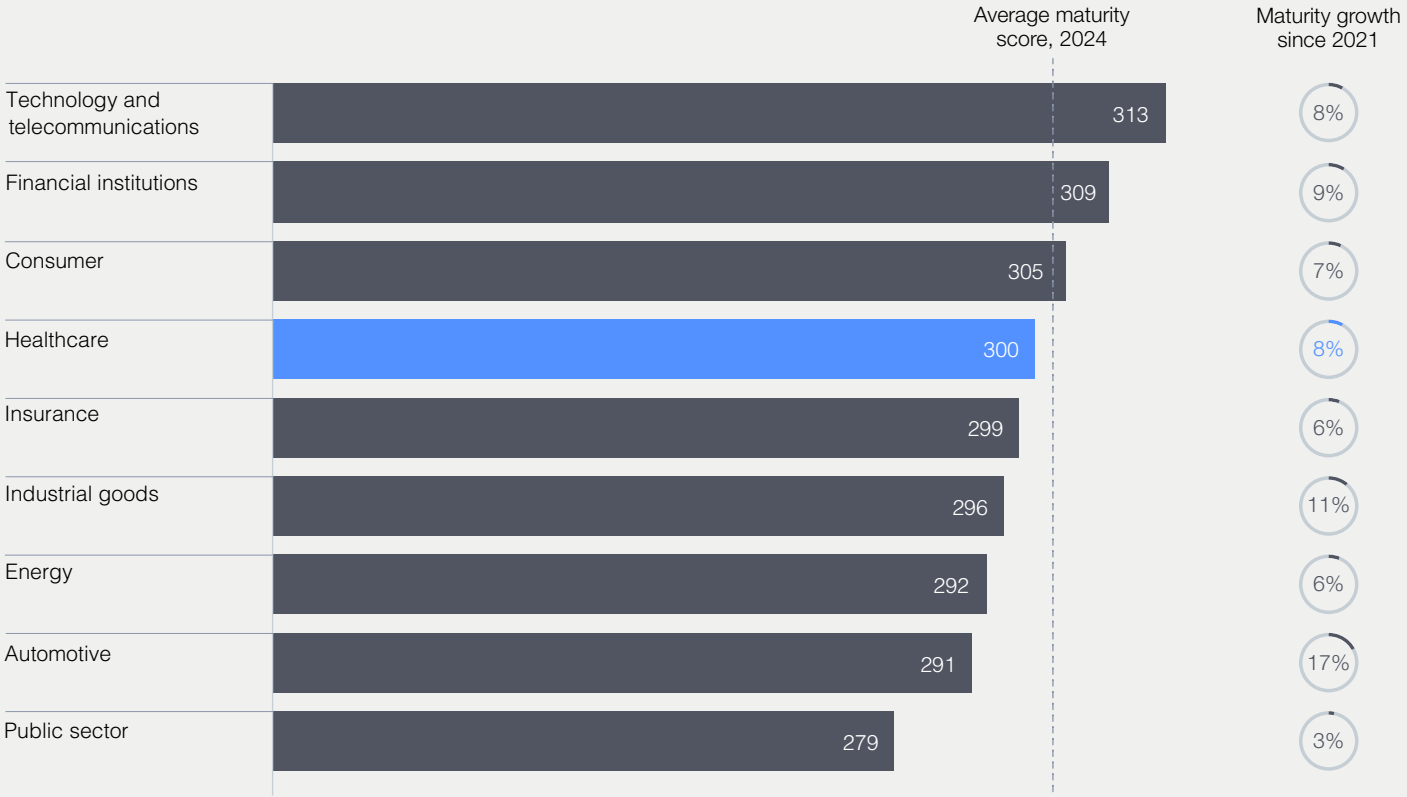
TABLE 1 **Uses for AI in healthcare**

	Use case	Description	Examples of companies
Pharmaceutical firms	Accelerated drug discovery and design	Analyse millions of molecules and potential interactions with target proteins to develop new drugs	Atomwise, Exscientia, Absci, Profluent
	Clinical trial planning and execution	Improve design, execution and analysis of clinical trials	Owkin, Saama Technologies, AiCure
	Precision medicine	Provide clinicians with an opportunity to specifically tailor interventions to each individual	BERG Analytics, AstraZeneca
Providers	Patient screening	Use AI to analyse voice patterns and codify voice biomarkers to non-invasively detect abnormalities for clinical diagnosis	Canary Speech, Clarigent Health
	Automated document processing	Automate processes such as documentation, claims handling, preauthorization and appeals, patient onboarding and scheduling	Augmedix, DeepScribe, Nuance, Doximity
	Medical image recognition[6]	Use deep learning and categorization of medical images for faster and more accurate image interpretation	PathAI, DiA Imaging Analysis, Aidoc
	EHR interoperability	Improve interoperability between different electronic health record (EHR) systems, enabling better management and exchange of patient data for continuity of care	Epiq, eClinicalWorks
Healthcare payers	Preventive healthcare	Identify and proactively manage high-risk segments of the population	ConcertAI
	Automation of claim processing	Detect fraud patterns by finding connections based on different factors from previously processed claims	UiPath, H2O.ai
Medtech	Generative product design	Optimize the design of medical devices, tailoring them to the needs of individual patients	National Centre for Additive Manufacturing
	Supply chain risk identification and process augmentation	Improve supply chain management	thoughtful.ai, IQVIA, UiPath
Services and operations	Synthetic data generation	Generate synthetic healthcare datasets with machine learning models	Syntegra, Google EHR-Safe
	Inventory tracking and restocking	Optimize healthcare inventory management	IDENTI Medical
	Data sharing/interoperability	Enable the safe use and sharing of sensitive data	Veil.ai, Arcadia
	GenAI cloud services	Develop cloud genAI services tailored to healthcare	Google Med-PaLM 2
Public health agencies	Public health surveillance	Build early-warning systems for pandemics	InstaDeep
	Resource allocation and use	Use data to make informed public policy choices	CDC

1.2 Industry adoption

Despite its transformative potential and the various use cases and stakeholders involved in the field, the potential of AI in healthcare has yet to be fully realized. Adoption at scale has been below global average, compared to other industries (Figure 3).

FIGURE 3 **Healthcare data and AI maturity is below global average**



Source: 2024 BCG Data and AI Capability Maturity Assessment (DAICAMA) study
https://www.bcg.com/publications/2024/leaders-in-data-ai-racing-away-from-pack

An analysis of US job advertisements reveals the diffusion patterns of AI in different industries: healthcare shows a notably low adoption rate, with only 1 in 1,850 job listings requiring AI skills. This rate lags far behind the information sector[7] (1 in 71), as well as professional, scientific and technical services (1 in 88), finance and insurance (1 in 175) and educational services (1 in 333).[8] Only the construction industry ranks lower than healthcare in AI adoption.

To gain a better understanding of the obstacles that have hindered progress and identify strategic approaches to maximizing AI's impact in health, the project team conducted more than 75 interviews with experts in the public and private sectors, asking for their ideas. Of the many they shared, some could have been relevant 10 years ago. This prompts the question: why have these ideas not materialized?

