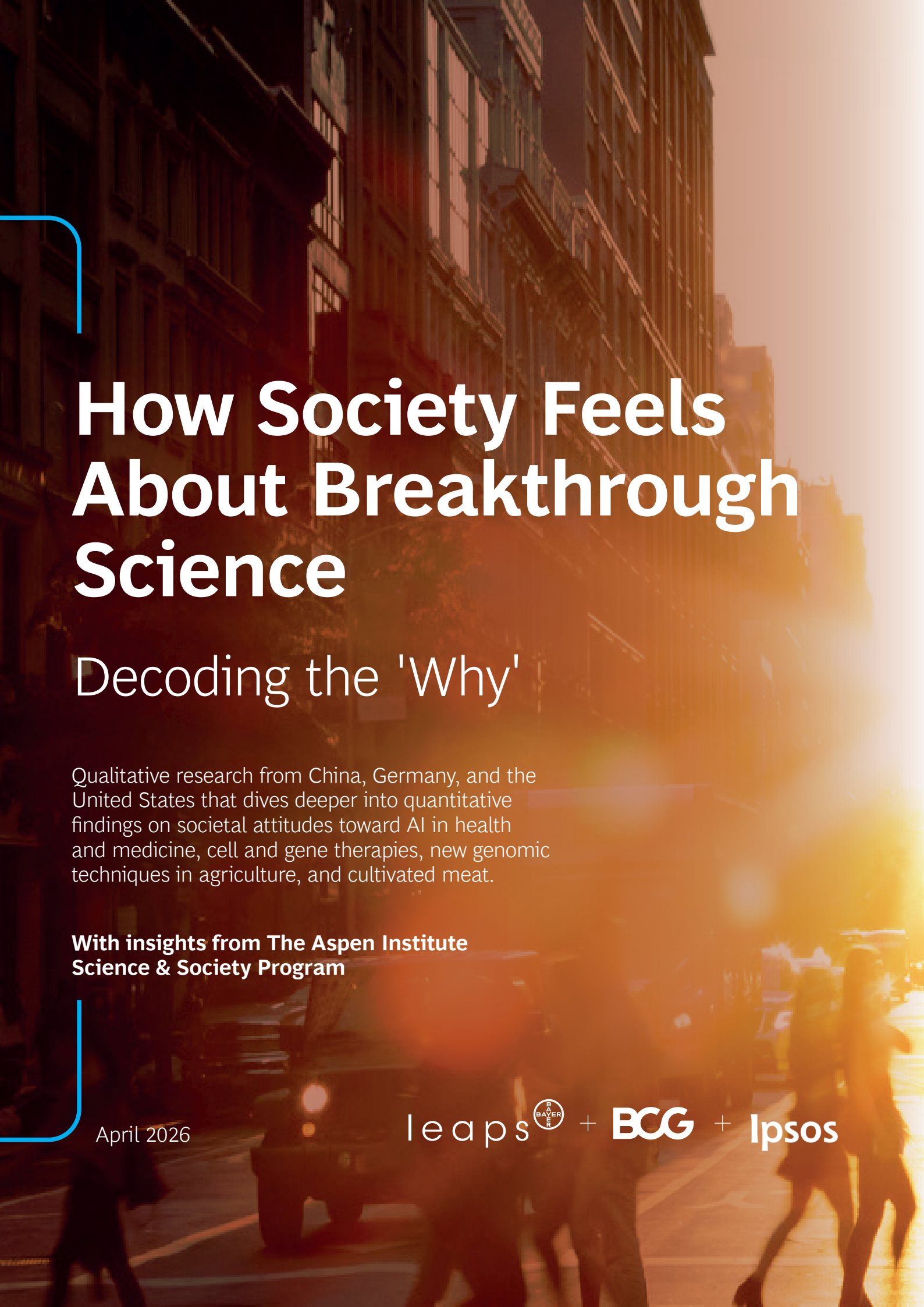


How Society Feels About Breakthrough Science

Decoding the 'Why'

Qualitative research from China, Germany, and the United States that dives deeper into quantitative findings on societal attitudes toward AI in health and medicine, cell and gene therapies, new genomic techniques in agriculture, and cultivated meat.

With insights from The Aspen Institute Science & Society Program

April 2026

leaps by Bayer + BCG + Ipsos

01

Introduction

Breakthrough science advances rapidly, propelled by waves of innovation in biology and data science

Yet these advances will only achieve impact if people are ready to embrace them. Societal acceptance depends less on technical understanding than on trust and emotional resonance – how innovations align with people's values, identity, and lived experience[1].

This tension is visible in large-scale data such as our report, *How Society Feels About Breakthrough Science*, published in 2025 by Leaps by Bayer (the company's strategic investment arm) and BCG, together with Ipsos (a leading market research agency)[2].

How Society Feels About Breakthrough Science used quantitative methods to gather insights from more than 13,000 participants across 13 countries and provided a global overview of attitudes toward four transformative technologies: artificial intelligence (AI) in healthcare, cell and gene therapies (CGT), new genomic techniques in agriculture (NGTs), and cultivated meat.

This initial report shows scientific optimism is high globally, yet fragile – support declines in the absence of trust: when safety, fairness, or institutional motives feel uncertain[2].

Quantitative findings reveal what people believe, but not why. They do not capture emotional reasoning, cultural influences, or lived experience

How Society Feels About Breakthrough Science had two goals: to gauge public understanding, fears, hopes, and priorities around breakthrough technologies, and to deliver actionable insights that can foster societal alignment.

While the quantitative survey offers a global snapshot of the public's attitudes toward breakthrough science – understanding emotional drivers and developing strategies to engage individuals requires a closer look, as people interpret innovations through worldviews: naturalness, autonomy, fairness, trust in institutions, and personal experience with science.

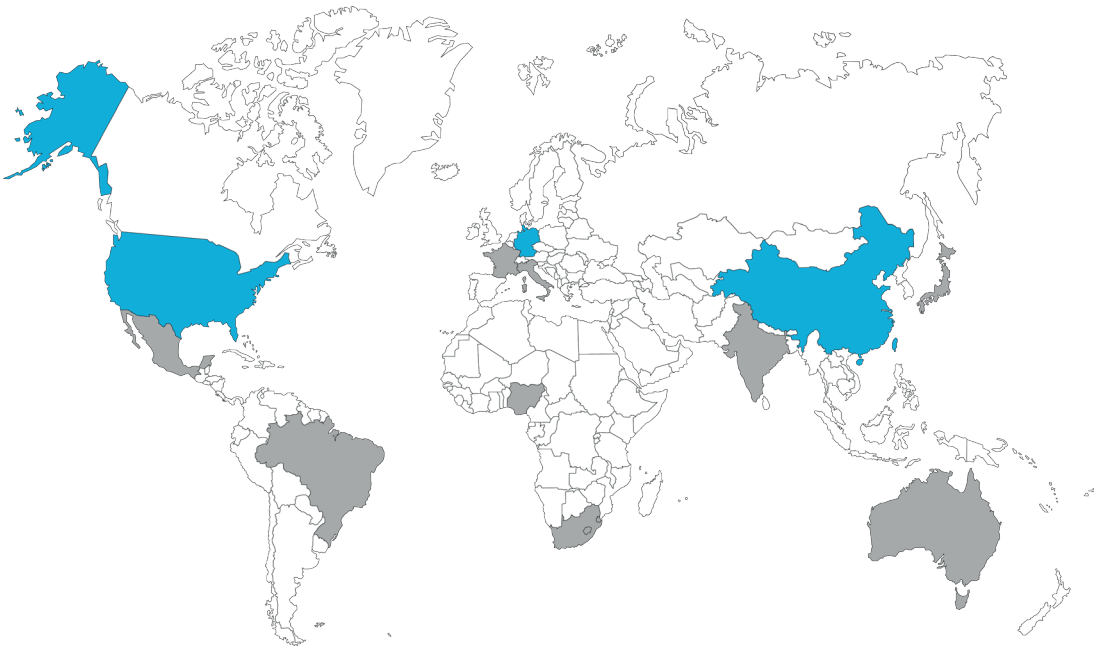
The central questions to be further explored are: Why do people hold these hopes and fears? And what has the power to shift them?