1.3 Key barriers

Through the enquiry, experts listed fundamental challenges that limit the positive impact of AI in health. They categorized them into two groups:

1. Structural constraints governing the operation of AI scaling, which are largely fixed and unchanging.

2. Challenges that can be overcome, for which they believe collaboration between the public and private sectors, e.g. through PPPs, would have the most significant impact.

The exercise highlighted five fundamental structural constraints that need to be considered in plotting a successful path to transformation:

1. **Political conditions:** Election cycles create pressure to show results within two to three years. Additionally, scaling innovation is often limited by national systems.

2. **Need for scale:** Public health outcomes require large-scale and appropriate validation and long-term data to demonstrate significant impact.

3. **Resource limits:** Budget pressures are universal, with Organisation for Economic Co-operation and Development (OECD) countries spending on average 11% of gross domestic product (GDP) on health, where spending growth exceeds GDP growth.

4. **Resistance to change:** Inherent resistance to change must be managed, including inertia and conservatism in the medical field.

5. **Legacy systems and processes:** Existing legacy systems, regulations and incentive models must be addressed to unlock AI's full potential in health.

Beyond these structural constraints, experts identified three core challenges that can be overcome, particularly through collaboration between the public and private sectors:

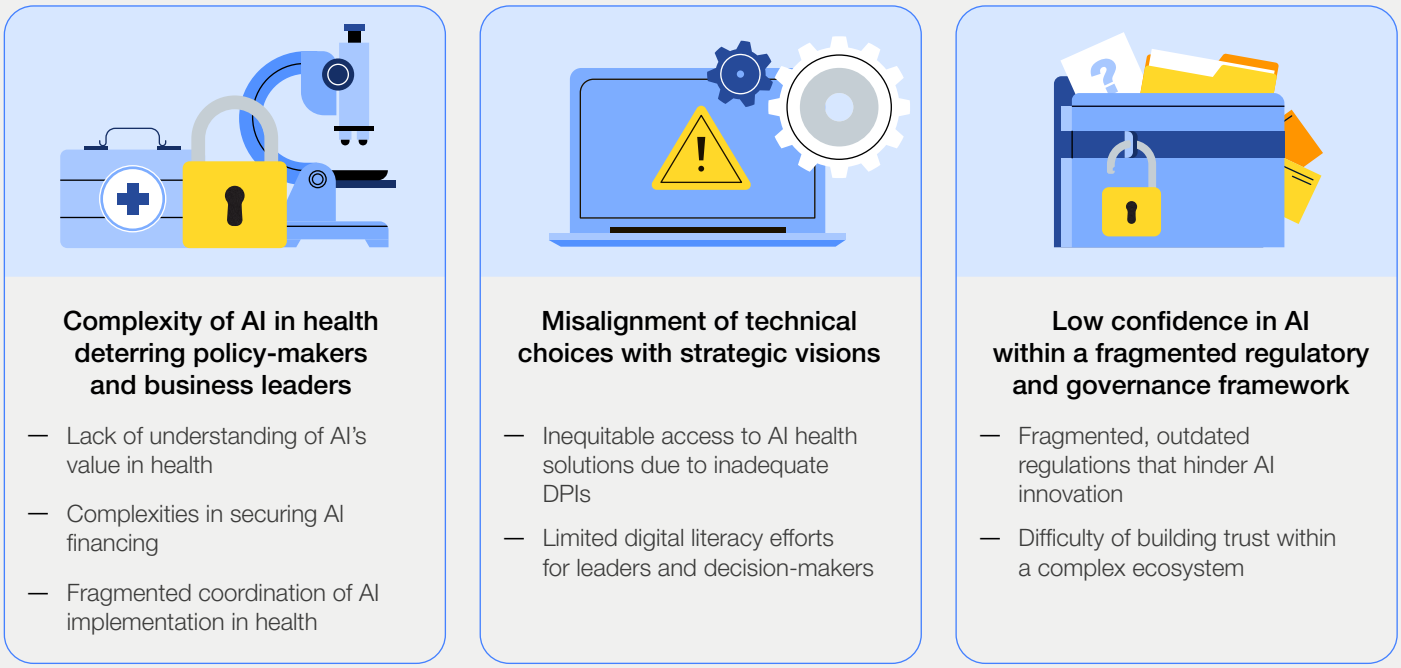
1. **Complexity of AI in health deterring policy-makers and business leaders:** Despite a perception that AI in health is attracting significant attention and energy, it is difficult to prioritize on political and strategic agendas for both the private and public sectors. This challenge stems from the lack of a clear and compelling strategy that aligns AI initiatives with broader health goals and political priorities.

2. **Misalignment of technical choices with strategic visions:** Public leaders often fail to integrate technology effectively into their vision for health, delegating technical decisions entirely to chief technology officers (CTOs) and other technical experts. This neglect leads to missed opportunities for using AI to enhance healthcare delivery and outcomes.

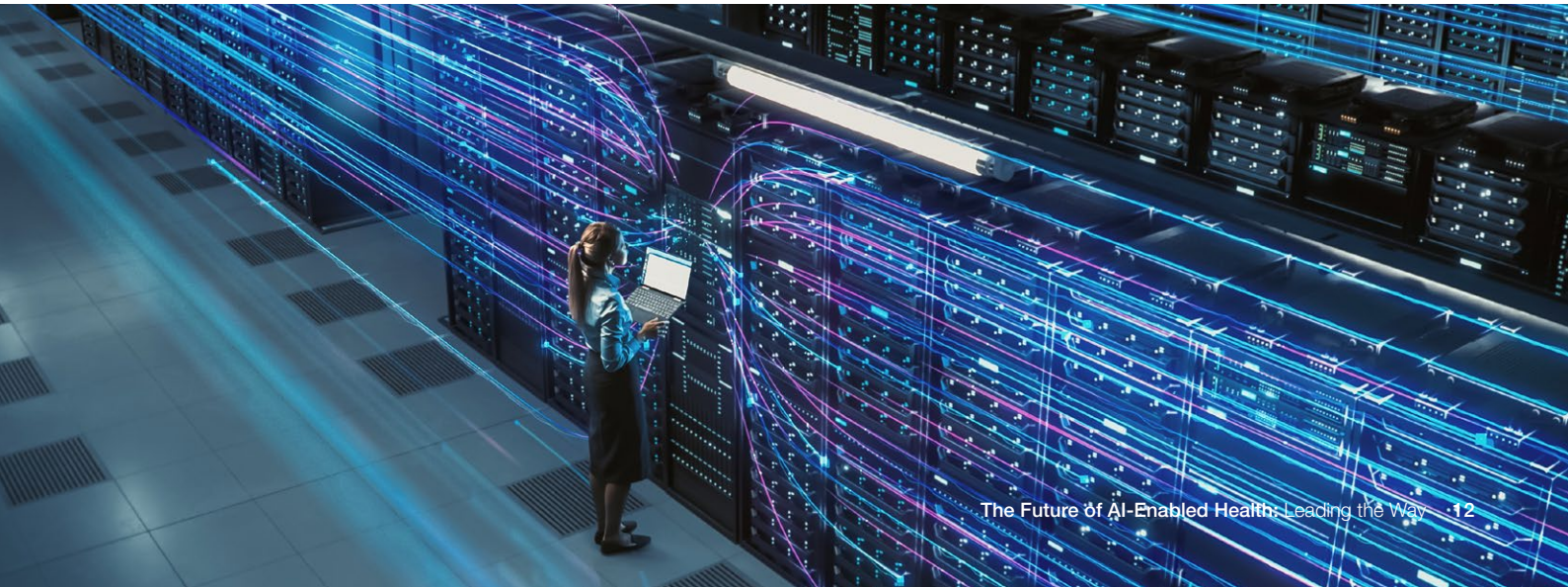
3. **Low confidence in AI within a fragmented regulatory and governance framework:** As AI technology becomes more prevalent in health, there is a growing concern about its impact, leading to increased distrust. This challenge reflects the need for transparent and accountable AI systems to build and maintain public trust.

By addressing these challenges, stakeholders can unlock the full potential of AI to transform global health, ensuring resilient, efficient and equitable health systems for all.

FIGURE 4 **Three key challenges that must be overcome to implement AI at scale**



Source: Digital Healthcare Transformation Initiative dialogues, Boston Consulting Group and World Economic Forum analysis



2

Future outlook: Four visions for AI-enabled health

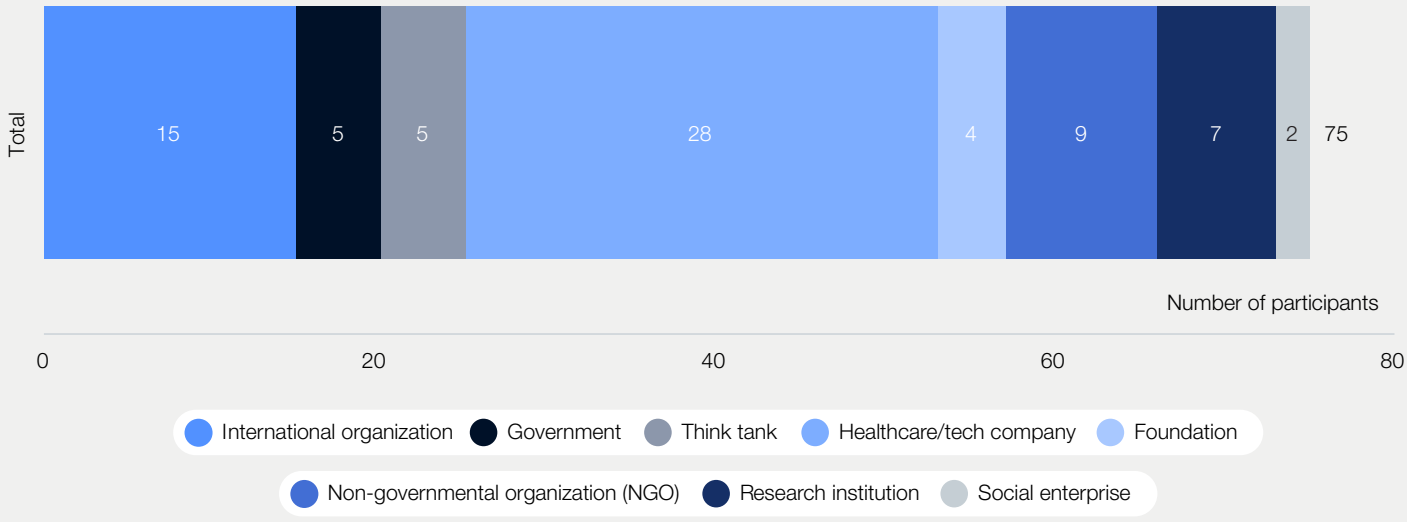
Expert visions of AI's future in health balance enthusiasm with a measured scepticism.

To better grasp the transformative potential of AI in health, it is essential to explore the varied perspectives of experts in the field. Their insights offer a glimpse into the future, highlighting opportunities and challenges.

The experts interviewed (Figure 5) provided invaluable insights from leading organizations in AI and health. They were asked for their input on four AI-driven hypothetical visions that are summarized in Figure 6. These are not mutually exclusive or definitive; instead, they illustrate what could be possible with AI. While some health professionals were enthusiastic, others were cautiously sceptical, highlighting the fact that despite the optimism, significant technological and structural constraints remain. Current large language models (LLMs), for example, still face issues with hallucinations,[9] or non-existent patterns or objects, indicating that this generation of AI tools still needs to mature. Additionally, there are substantial technological gaps, especially in LMICs. Understanding and addressing these nuanced challenges is essential for unlocking AI's full potential in health.

The fact that these visions were not proposed a decade ago is not rooted in technology but in systemic structural constraints. Describing the visions helps identify the constraints and challenges. The visions highlight the transformative potential of a complex landscape of traditional AI (e.g. machine learning) and genAI. Incorporating both static and dynamic approaches poses unique opportunities and challenges, including the need for tailored regulatory and strategic approaches.

FIGURE 5 **Expert group composition**



Source: Digital Healthcare Transformation Initiative dialogues

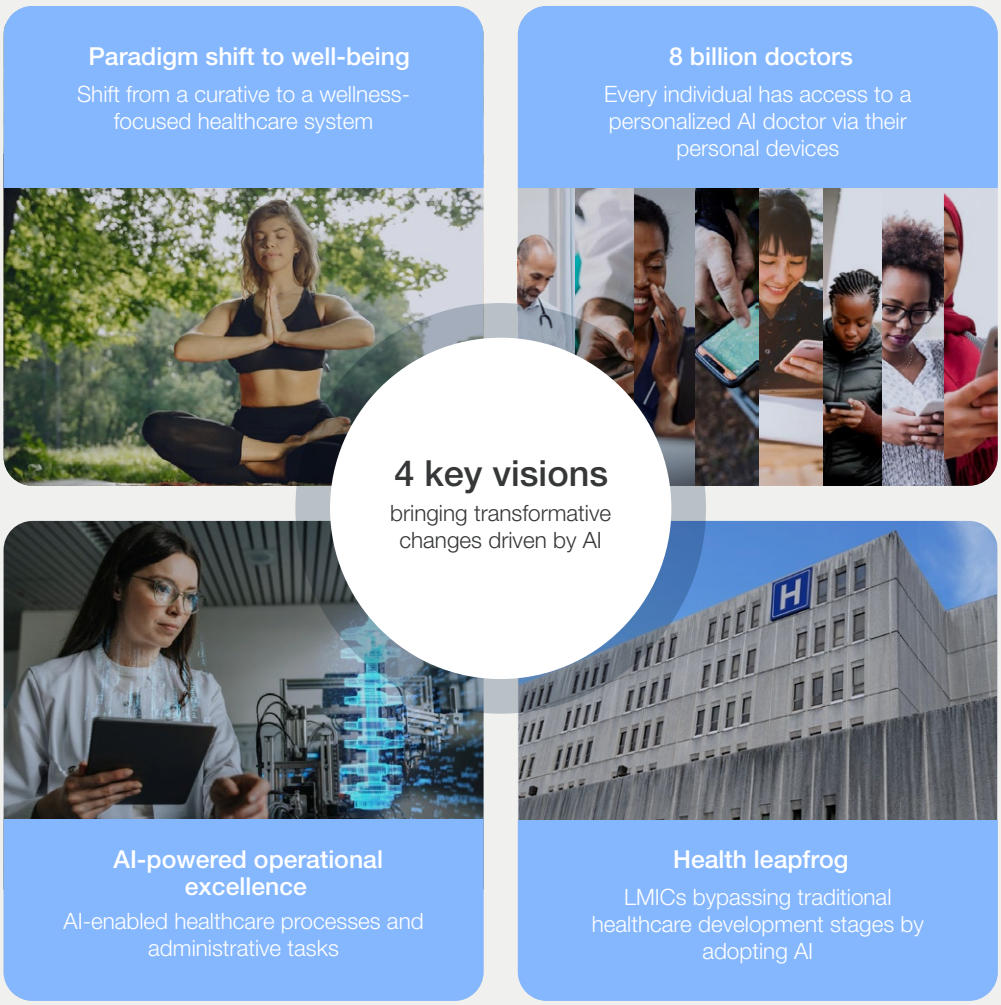
The experts considered these four AI-driven visions:

– **Transformation in well-being:** This vision highlights a widespread availability and use of sensors to generate extensive data, enabling predictive care, lifestyle management and personalized wellness programmes. Implications include a shift in the economic model of health from treatment to prevention and workforce realignment to focus more on preventive care.

Challenges such as intrusiveness, cybersecurity risks and privacy protection must be managed to maintain personal autonomy and trust.

- **8 billion doctors:** This vision proposes that every individual will have access to a personalized AI doctor through their personal devices, offering real-time health advice and transcending geographical and socioeconomic barriers. Implications involve significant changes in health roles, with more AI-enabled practitioners and a redesigned regulatory framework to keep pace with rapid AI advances. Challenges include the need to upskill both medical professionals and patients, as well as ensuring accessibility to quality AI services for all.
- **AI-powered operational excellence:** This vision focuses on using digital twinning, predictive analytics, ambient listening and document creation to optimize health processes and reduce administrative burdens. Implications include the need for enhanced hospital information technology (IT) systems, improved digital literacy among health workers and a shift in caregiver roles towards more cognitive tasks supported by AI-driven diagnostics and decision-support tools for interventional excellence. Challenges include equity in access, regulatory pace, clinical risks of over-reliance on AI and cybersecurity threats.
- **Health leapfrog:** This vision highlights LMICs bypassing traditional health development stages by adopting AI technologies, overcoming infrastructure challenges and improving health outcomes through innovative business models and partnerships. Implications include the implementation of digital public infrastructure, new patient pathways, reinvented collaboration models and workforce development. Challenges focus on developing sustainable business models, ensuring equitable access and managing integration and cybersecurity risks.

FIGURE 6 **Four expert visions exploring the impact of AI in health**



Source: Digital Healthcare Transformation Initiative dialogues, Boston Consulting Group and World Economic Forum analysis

Despite the promising vision of AI's impact in health, turning possibilities into reality demands substantial political support and investment. How can stakeholders ensure that in 10 years' time they are not having the same conversations? Section 3 explores the challenges that must be overcome to advance these conversations.

3 Analysis: Three key challenges to scaling AI in health

Major challenges restricting the expansion of AI in health include lack of political direction and failure to deliver effective regulation.

Experts identified three core challenges that hinder the scaling of AI in health: AI lacks priority on policy agendas; technical decisions often misalign with strategic health goals; and a fragmented regulatory landscape undermines public trust. Addressing these issues requires clear alignment between AI initiatives and health objectives, along with transparent, accountable systems to build confidence.

3.1 Complexity of AI in health deterring policy-makers and business leaders

Making AI in health strategically and politically relevant requires key challenges to be met. These include the need to show results within a short timeframe in order to maintain support across election cycles and having to deal with budget constraints.

The benefits of AI in health are not always immediately clear, making it difficult to access political and financial support due to political pressure to demonstrate results quickly. Policy-makers may hesitate to invest without immediate, tangible benefits. Additionally, the long-term nature of certain AI use cases in healthcare introduces financial uncertainty, which, combined with high upfront costs, can make large-scale AI initiatives less attractive to leaders focused on short-term gains.

Lack of understanding of AI's value in health

The value of AI in health remains unclear, leaving stakeholders hesitant and liable to treat AI as a nebulous and potentially dangerous concept rather than a tangible tool.

Policy-makers often grapple with understanding the true impact of AI in health because its theoretical benefits often fail to materialize in practice. For instance, technologies that increase patient demand might overwhelm under-resourced health systems, stalling innovation. This is often because of a failure to translate overall goals to AI goals, i.e. to validate, to gain diverse and representative data and to have end-to-end perspectives on how to optimize at different levels.

A comprehensive framework to assess AI's value and clinical outcomes is lacking. Public–private partnerships (PPPs) are vital for demonstrating AI's practical, scalable value in health. Such collaboration is mutually beneficial: policy-makers gain insights into costs and potential returns on investment, while the private sector can be appropriately compensated and benefit from understanding regulations, government priorities and policy frameworks. As a part of this there is a need to move towards adapting existing methods into more flexible approaches to take into account the outcomes of AI tools, such as capturing real-world evidence and tracking benefits.

Complexities in securing AI financing

A dual approach to financing AI in health supports a gradual and structured rollout of AI technologies. But the approach means that financing AI transformation is not straightforward, as AI investment requires two different time horizons:

Navigating the "valley of death"[10]

Short-term public–private investments are crucial for initially managing change, generating evidence and demonstrating the value of AI in health. These investments are essential for showcasing AI's effectiveness and establishing proof of concept. However, beyond such short-term support, multi-year investments spanning two to three years are necessary to ensure sustained progress. In the initial stages, various stakeholders, including payers and funders, focus on education and upskilling to ensure that all parties are adequately prepared for AI integration. These short-term investments help build the foundational infrastructure and training necessary for AI adoption. Crucially, these investments should aim to implement multiple solutions in parallel, rather than isolated point solutions, enabling a whole-system transformation. For instance, according to Accenture, AI in health could save the US health economy $150 billion annually by 2026.[11]

These investments are essential for innovation to get through the "valley of death"; however, they carry risks, and stakeholders should consider a blend of different financing options, both public and private. Additionally, a significant challenge is in establishing appropriate revenue models to ensure that early adopters are compensated for their initial investments and ongoing costs. This includes considerations for procurement, reimbursement and other financial mechanisms relevant to different regions and health systems. Moreover, it is not just about the technological solution but about a new way of working – addressing "how" the transformation happens as well as "what" is implemented. This involves removing constraints such as procurement processes and ensuring the right capabilities are in place, including training and PPPs to enable rapid assessment and innovation cycles.