To explore the "Why" behind the quantitative data, a qualitative study was launched in late 2025

How Society Feels About Breakthrough Science: Decoding The 'Why' investigates insights from the quantitative survey by exploring the underlying beliefs shaping views on AI in healthcare, CGT, NGTs, and cultivated meat across the US, Germany, and China – three nations with the highest nominal GDP[3], global leadership in R&D[4] and patent filings[5]. These countries also revealed contrasting attitudes in the quantitative phase, inviting further exploration[2].

While these findings help to explain the underlying reasons driving some of the key findings from the quantitative survey, it is important to note that qualitative research is designed to be illustrative, detailed and exploratory, and that findings are not statistically representative of the audience.

Overview of countries included in the breakthrough study



Twenty-one interviews were conducted across these geographies, 12 of them with Gen Z participants – the first "digital native" generation – represents 25% of the global population and plays an outsized role in shaping trends and media[6]. While they are hardly a monolith in terms of beliefs and attitudes[7], our previous study suggests they are the most optimistic and trusting generation when it comes to science and technology[2]. Therefore, Gen Z was a larger focus in this study as understanding how to sustain this positivity and trust is critical for the future of innovation.

Participants reflected a range of educational and income levels, and perspectives that challenged assumptions surfaced in the quantitative data were prioritized. While each interview revealed nuance, clear patterns emerged.

How Society Feels About Breakthrough Science: Decoding The 'Why' shares insights from new qualitative research, complemented by our previous quantitative findings and third-party research to help to provide broader context and equip innovators with actionable guidance to meaningfully engage society and build trusted, impactful solutions.

Executive summary

Across all three countries, interviews suggest people are caught between two forces: rising hope in what science can do – and rising anxiety about how fast the world is changing.

Breakthrough technologies feel powerful and full of promise, yet also distant, opaque, and difficult to judge. This creates an emotional state where excitement about potential benefits mingles with unease about an uncertain future.

Through qualitative interviews in China, Germany, and the United States, ten key insights surfaced that help to explain the "why" behind the quantitative data from our previous study and translate public sentiment into actionable guidance for innovators seeking trusted, impactful engagement.

At the heart of the tension between hope and anxiety is a simple truth: people do not react to technology itself – they react to what it represents in their lives.

When people discuss AI, CGT, NGTs, or cultivated meat, they're expressing fundamental beliefs about control, naturalness, fairness, and what it means to be human in an age of accelerated change.

- **Three mindsets shape these reactions – emotional worldviews that cut across age, education, and geography**

  Optimists see breakthrough science as the engine of progress, they are eager for solutions to disease, climate change, and food insecurity. **Rationalists** approach innovation like an equation – balancing risks, safeguards, and accountability before granting trust. **Skeptics** protect values they fear innovation could erode: autonomy, authenticity, and human connection.

- **These mindsets are not static categories – they behave like emotional positions people move between depending on technology**

  Participants are not inherently critical nor accepting of all types of technology. The same person who is optimistic about AI's potential might be skeptical about cultivated meat. Someone wary of CGT might welcome climate-resilient crops. Technology is filtered through personal relevance and lived experience.

- **Beneath these perspectives lies a shared desire: most people want scientific progress, but they want it to feel human, fair, and safe**

  People want

  - AI to support their doctor, not replace them.
  - CGT to cure suffering, not create new divides.
  - NGTs to protect the planet, not hand control to corporations.
  - Cultivated meat to be transparent and real – not mysterious or misleading.

- **Young people embody this tension most intensely – hopeful about what innovation can unlock yet fearful about losing agency in a world shaped by algorithms and engineered biology**

  Their relationship with technology carries both aspirations for what's possible and existential concern about what their place in the future might be.

- **Across countries, trust (e.g., in science, institutions) influences everything**

  When trust is high and institutionally anchored – as seen with China participants – optimism translates more directly into acceptance, with confidence in authorities reducing uncertainty around oversight.

  When trust is fragmented and in flux – a theme with US participants – attitudes polarize: enthusiasm for some innovations (e.g., AI or gene therapy) coexists with deep skepticism toward institutions and commercial motives, causing even promising technologies to trigger caution or resistance.

  When trust is stable but conditional – as seen in Germany – acceptance is more measured: strong regulatory institutions provide reassurance, but cultural emphasis on safety, long-term proof and naturalness leads to cautious, slower uptake rather than rapid enthusiasm.

- **Importantly, unfamiliarity does not always lead to rejection – often, it leads to neutrality, especially for NGTs and cultivated meat**

  Interviews indicate this neutrality does not suggest indifference. It is a signal that people are open to being guided if communication is meaningful, relatable and honest. Technologies people can experience directly, like AI, generate stronger opinions than those that remain intangible, like NGTs, suggesting that familiarity through use builds stronger positions than information alone.

- **People seek trusted expert guidance that helps them make sense of complex technologies, not an overload of competing claims**

  The desire for information is real, but today's landscape of fragmented, poorly contextualized and contradictory claims across media creates confusion rather than clarity. People want credible experts to help them interpret evidence and understand both who holds accountability and what protections exist. Scientists, doctors, and other trusted intermediaries become essential translators between complex science and public understanding. Generational differences shape how this plays out – older generations often default to traditional media and official sources while digital media often propels younger people to actively question and construct their own perspectives.

- **The path toward societal alignment is therefore not purely scientific – it is also emotional**

  While evidence forms the foundation, interviews suggest that acceptance accelerates when innovations are seen to benefit wider society and solve challenges (e.g., environmental) that negatively impact our shared futures. This sense of a collective benefit appears particularly powerful in shaping openness to food and climate-related technologies, where benefits may be long-term and many steps removed from daily reality. Meanwhile, healthcare innovations are often evaluated through more immediate, personal impact.

  It thus requires innovators to communicate facts with empathy, to engage people early and openly, and to show how breakthrough technologies strengthen – rather than diminish – human agency and collective well-being.

To further explore best practices in building societal alignment, we collaborated with

SCIENCE & SOCIETY
aspen institute

Read the full essay in Section 4. Building Trust in Breakthrough Science: The Innovator's Toolkit

Abstract: The durable impact of breakthrough science depends not only on technical success but on institutions' capability to earn public confidence at scale. In this essay, the Aspen Institute Science & Society Program argues that trustworthiness – expressed through transparency, governance, ethical integrity, and narrative clarity – is the enabling infrastructure that allows discovery to translate into societal adoption.

Three mindsets shape perspectives toward breakthrough innovation

People's opinions about breakthrough technologies are based on their overall perception of science, innovation, and trust in the system – shaped by factors such as education, age, and whether they personally feel the impact of progress – as well as by emotional logic rather than scientific detail. Three mindset categories based on responses in the interviews were identified. These 'mindsets' appear across all generations and countries.

These mindset categories are used only as lenses to interpret how people approach different innovations, recognizing that reactions vary significantly by technology type. For example, CGT and AI tend to inspire more optimistic responses, while NGTs and cultivated meat draw a more mixed set of views. The mindsets serve as guiding patterns to explain broader attitudinal differences, not rigid classifications that must appear uniformly across every innovation topic.

The mindsets presented here emerge from qualitative interpretation of interview narratives and should be understood as analytical lenses, not as statistically defined population segments.

Mindsets

	Optimist	Rationalist	Skeptic*
Summary	Are broadly positive toward breakthrough science and believe science can solve major societal problems.	Combine hope with caution, evaluating innovations through evidence, regulation, and accountability. As the "persuadable middle", their acceptance influences whether society aligns behind a breakthrough technology.	Are not necessarily anti-science – rather protects values threatened by perceived artificiality, loss of control, or commercial motives.
Trust in 'the system' (governments/ regulatory bodies)	High baseline trust in governments and health authorities. Generally trustful of companies but also recognize their commercial interests.	Conditional trust of health authorities, governments, based on transparency and track record. Express skepticism about motivations of private companies, but take a pragmatic view when considering the importance of their role in innovation.	Hold distrustful views of health authorities, seen as self-interested, pessimistic based on prior perceptions. Hold deeper fundamental suspicion of corporate motives, and government's susceptibility to lobbying more than other groups.
Education	Skew toward higher education.	Skew toward higher to middle levels of formal education.	Skew toward lower levels of formal education
Age/Generation	Skew younger (Gen Z & Millennial).	Have the most evenly distributed range of age groups identified.	Most polarized in age (Gen Z & Baby Boomer).

*The term skeptic is used here in terms widely used in common language and should not be confused with the rigorous pro-science movement that identifies as 'Skeptics' embodied by The Skeptical Inquirer.

Beyond mindset archetypes, analysis of interviews revealed shared generational and country-specific dynamics:

- Gen Z participants display high scientific optimism combined with deep societal anxiety, especially regarding AI oversight and fairness.
- Chinese participants generally show higher institutional trust, speeding acceptance of new technologies.
- German participants prioritize safety, regulation, naturalness, and long-term proof.
- US participants show the highest polarization – strong optimism among some, strong institutional distrust among others.

Accordingly, the chapters that follow deepen this analysis by examining mindset dynamics across breakthrough innovations, while also focusing selectively on Gen Z as a pivotal generation for understanding how trust, agency, and alignment with science may evolve over time.

02

Technology and Healthcare

2.1 Innovation in AI

Widespread use of AI across geographies

Findings across studies suggest AI is widely seen as both a familiar, useful tool and a transformative force, with strong potential to improve systems, increase efficiency, and accelerate discovery. This dual perception of AI as both practical and revolutionary creates heightened expectations – people see it as capable of solving complex problems from climate change to healthcare access, while simultaneously worrying about its disruptive power.

The broader context

The paradox of AI adoption is that widespread use of generative AI tools (ChatGPT, Claude, Gemini) hasn't translated into widespread understanding. Many participants describe AI with a sense of feeling 'everywhere but unexplained', which breeds a distinctive modern anxiety: curiosity about AI's capabilities mixed with unease about its creator's intentions.

Privacy emerges as the sharpest concern. **Only 48% trust companies using AI to protect their personal data, while 42% do not**[8], revealing tension between embracing AI's benefits and fearing its reach. This indicates that distrust extends to concerns about accuracy and the increasing invisibility of decision-making processes that shape daily experiences.

Generational divides reveal complex dynamics. **Younger cohorts display high AI fluency yet harbor the strongest anxieties about its societal impact.** 65% of younger respondents agree that they expect AI to cause significant job losses[8], a fear that interviews indicate resonates especially with younger generations who see their future careers at stake. Younger people also worry that AI could worsen online disinformation over the next 3-5 years, with 40% anticipating a decline in the reliability of online information[8].

The appetite for human oversight cuts across all demographics. While 69% say they would use AI tools for healthcare if approved by national authorities[2], only 54% trust their governments to regulate AI responsibly[8]. This gap reveals a central challenge: people want guardrails but doubt whether existing institutions can provide them. It suggests that – **people want AI to enhance human capability – continuing progress, but with clear boundaries and responsible use.**

This rapid expansion sets the context for both optimism and unease around how AI is understood, governed, and used.

53% **say AI has already profoundly changed their daily lives**

67% **expect even more substantial change ahead**[9]

Mindsets toward AI in healthcare

Optimists

For Optimists, AI represents genuine opportunity. They embrace its ability to process vast datasets, personalize services, and accelerate problem-solving. These early adopters see themselves as partners with AI, using it to amplify their own capabilities.

> *With the development of technology and innovations in these fields, AI will ultimately become indispensable.* ***It can reduce a lot of tedious tasks and allow us to analyze data more quickly.*** *I've actually sometimes used AI in my work.*
>
> **Female Gen Z, China**

Their enthusiasm and perception of AI stems from practical experience – they've seen AI help them work faster and smarter, and they trust that continued development will bring even greater benefits. They are aware of current limitations, but express confidence that tools will evolve to better address privacy safeguards, transparency requirements, and the human need for meaningful oversight.

> *So, instead of doing a lot of research, I can just plug in a query into a ChatGPT, get a really fast summary, [...]* ***it has a lot of potential to work just by the sheer amount of data it can learn versus what a human can learn.***
>
> **Female Gen X, US**

Rationalists

Rationalists see AI's promise but insist on conditions, emphasizing verification, regulation, and proper governance. AI "hallucinations," reports of bias, and other errors loom large in their awareness; proof of fairness and accuracy are essential to build trust. They want AI to remain one option – not the only option.

> *AI is [...] like a computer, it's like a stethoscope. But at the end of the day, it's [...]* ***only as good as the wielder.***
>
> **Male Millennial, US**

Their support comes with caveats about maintaining human agency. They recognize benefits while acknowledging risks, particularly around AI's ability to create convincing but false content.