Securing long-term market-based financing

Long-term market-based financing aims to support sustained investment and scaling, ensuring continuous positive impacts on local economies. This phase will allow AI technologies to be effectively scaled and maintained, providing lasting benefits. To facilitate ongoing development and innovation, a new costing model is needed. This model should detail the allocation of funds and identify who is responsible for financing different stages of market development, especially for early innovators and research teams. It should include guidelines for covering costs associated with research, development, implementation and scaling of AI technologies to ensure a clear and sustainable financial pathway. Studies indicate that countries investing in AI technologies in health have received a return on investment (ROI) of 10–15% annually over a five-year period.[12] Furthermore, continuous investment in AI technologies could lead to savings of up to 10% in healthcare spending.[13]

Following the initial change management and value demonstration phase, financing for these long-term activities should rely on traditional market principles. Effective reimbursement and revenue models must be in place to ensure that providers and developers still feel they have an incentive to implement and improve AI solutions. This sustains innovation and operational efficiency over the long term. Additionally, one critical aspect often overlooked is the necessity of multimodal data training sets, which are essential for many AI applications. Such datasets are not only crucial for accelerating AI but also present a significant opportunity for governments to generate revenue or share in novel intellectual property (IP). However, these business models, often managed by government payers, can pose risks, as they must ensure that ongoing investments yield the anticipated benefits. Additionally, incorporating concepts such as health technology assessments (HTA) and health economics and outcomes research (HEOR) can help evaluate the value and impact of AI solutions, ensuring that investments are justified and beneficial in the long run. There is a need for convergence of HTA standards across borders to allow for a globally integrated approach.

Investment strategies must be designed to ensure equity throughout the entire health value chain, from development to delivery of solutions. This includes preventing the exacerbation of existing disparities and supporting local production initiatives as advocated by the G20 intergovernmental forum,[14] the World Health Organization and other bodies, including establishing local networks for AI-driven health research, development and validation.

Fragmented coordination in AI implementation in health

Implementing AI on a large scale requires a coordinated approach that engages both national governments and local champions. AI offers a unique opportunity to redesign health systems and workflows by integrating lessons from past initiatives while advancing new innovations. To do so, governments must exhibit expertise and leadership to create an appealing vision for AI in health and articulate a transformation journey to deliver this vision. Traditional change management often emphasizes operational or decision-making levels. In contrast, AI-driven change should be shaped by demand, incorporating feedback from end users, such as patients and communities, alongside input from payers and policy-makers. This dual-track approach ensures solutions are relevant, sustainable and scalable, thereby preventing fragmentation. By aligning these diverse perspectives, AI can be more effectively integrated into health systems, addressing real-world needs and ensuring broader adoption and success. Additionally, a public communications campaign is needed to ensure that AI-driven changes are seen to be beneficial for patient care and to encourage behavioural shifts, particularly when front-end pathways are affected (one example being digital front doors, which allow patients to access healthcare without the need to see a health professional).

Change management processes will be more effective if designed and driven by local champions. Identifying and supporting these champions is crucial for successful implementation. In some countries, experts recognize that digital health operates on a push model due to low structural demand; in these settings, local champions are essential to ensure adoption and diffusion.

For example, India's AI for TB initiative has demonstrated significant success. By using AI-powered mobile apps, local health workers in rural areas have increased early detection rates of tuberculosis by 16%,[15] showcasing how local champions can effectively use AI to improve health outcomes in underserved regions. However, they need to operate in a context where their push is paired with a demand or minimal pull. This demand is usually the responsibility of local policy-makers or decision-makers, meaning that the coordinated national governments and local champions change process is a requirement for scaling up AI in health.

Another example is the National COVID-19 Chest Imaging Database (NCCID) in the United Kingdom, established by the country's National Health Service (NHS) during the pandemic. This initiative collected an extensive repository of chest-imaging data (more than 40,000 X-rays, magnetic resonance images and computed tomography images) from all over the United Kingdom to support the development of AI tools for better diagnosis of COVID-19. The decentralized nature of the NCCID promoted collaboration among various NHS trusts, universities and private companies. More than 20 NHS trusts contributed imaging data, and several universities (such as the University of Cambridge) and research institutions used this data to develop AI tools. These tools were then made available at the local level to speed up the process of identifying patients at risk of severe complications, enabling quicker interventions and improving intensive care unit resource allocation.[16]

Short-term pressures and long-term sustainability need to be balanced

Overcoming these challenges and securing AI's place in healthcare requires a strategic approach that balances short-term political pressures with long-term financial sustainability and innovation. Even with these solutions in place, success hinges on leadership that actively engages with the technical decisions critical to AI integration.

Too often, leaders defer these crucial decisions to technical experts, creating a risk of fragmented and inefficient systems. To ensure AI adoption is both strategic and sustainable, it is essential for leadership to take an active role in shaping the technical landscape and guiding the integration process effectively.

3.2 Misalignment of technical choices with strategic visions

Technical choices are often the remit of technical experts, and leaders tend to shy away from engaging in technical matters. However, this is a dangerous pattern, given how some technical decisions limit or constrain the ability to deliver on a vision.

Historically, due to legacy systems, persistent budget constraints and an undersized workforce necessitating strategies that optimize productivity and effectiveness, health systems have evolved through a series of independent tenders and cost-oriented procurement processes with no real overarching strategic perspective. This has led to disjointed infrastructure, even within an organization; this is often the case in hospitals. To move beyond this ad hoc development, a clear, long-term architectural vision is essential.

This vision should incorporate health needs into broader digital public infrastructure (DPI) strategies to ensure that stakeholders (1) do not attempt to "reinvent the wheel" and (2) secure equitable access to AI-driven health solutions.

Indeed, the persistent access gap to digital health solutions due to inadequate DPI further exacerbates the challenge. For example, focusing on comprehensive datasets that include social determinants of health (SDOH) can help address biases and privacy issues in AI systems. Promoting local production initiatives and ensuring that datasets are reflective of local contexts can bridge the digital divide and support the implementation of AI-driven health solutions in underserved regions. By managing legacy systems and integrating them with new AI technologies, health systems can support AI adoption without discarding valuable existing infrastructure. This comprehensive approach ensures that health needs are met within a broader digital strategy, promoting equity and efficiency in AI deployment. Only through a combination of intentional architectural planning and enhanced digital literacy can health systems effectively use AI to deliver comprehensive, equitable care.

Persistent inequitable access to digital health solutions due to inadequate DPI

Equity must remain at the forefront of AI initiatives in health, and efforts should focus on ensuring that AI tools increase access for those most in need, bridging the gap between populations with and those without quality health services.

Table 2 summarizes the main points and strategies related to equity in AI initiatives in health, categorized into data ownership/access, public goods/infrastructure. Each category addresses different aspects and challenges in ensuring equitable access and the effective use of AI technologies in health.

Successful examples of addressing data ownership and DPI gaps include the United Kingdom's NHS and Israel's health sector. In the United Kingdom, the NHS centralizes public and private health data to enhance transparency and benchmarking, while Israel's centralized data management system played a crucial role in its successful COVID-19 vaccination rollout. By early January 2021, Israel had vaccinated more than 14% of its citizens, outperforming many larger and wealthier nations. These examples show that effective data management and the integration of health needs into broader digital infrastructure are essential for achieving large-scale health success. Such integration not only enhances transparency and efficiency but also ensures that health systems are better prepared to respond swiftly and effectively to public health challenges such as pandemics.

Limited digital literacy is hindering leaders and decision-makers

The importance of digital literacy among key stakeholders cannot be overstated. AI is a relatively new field, and many decision-makers have not had the opportunity to become well versed in it. However, a lack of fundamental knowledge about AI slows progress. This limited understanding can spark societal fears, lead to regulatory missteps and result in a hesitation to embark on the AI journey. To bridge this gap, there is a pressing need for comprehensive upskilling.