> *In many areas, it is helpful and really makes life easier, but* ***some things I do find quite alarming.*** *If you observe now that AI can create images that you can no longer distinguish from real ones and that basically anyone can be placed in any situation, at least seemingly, then I find that rather frightening. But I still believe it has more advantages than disadvantages.*
>
> **Female, Gen X, Germany**

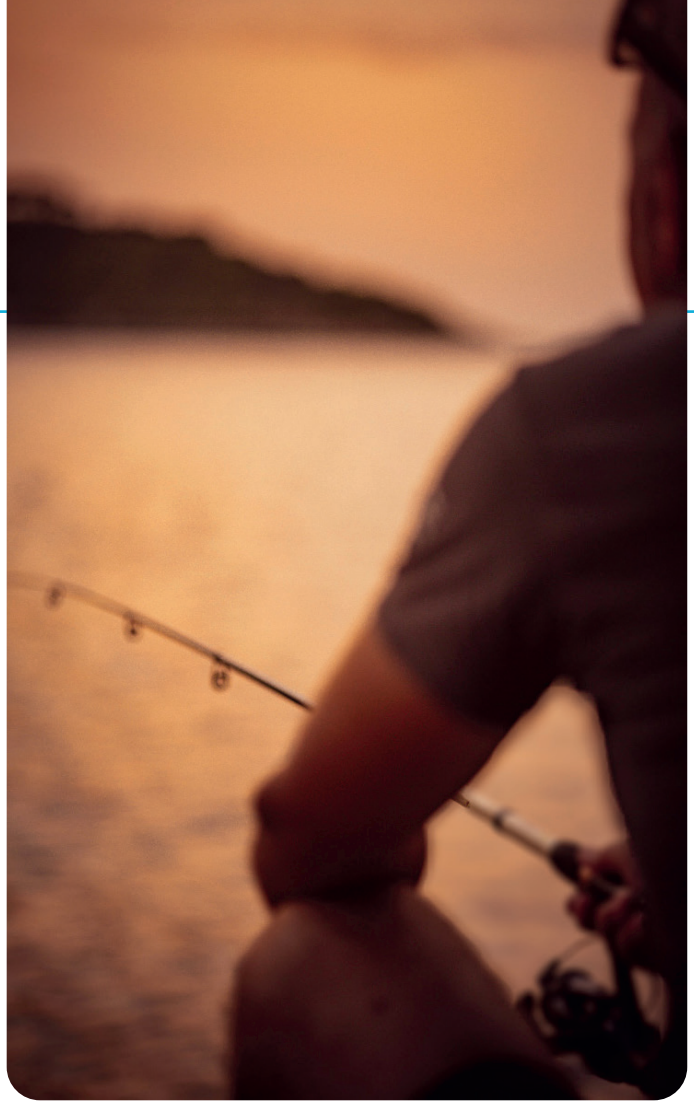
Skeptics

Skeptics view AI through a lens of loss – of jobs, of human connection, of critical thinking skills. They see machines taking on roles traditionally reserved for humans and worry about what gets sacrificed in the name of efficiency.

> *I'm scared of the fast advancement of AI. It makes me worried for the future. Although it's cool,* ***I do have a fear that AI will take over a lot of jobs*** *[...], especially in my field as communications major.*
>
> **Female Gen Z, US**

Their resistance often focuses on the human element that technology cannot replicate – empathy, intuition, and contextual understanding.

> ***I feel more connected talking with another human being rather than a robot.***
>
> **Male Baby Boomer, US**



Some skeptics are also concerned about AI's longer-term effects on people, i.e., reduced independence and over-reliance on machine-generated information.

> *My concerns are not really about AI itself, but more about people, that over time they might, bluntly speaking, become less intelligent, or that since much of the information AI produces is not necessarily correct, people might lose the ability to think critically or do proper research to find reliable sources.*
>
> **Female Gen Z, Germany**

Outlook

Building trust in AI requires transparency: explaining how systems work, who oversees them, and how decisions can be checked will positively influence acceptance. In the near term, progress depends on establishing guardrails, standards, and human oversight that balance innovation with accountability. Longer term, trust will hinge on whether AI does indeed deliver the transformative societal impact comparable to railways, highways, and the internet.

2.2 AI in healthcare

Broad acceptance demands humans in the loop

AI in healthcare elicits unusually strong emotional reactions because it enters moments of personal vulnerability. Across regions, people broadly welcome AI when it clearly supports – rather than replaces – human clinicians. What people want is 'augmented care', not 'algorithmic care.'

The broader context

AI in healthcare is broadly viewed as positive when it enhances the capability of medical professionals.

64% feel positive about AI's impact on human health[2]

66% would be happy for their doctors to use AI to support treatment decisions.[2]

Openness for doctors to use AI to support treatment is notably higher in lower- and middle-income countries – for example, 85% in China – than in higher-income countries such as Germany (59%), and the United States (50%)[2].

Additionally, 70% agree that AI can lead to new discoveries in medicine, and 68% agree that AI can improve diagnoses[2]. People recognize benefits such as faster diagnostics, reduced human error, and expanded access to care, especially for mental health and remote settings[2]. At the same time, concerns reflect those raised about AI more broadly: data privacy, fairness, and the loss of empathy in doctor–patient interactions. 71% say they are concerned about the loss of human empathy in healthcare interactions[9].

Interviews indicate that people are most comfortable with AI where it offers technical advantages, such as image and pattern recognition for scans, triage, or data analysis. Participants largely understand that these applications are powered by specialized, data-driven tools. However, hesitations increase as AI moves closer to diagnosis or treatment decisions, where stakes are higher, tools and decision paths are murkier, and accountability becomes more complex.

Oversight is a defining priority. 76% believe AI used in healthcare should be reviewed by national health authorities, and 74% worry about errors or misdiagnosis[2]. This suggests public concern is driven in part by doubts about AI's technical performance as well as by uncertainty about who is responsible if something goes wrong.

Mindsets toward AI in healthcare

Optimists

Optimists view AI in healthcare as a powerful extension of medical expertise – speeding diagnoses, reducing human error, enabling new therapeutic breakthroughs, and expanding access to care. They are more trusting of clinicians and regulators to manage risks effectively, aware of the present-day shortcomings of AI, and eager to apply the technology when and where it can be meaningfully applied – as soon as possible.

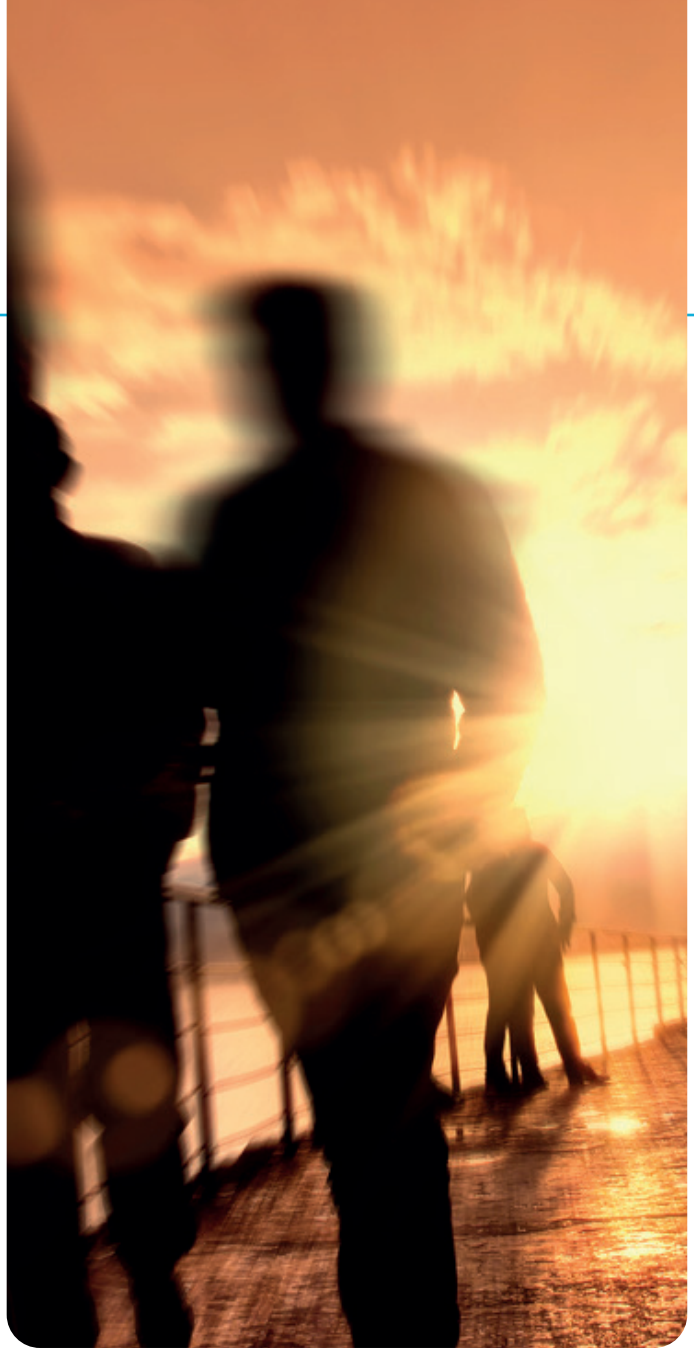
> ***If I'm feeling unwell, I usually ask AI first.*** *Only if it's a serious problem, I will go to the hospital. Because if it's common, I can just go to the pharmacy and buy some medicine.*
>
> **Male Gen Z, China**

> *I think that if we use AI, we can treat patients more quickly, maybe also more efficiently, and then save the time that we can use to do what currently isn't possible. Perhaps to treat more patients, or maybe to spend more time with individual patients.*
>
> **Female Gen X, Germany**

Rationalists

Rationalists take a 'benefits with guardrails' approach. They support AI in healthcare when evidence, transparency, and accountability are clear. They draw a firm boundary between assisting and deciding: AI may detect patterns, triage information, or generate summaries, but clinicians must interpret outputs and remain accountable.

> ***There are some things which an AI tool can probably see that maybe a doctor misses*** *if they don't have as much time with patients nowadays as they should.*
>
> **Male Millennial, US**



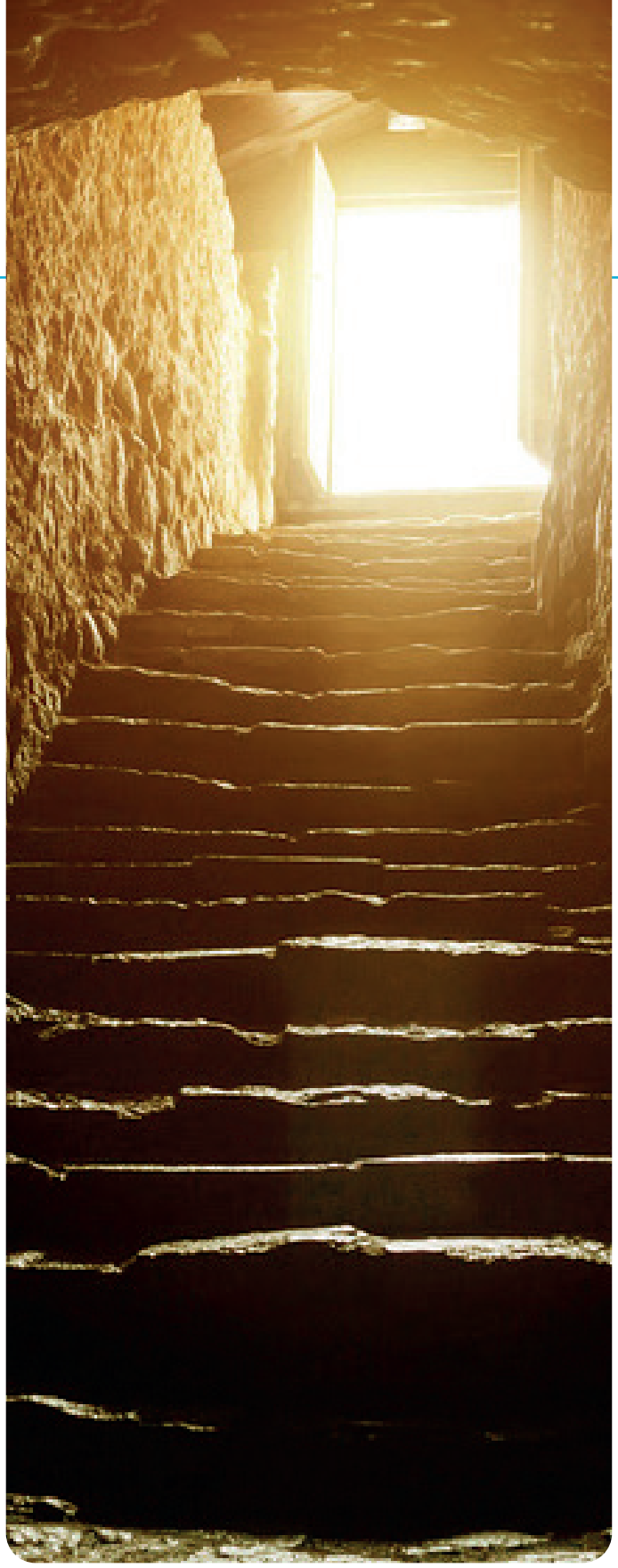
> ***It's always been like, the AI as compared to the best standard of care, but most people aren't getting a good standard of care.*** *And so, if the alternative is nothing, then I think in almost every case a chatbot is probably better, even at current levels of regulation and current levels of accuracy.*
>
> **Male Gen Z, US**