Leaders must grasp not only the strategic purposes of AI but also the foundational digital principles that underpin it. Defining the minimum required knowledge for informed decision-making regarding AI is crucial. Ensuring that all stakeholders are on the same page will facilitate smoother discussions and more effective implementation strategies. Equipping decision-makers and AI users with the right approach to interrogate AI solutions – tracking key performance indicators and clinical outcomes, for example – will help them understand the value of AI and generate trust.

TABLE 2 | **Equity in AI initiatives in the health sector**

Challenges	
Gap in data ownership/access	**Gap in digital public infrastructure**
Key issue	
Digital technologies can be equalizers, but risk increasing disparities if not managed carefully	A comprehensive DPI approach is crucial for bridging the digital divide and ensuring equitable access to AI-driven health
Transverse mitigation	
There is a need to prioritize and distribute computing resources effectively, including investing in cloud infrastructure that supports both high-performance computing and extensive storage solutions	
Ensuring equitable access to computational resources is essential for enabling widespread and fair use of AI technologies	
Transitioning to an open health system, where data is shared for the common good, requires a cross-country approach with harmonized data regulations and standards mandated by governments	
Specific mitigation	
Encouraging local ownership and transferring AI technologies to under-represented regions is vital to ensure that benefits are shared globally and to prevent rapid innovation leading to unequal data ownership and deepening inequalities	Comprehensive datasets, including SDOH, can help addressing bias, privacy, accuracy and quality in AI Prioritizing local production and ownership of DPIs will support digital equity
Locally controlled but globally federated datasets and a secure sandbox environment for testing AI models are required to facilitate global collaboration while maintaining data privacy	Prioritizing digital identities and internet access for the disconnected, along with providing online computing and storage resources, will support digital equity
There is a need to validate AI algorithms on local data to make sure that services are accurate, relevant and reflective of the local context; this helps build trust and ensure that AI models are trained on data that truly represents the local population it serves	Health alone might not provide the scale for an effective DPI approach, and should be considered as one service need within a broader DPI strategy

Of course, alongside this training of decision-makers, it is also important to help patients, health professionals and caregivers to understand AI in order to develop greater trust and promote the adoption of public digital health tools. There is a common belief that AI is here to replace people, so building trust involves demonstrating that AI is not here to replace but to complement healthcare professionals. Physicians often view AI as a competitor rather than as a tool, which calls for a stronger focus on education, and unleashing the full potential of AI in health will require addressing this concern to enhance trust among caregivers. Educating the general public about the benefits and purposes of AI-driven health solutions will lead to a higher degree of acceptance and a more effective use of these technologies.

Understanding the implications of technical decisions is critical

As leaders grapple with the complexities of making strategic technical choices in healthcare, the consequences of disengagement are profound – leading to fragmented systems and missed opportunities for cohesive AI integration. Addressing these challenges is not just about making informed decisions, it is also about bridging the gaps in locally developed digital infrastructure and literacy among decision-makers. This groundwork is essential for building the trust and regulatory frameworks necessary to support AI's successful implementation. Yet the road ahead is fraught with obstacles, particularly in navigating the fragmented and evolving landscape of AI regulation, which poses significant challenges to establishing trust and ensuring the safe, effective deployment of AI technologies in health.

3.3 Low confidence in AI within a fragmented regulatory and governance framework

Ensuring AI transparency and accountability is critical for building trust and safely and effectively implementing AI systems in health. Given the inherent resistance to change, including inertia and conservatism, in the medical field, establishing transparent regulatory frameworks is essential. This involves developing nuanced regulatory approaches that keep pace with rapid AI advances, as traditional one-size-fits-all regulation is inadequate for the diverse and evolving nature of AI technologies. Creating adaptable frameworks that address the specific characteristics of different AI technologies is crucial. Harmonizing data-sharing policies across borders facilitates global collaboration while maintaining security and privacy, which is essential for the widespread adoption of AI.

Maintaining human oversight of AI systems is of paramount importance for safeguarding trust, efficacy and ethical standards. The World Health Organization (WHO) emphasizes that the "principle of autonomy requires that the use of AI or other computational systems does not undermine human autonomy. In the context of health care, this means that humans should remain in control of health-care systems and medical decisions."[17] Given the complexities of AI, especially genAI, human involvement is necessary to validate AI outputs and support decision-making. If a culture of trust and collaboration is established, ensuring that AI systems are safe, reliable and accepted by all stakeholders, AI can be effectively integrated into health provision.

Fragmented, outdated regulations that hinder AI innovation

Tactically, AI-driven health faces four significant regulatory challenges in the short term. First, there is a fragmented regulatory landscape with a divide between countries with stringent regulations and those without.[18] Second, the perceived lack of regulatory clarity, where regulations do not keep pace with the advance of AI, stifles innovation. Third, the regulation of software and AI uses a one-size-fits-all approach that might not be fully relevant for genAI. Finally, AI development and regulation without data-sharing rules remains a challenge.

The gap is growing between countries leading the race in AI regulation and those without the means to engage in this new field. Public engagement and political will are essential: in the US, the 2023 Executive Order on the Safe, Secure and Trustworthy Development and Use of Artificial Intelligence[19] was one catalyst for progress. Supporting emerging economies and local or regional regulation approaches will help mitigate inequities: this should remain part of international development priorities as well as national priorities.

Slow regulation often stems from the expectation that AI must be fully developed before implementation, and that risks should be mitigated with ambitious regulations. This conception is almost ineffective by design for two reasons: it does not use all of the tools available for mitigating risks, and it does not address a core problem of AI, which is the regulation and control workload. On the first point, AI risk mitigation should use the full portfolio of tools: guidance and standards in particular are more flexible than regulation, and they still help to strike the right benefit-to-risk ratio. Giving more space and more funding to support early guidance and standards could help the ecosystem avoid premature regulation that would hinder innovation.

On the second point, it must be acknowledged that the rapid pace of AI development necessitates a new approach to expanding validation capacity. This can be achieved by delegating the validation process, under the supervision of regulators and governments, to involve not only government bodies but also non-profits, care providers and private-sector players. Unlike the slower pace of drug and medical device development, AI software evolves rapidly and public capabilities alone cannot keep pace. New testing and validation methods are required, and private-sector expertise is crucial in developing these. While the private sector cannot directly regulate AI, its collaboration helps to ensure that new regulatory frameworks are well informed, practical and agile enough to keep up with technological advances.

Yet the private sector is a diverse landscape, and large organizations are more likely to be able to free up resources to participate in discussions on guidelines and standards. The academic world might suffer from the same lack of resources as smaller private-sector organizations. This is why public–private partnerships, including funded PPPs as defined by the American National Standards Institute (ANSI),[20] should be considered for long-term sustainability, as well as the inclusion of small and medium-sized enterprises (SMEs) or academics in the design and rollout of standards, guidance and, eventually, regulations. Collaboration initiatives are also promising. For example, the Coalition for Health AI (CHAI) brings together a diverse array of stakeholders to drive the development, evaluation and appropriate use of AI in healthcare. CHAI has developed a certification framework to establish a network of quality assurance laboratories that evaluate AI models for healthcare use.