Skeptics

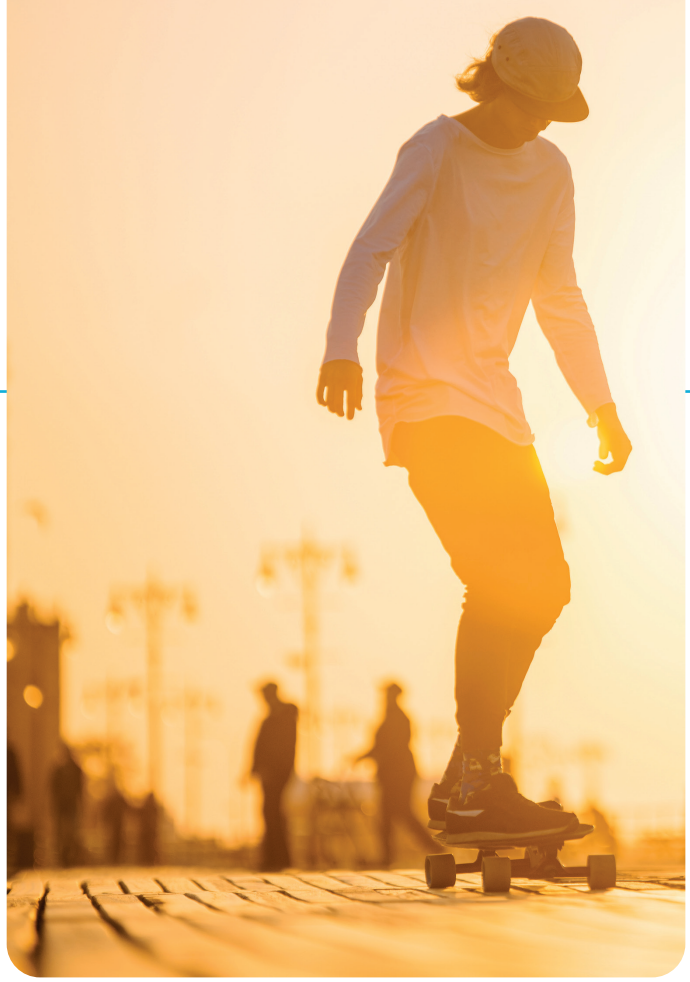
Skeptics fear reduced human contact, loss of empathy, and over-reliance on automated systems. Their mistrust often stems from broader distrust of institutions as well as AI itself.

> *[When] **I want to see a doctor, I want to see somebody who studied this**, who went to medical school. I don't want my doctor to be using AI to tell me what's wrong with me. That's why they studied [...] medicine.*
>
> **Male Gen Z, China**

> ***The AI tends to exaggerate,** I've noticed that. And the human-to-human factor is missing. The AI can't see you or assess your physical condition.*
>
> **Female Gen Z, US**



Gen Z in focus



Research highlights key generational differences: Gen Z is globally the most positive about AI in healthcare but also expresses the strongest anxieties about dependence, fairness, and loss of human skills. Interviews show that Gen Z and Millennials report higher concerns about AI errors, misdiagnosis, and data privacy than older adults. Alongside this, self-reported understanding of AI is highest among Gen Z (72%) and Millennials (71%), compared with only 58% among Baby Boomers[10].

Within Gen Z, attitudes toward AI in healthcare diverge sharply by geography. Outside the United States, Gen Z shows strong optimism about AI's potential to improve human health. In contrast, US Gen Z are distinctly more cautious:

72% of Gen Z respondents outside the US feel positive about AI's impact on the future of human health, compared with just 42% of Gen Z in the US[2].

This caution is driven by high familiarity in combination with low institutional trust. US Gen Z shows high exposure to and understanding of AI[11], but notably lower confidence in the institutions responsible for governing it: For example, only 51% of US Gen Z agree that health authorities act in the public's best interest (vs. 66% outside the US)[11].

This indicates acceptance among US Gen Z hinges on visible human accountability. They are open to AI supporting clinicians, but resist scenarios where responsibility appears blurred or delegated to systems rather than people.

> *I would go to a medical professional who spent 10 years studying and ask them the question…I think there's an emotional intelligence it lacks. So, if somebody is sick and you're asking it questions, a doctor can tell you if something's in your head, and then a computer is so literal that it will make you think something could be wrong with you when it's not. If your eye hurts, ChatGPT can't tell you there's an eyelash, but an eye doctor would be able to see something like that.*
>
> **Female Gen Z, US**

Outlook

To foster acceptance, innovators need to show how AI strengthens – not replaces – human judgment and make safety and oversight visible.

Clearly demonstrating the benefits of integrating AI into healthcare will be critical. Evidence from successful trials (e.g., AI diagnostics outperforming doctors, improved outcome of remote patients using AI tools) coupled with individual experience in data-driven areas such as radiology can drive broader societal acceptance.

2.3 Cell & gene therapies:
High optimism for cures, complexity leads to concern

Cell & gene therapies (CGT) represent something unprecedented for most people interviewed – the hope of fixing root causes rather than managing symptoms over time. These curative potentials lead CGT to be seen as the 'best version' of medical breakthroughs. Yet the same transformative power that makes it exciting also triggers concern about permanently changing human genetics.

The broader context

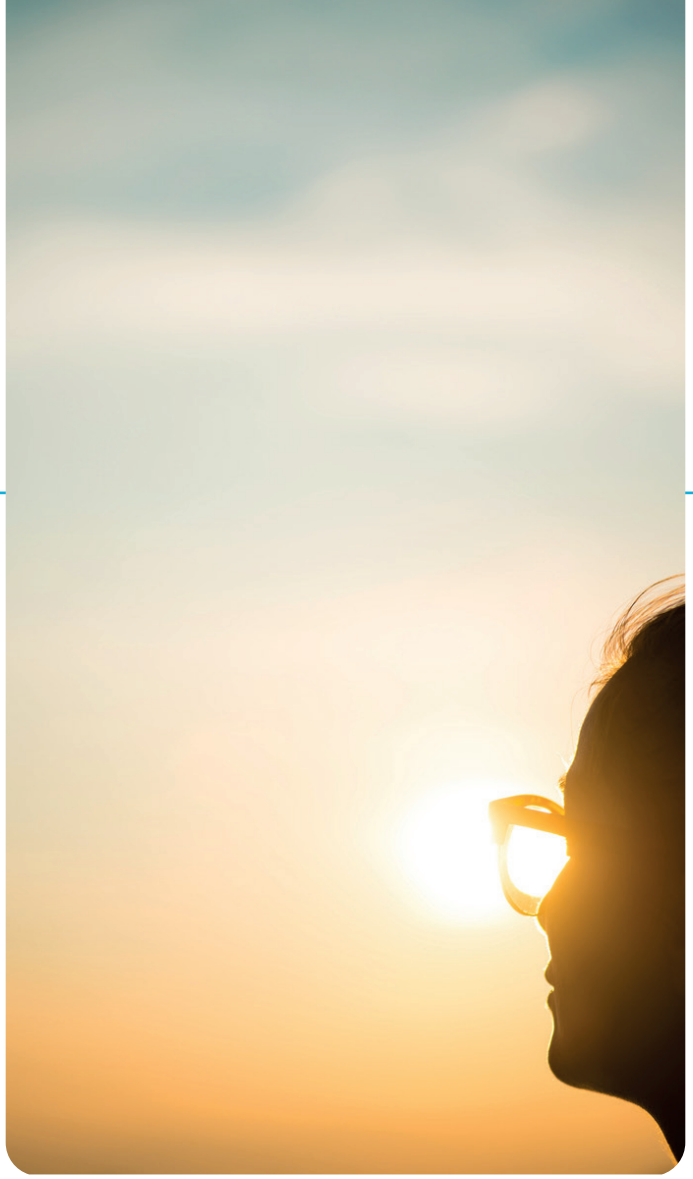
While people show reasonable understanding of AI in healthcare, CGT understanding remains more basic – a knowledge gap that increases concerns about irreversibility. DNA and its role in defining traits and disease risk is somewhat familiar, and several interviews equated CGT directly with gene editing to correct faulty genes.

74% of people who feel they understand CGT are optimistic about its potential to cure serious diseases, with only 3% pessimistic[2]. This optimism reflects CGT's promise as a turning point for previously incurable diseases. Yet the technology evokes core anxieties about modern medicine. Almost half (48%) worry that CGT could have strong side effects[2]. Interviews reveal limited awareness of the diverse modalities of CGT (cell regeneration, sRNA, etc.) beyond gene editing, so fear is focused on genetic changes. This suggests that trust in institutions becomes key to shaping acceptance. **Where trust is high, fears decrease; where weak, even promising science faces resistance.**

Fairness and accessibility create similar concerns. People interviewed worry CGT could deepen inequalities if only the wealthy, or people in certain countries can access transformative – and potentially high-cost – treatments. Nevertheless, 59% agree CGT should be developed regardless of cost[2], showing strong belief in the societal value of advancing the technology. This suggests that while cost concerns are real, they don't override the value of the innovation, and that there is some understanding that breakthrough science becomes more accessible over time.

Across countries, participants differentiate clearly between medical use and perceived "enhancement". Treating severe diseases wins broad acceptance but using these tools to select traits or extend life beyond "what feels natural" triggers moral concerns, especially among Rationalists and Skeptics.

Mindsets toward cell and gene therapies



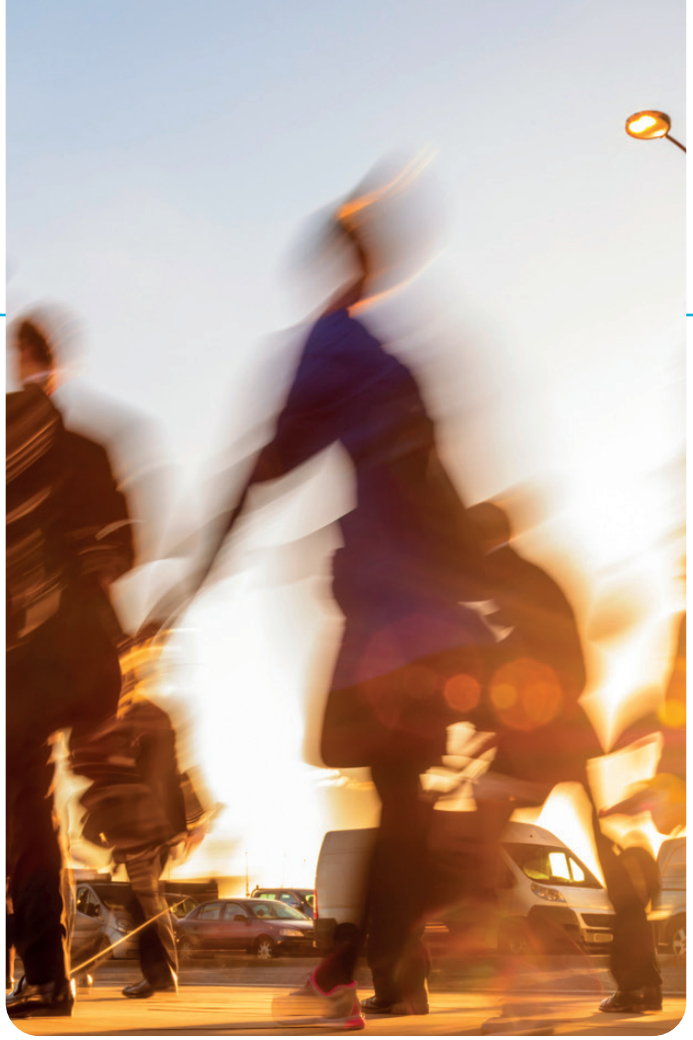
Optimists

Optimists view CGT as science "doing what it should" – curing cancers, rare genetic disorders, and chronic conditions that current medicine can only manage. They perceive CGT as breakthrough science with tangible human impact, capable of end suffering for millions. They trust medical experts to handle unknowns responsibly, and believe potential benefits justify accepting some risk.

> *I would discuss it with my doctor. If my doctor tells me, hey, look, this is how it is, then yes.*
>
> **Female Gen X, Germany**
> on whether she would consider an (hypothetically) approved CGT vaccine to reduce cancer risk.

These individuals show the greatest willingness to personally adopt CGT when recommended by physicians. Chinese and German Optimists particularly link their enthusiasm to expectations that CGT will be covered by national health insurance schemes, while US Optimists more often worry about cost, insurance coverage, and who will be "left out".

> *It would be exciting if this can be covered by our national medical insurance.*
>
> **Female Gen Z, China**



Rationalists

Rationalists share optimism about CGT's potential – most agree its benefits outweigh risks – but their support depends on strong safety measures. They demand rigorous trials, long-term safety data, transparent oversight, and clear clinical boundaries before offering full support.

Rationalists insist on equitable access to avoid creating 'genetic haves and have-nots.' While treating severe, otherwise untreatable diseases sits firmly within their comfort zone, using CGT for enhancement, non-essential traits, or purely cosmetic reasons represents a hard line many won't cross.

> *If I know that this is approved by the government, I think I'm willing to take that chance in helping me prevent cancer.*
>
> **Male Gen Z, US**
> on whether he would consider an (hypothetically) approved CGT vaccine to reduce cancer risk

When stakes are high – facing a life-threatening disease or running out of conventional options – Rationalists become more open. But they want choices explained, risks and benefits clearly stated, and time to discuss with trusted doctors.

> *I'm all about cell therapies and I'm all about gene therapies. I think they have a lot of wonderful potential. I truly do. My concern is how they're implemented, what controls are in place to ensure that we minimize any damage? From a medical standpoint, the objective ultimately is always, first, do no harm to any patients. How are we keeping that first principle in mind?*
>
> **Male Millennial, US**

Skeptics

Skeptics' wariness comes less from biology than from systems and motives. Many feel uneasy about "editing" or "replacing" cells and genes, fearing scientists might be overconfident about complex systems not fully understood. They focus on worst-case scenarios: treatments causing new illnesses, side effects, or irreversible genetic changes.