AI regulation often follows a one-size-fits-all approach, which is inadequate for the diverse and rapidly evolving nature of AI technologies. The nature of genAI, which is non-deterministic and can evolve as data is collected during use, requires more flexible and nuanced regulatory approaches compared to traditional AI. Current regulatory frameworks struggle to adapt to these technologies, as traditional methods are ill-equipped to manage their complexities and rapid evolution. GenAI's unique characteristics and risks demand a regulatory framework that is both adaptive and forward-thinking, ensuring that regulations keep pace with technological advances. A stronger focus on post-market surveillance could be considered as a way of detecting new risks early on, address errors and biases and adapt iteratively.

Finally, data protectionism hampers innovation and limits the potential for AI advances. It restricts the ability to develop robust AI using unbiased datasets and to validate AI tools in local contexts. To facilitate global adoption and development, it is essential to ensure the convergence of data models and exchange standards; for example, through locally controlled but globally federated datasets.[21] These datasets enable AI solutions to be developed and validated for different local populations, ensuring greater accuracy and safety while preserving privacy.

Difficulty in building trust within a complex ecosystem

A global study found 44% of people surveyed expressed a willingness to trust AI in health applications,[22] reflecting a cautious optimism about its potential benefits and concerns about its implementation and oversight. This cautious attitude is supported by data showing that 67% of health leaders in the US trusted AI technology to process medical records by 2020, a significant increase from 54% in 2018.[23] However, the acceptance of AI in health systems remains at risk due to broader concerns about misinformation and the quality of health information. This sentiment is echoed in consumer attitudes to AI in different countries, as illustrated in Figure 7, where feelings about AI are mixed, with more than 40% expressing concern in the US, Switzerland, the United Kingdom, France and Australia, while fewer than 20% share this concern in China, India, Thailand, Saudi Arabia, Indonesia and Mexico.

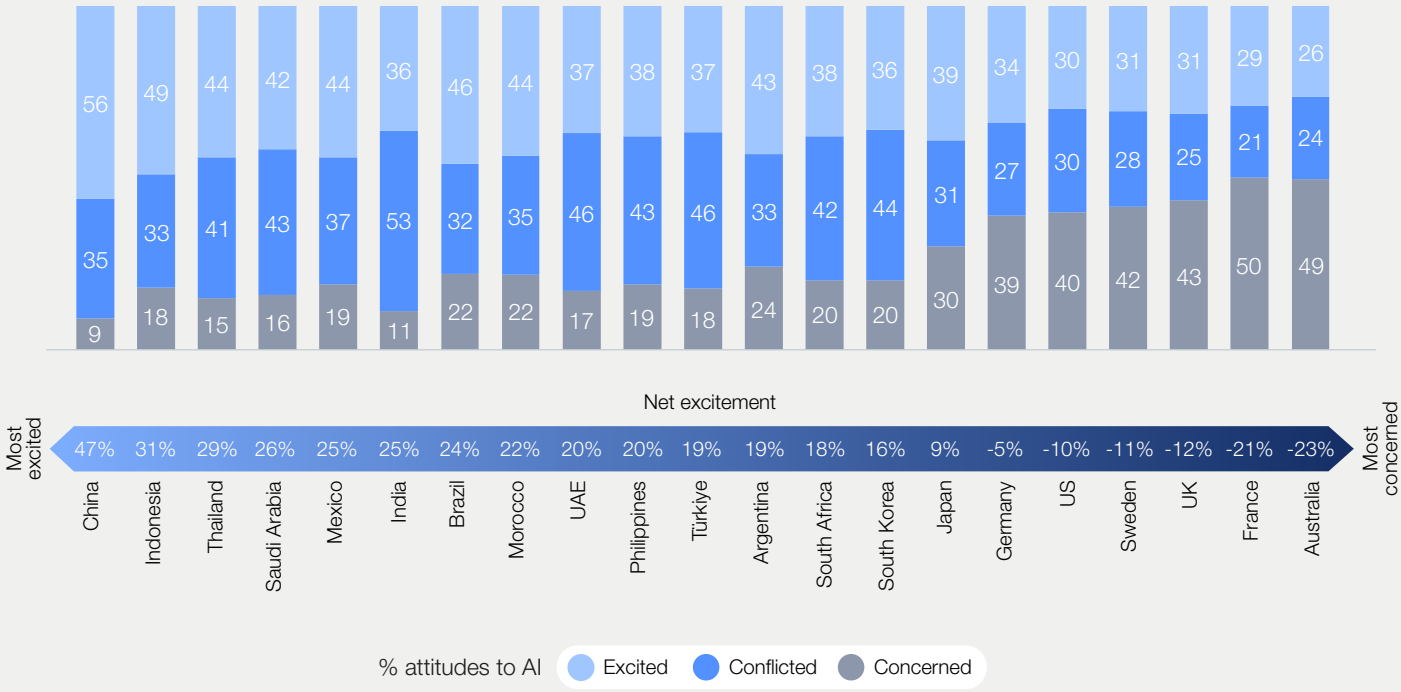
Building trust in AI for health requires a concerted effort on both the regulatory and business fronts. Transparency is a cornerstone in this endeavour. Regulatory bodies must ensure openness, clear communication and full disclosure of important facts about AI technologies to alleviate public concerns. As emphasized by the WHO: "it is fundamental to consider streamlining the oversight process for AI regulation through […] engagement and collaboration [among key stakeholders]".[24] Equally important is integrity, with regulations enforcing consistent honesty and ethical behaviour, ensuring that actions align with stated goals.

Human oversight also plays a crucial role, especially given the challenges with genAI, such as hallucinations. Ensuring that humans remain involved in validating AI outputs and supporting decision-making is essential for maintaining trust and efficacy. Furthermore, avoiding the anthropomorphization of AI is vital, as this creates confusion between the perception of capabilities and the limitations of AI. Humans must remain accountable to ensure trust, safeguard efficacy and address potential issues in AI systems. AI ambassadors can play an important role in communicating the benefits and limitations of AI-based products, helping to build a clear strategy for trust and transparency.

From a business perspective, demonstrating integrity, competence and potential is fundamental.

Companies need to show that they have the expertise to build reliable AI technologies that deliver on promises and achieve tangible results. For instance, a BCG survey conducted in April 2024 revealed that 20% of cardiologists do not adopt digital tools due to the lack of sufficient insights to support comprehensive clinical decision-making. This highlights the need for businesses to ensure that their AI solutions meet the high standards required by health professionals. Reliability, marked by consistent performance and dependability, is vital to meet expectations and fulfil commitments. Businesses also need to show benevolence – genuine care for the interests and well-being of others. By acting with the best interests of patients, providers and other stakeholders in mind, companies can promote positive relationships and build trust. Lastly, shared values between businesses and their stakeholders are essential. Mutual understanding and agreement on core principles provide a solid foundation for collaboration and acceptance of AI technologies.

FIGURE 7 **Contrasting consumer sentiments challenging AI adoption in global markets**



Notes: Net excitement = % excited minus % concerned.

Source: BCG. (2023). *Consumers know more about AI than business leaders think*. https://www.bcg.com/publications/2024/consumers-know-more-about-ai-than-businesses-think

Adoption hinges on strong trust but agile regulation and governance

Advancing AI in healthcare requires a balanced approach that promotes trust, collaboration and regulatory agility. Establishing flexible regulatory frameworks, integrating human oversight and ensuring transparency are essential to addressing public concerns and building confidence in AI technologies. Both public and private stakeholders have a role in developing adaptable guidelines and standards that keep pace with AI advances.

Additionally, promoting data-sharing while protecting privacy and encouraging sustainable business models can enhance AI's impact on health. By aligning strategies and maintaining a focus on ethics and public good, AI can be confidently used to improve global healthcare outcomes.

4 Strategy: Six calls to action to drive value creation

In the six steps outlined in this section, leaders are called on to cooperate in building and shaping a sustainable ecosystem to strengthen the positive impact of AI in healthcare and to increase trust.

The three main challenges described in Section 3 are interconnected in a vicious circle: technical problems and distrust discourage leaders from risking political capital on AI, and leaders currently focus on other priorities and do not engage in strategic technology decisions to scale the impact of AI or prioritize the work of building trust. One way to break this is to change leaders' behaviour towards AI and digital health.

1 From dreaming of breakthroughs to delivering near-term benefits that accelerates a long-term vision

AI in health is a complex and non-homogenous space: operational AI applications focus on productivity and processes, such as supply chain management, without directly affecting patients, while clinical applications fundamentally change the way healthcare is delivered. **Public leaders should start with operational applications of AI in health and work with private leaders to make sure the return on investment is measurable in a short time frame**. Lessons can be learned from other industries that inspire champions "on the ground" to start small, learn and move with agility, while also ensuring outcomes are achieved, including tracking of responsible key performance indicators for AI. Operational AI applications can significantly reduce caregiver workloads and improve the efficiency of health systems, creating short-term value that will build positive momentum for more substantial, long-term investments and set the scene for deeper transformations.

2 From the private sector progressing technology independently to public–private ecosystems driving shared objectives and benefits

For medical applications, the landscape is marked by a lack of agreed priorities, no consensus as to the value at stake, uncertainty about how to share potential value creation and, most importantly, no short-term ROI. **The right way forward here is for public and private leaders to align on priorities, understand the opportunities and risks of AI medical applications and agree on how best to share the value created**. This approach is common in other policy areas, such as defence, and health leaders should adopt similar strategies. It is particularly true for clinical transformation at scale, where public and private actors must collaborate closely, align on common goals and establish clear mechanisms for value sharing, acknowledging that this will take different forms in different political and economic contexts. While this process will take time, it will ultimately help the ecosystem hedge against investments that could become impossible to scale due to unmet requirements, such as reimbursements.

3 From fighting on infrastructures to winning on services

The competition over infrastructure is intense and dilutes the efforts of both public and private actors, exacerbating a significant financing gap in digital and AI infrastructure. **Leaders must prioritize common foundations, especially DPI, when making all technical choices**. Public leaders should view these as critical investments in the future and incorporate them in their vision for two reasons. First, encouraging cooperation on infrastructure pushes the private sector to differentiate through services, promoting a competitive market focused on high-value offerings. Such collaboration enhances efficiency and equity, enabling faster implementation, cost reduction and broader access. Second, promoting blended financing for AI infrastructure is essential: between 2018 and 2023, private investments in infrastructure grew by $700 billion, or 18% annually, outpacing traditional private-equity buyouts. Private investors can help close the significant financing gap and ensure equitable access to key digital enablers, but only if leaders prioritize this as a key agenda item.

4 From leaders with good intentions to leaders who make responsible technical decisions

Health leaders, both public and private, often defer technical decisions to experts, **but CEOs and clinicians should upskill and engage with technical matters, bringing a healthy scepticism to the debate**. By challenging technical ideas, health leaders can ensure alignment with the ambition they pursue. As an example, interoperability is almost never a requirement in public electronic health records, yet it is a concern raised by policy-makers. Additionally, as health workers are critical leaders in the adoption of AI and its success in scaling, capacity-building is crucial – for example, by including AI in medical curricula to build capacity from an early stage. In the future, understanding AI's potential, limits and risks will be a core skill for CEOs and other health leaders, not just CTOs, enabling them to make strategic decisions that will serve their broader vision.

5 From waiting for guidelines to proactively building trust

Doubts and distrust are slowing down the scaling of AI in health, and while regulation is often seen as a solution, leaders should not rely on it as a silver bullet, especially if it leads to over-regulation and excessive constraints. Premature regulation could stifle innovation, and there is broad consensus that effective regulation will lag behind technological advances. As the sector enters the AI for health era, leaders cannot assume that existing regulations will fully protect patients, including in relation to privacy issues, cybersecurity and ethical concerns. Instead, they should adopt phased and flexible approaches that are proportionate to the associated risks. Therefore, **they should proactively engage their organization in bolstering post-market surveillance to detect as soon as possible, and with full transparency, early signals of AI-related risks**. In addition, **organizations should consider AI ethics committees and principles**, similar to bioethics in healthcare, to make informed ethical decisions with known information that will stand the test of time. Leaders can begin to build trust even before regulations are in place by steering their organization in a way that ensures that existing guidelines and standards evolve and are fit for purpose.

6 From dispersed data to deliberate integration

Access to data remains a significant concern, reducing both trust and AI performance. Datasets can be biased, and not all data is accessible, promoting the perception that some players are hindering others from innovating, which can stifle the overall growth and potential of AI. To overcome these challenges and ensure equitable access to quality data as a common foundation for AI infrastructure (see point 3), **leaders must advocate for globally connected but locally controlled datasets**, including for broader medical data, such as dental information and socioeconomic data. This approach will not only preserve local ownership and data protection but also promote collaboration, ensuring that innovation can thrive on a global scale while addressing the specific needs and concerns of individual regions. Such an approach would ensure rapid success in achieving point 1 with common data exchange models and basic architecture.

Conclusion

AI has the potential to be a revolutionary force, reshaping the future of global healthcare, boosting the effectiveness of treatments and supporting professionals to better care for patients.

If AI manages to captivate policy-makers, if technical decisions align better with strategic goals, if shared regulations successfully unlock public trust, the beneficial effects of using AI in healthcare could be extraordinary. By embracing the six critical shifts identified in this white paper, leaders can accelerate AI's impact, paving the way for a healthier, more equitable world.

These six shifts in behaviour have a common requirement: **novel cooperation between public and private health leaders, focusing on creating a sustainable ecosystem for AI in health**. All involved need to avoid fragmentation and find ways to work together in a people-centred way to create new value. PPPs have already demonstrated their value in other settings, and this partnership approach should be expanded to how AI is adopted and scaled.

Public leaders face a daunting task when it comes to AI in health: AI has the potential to radically transform the lives of citizens and carries unprecedented challenges. They should look to tap the expertise, ingenuity and resources of the private sector by engaging with companies in public–private partnerships. Private companies should engage in these PPPs to increase the social impact of AI technologies in health and enable deep and lasting healthcare transformation.

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