> *What if something goes wrong during the process? Then that's going to be very concerning. (Why would that be concerning?) I'm thinking that maybe for cell and gene therapy, there's not much background or experience behind it yet.*
>
> **Female Gen Z, US**

Yet even Skeptics show surprising flexibility when facing serious illness. While they wouldn't be early adopters – especially for preventative uses – their thinking changes when facing life-threatening disease with no alternatives. Interviews show that when Skeptics imagine a loved one facing serious disease with no effective treatment, many say they would "probably try" a well-established CGT if recommended by their doctor.

> *I'd consider alternatives, of course, as well, but if it was like this or nothing, absolutely! That seems easy.*
>
> **Male Gen Z, US**

Outlook

The central challenge isn't convincing people that cures are desirable, but showing that those cures will be safe, fairly distributed, and well-governed. Success hinges on transparent benefit-risk data and credible oversight systems that convert theoretical support into real-world acceptance. As curative therapies transition from laboratory to clinic, people seek assurances on fair access. Framing CGT as a collective investment – through public-private partnerships, inclusive reimbursement models, and global access initiatives – can bridge the gap between scientific promise and societal trust.

03

Innovation at the dinner table

3.1 Climate change and food scarcity:

High climate concern, low food-scarcity worries, and limited sense of urgency for agricultural innovation

Climate change emerges as a near-universal anxiety. Food scarcity, less so. People easily identify a nexus between climate change and agriculture: many have some understanding that agricultural production contributes to climate change, and in turn how climate change will impact future crop yields. There is a growing sense of inevitability regarding the climate, and some express resignation that the problem is too big for humans to solve.

The Broader Context

Climate concern runs deep across all geographies and generations.

82% globally report concern about climate change[2]

At the same time, many feel personal actions are insufficient; they expect technological solutions to play a major role.

69% are optimistic that scientific breakthroughs can improve access to nutritious food

and

58% are optimistic they can help solve environmental challenges[2].

However, interviews show openness to innovation is higher in healthcare than in food, across mindsets. Even individuals optimistic about breakthrough science in other domains tend to become more skeptical when innovations touch food and farming. This may be attributed to lower perceived urgency – no respondents described first-hand experience of food shortages, and beyond participants from China, few understand how agricultural innovation is associated with declining rates of global starvation. People consistently frame healthcare breakthroughs as responses to urgent, concrete problems: serious disease, system strain, and lack of alternatives. By contrast, while climate change concern is widespread, interviews often frame its impact as abstract, contested or already beyond meaningful control – and technological interventions are approached cautiously rather than enthusiastically.

Mindsets toward climate change

Optimists

Optimists broadly support science-led responses to climate change through agricultural innovation. Their support strengthens when breakthrough science is framed in terms of concrete benefits: climate-resilient crops, less need for pesticides and water, and more reliable harvests for farmers, especially in vulnerable regions.

> *China is a big agricultural producer using a lot of technologies. But as a whole, it still mostly depends on the weather. Given that climate change is unchangeable,* ***perhaps we can improve the ability of food plants to withstand adverse weather conditions.*** *This includes researching and developing new species.*
>
> **Male Baby Boomer, China**

Rationalists

Rationalists acknowledge urgency, but demand careful assessment of risks, lifecycle impacts, and sustainability. They support innovation if evidence can demonstrate real climate benefit, without creating new ecological risks or impracticalities in daily life.

> *If these fruits or vegetables can be **resilient to climate change** and are **also able to have a longer shelf-life**, I'm all in for it.*
>
> **Female Gen Z, US**

> *I feel somewhat confident that **technological innovation and cultural adaptation (will) keep us pretty well ahead** if there's not enough food to go around... My understanding ... is that just on pure calories, we can feed many times over the world population. It's just how we use them. Feeding agricultural products to animal is just massively inefficient.*
>
> **Male Gen Z, US**

Skeptics

Skeptics tend not to perceive climate change as an urgent or immediate personal threat, reducing their openness to large-scale technological interventions. They remain wary of high-tech solutions, preferring natural or traditional approaches instead. There is overwhelming concern that technological fixes may introduce new problems rather than solve the underlying issues.

> *I am **skeptical that my life is going to be made hugely worse by climate change concerns.** I feel like the place I live is not like super affected.*
>
> **Male Gen Z, US**

> *Is it sensible for humanity, in order to maintain the will to survive, that humans make adaptations so we can all still be provided for? I tend more towards **the idea that nature knows what it's doing,** and that there must also be a natural way for us all to continue living.*
>
> **Male Millennial, Germany**

Additionally, a sense of resignation emerges among those who believe that climate change is already too advanced to be meaningfully reversed; this further weakens confidence in the potential that new technologies can make a real difference.

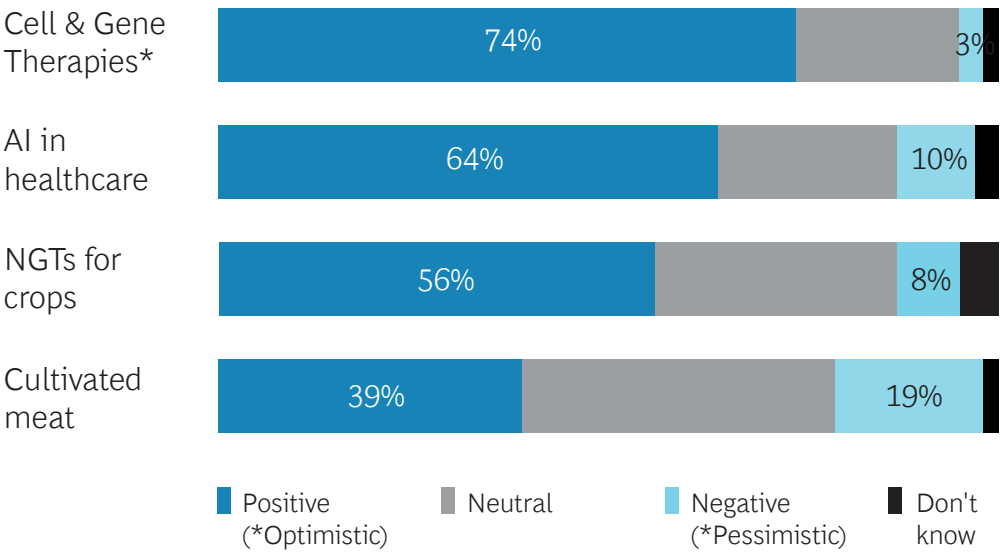
> *I think there's little we can still do about it. It's just gone on for too long or is too far advanced.*
>
> **Male Gen Z, Germany**

Outlook

Compared with healthcare, technologies around climate change and food scarcity face a higher legitimacy bar, shaped by weaker perceived urgency and strong expectations around naturalness, tradition, safety, and governance.

Building societal alignment requires linking innovation to visible, collective benefits, such as resilience, food security, and reduced waste, while addressing underlying anxieties about intervention in a deeply personal and cultural domain.

Attitudes toward breakthrough innovation[2]



3.2 New genomic techniques:
Openness tempered by intangibility and unfamiliarity

Only a small fraction of the populations across high-income and many upper-middle income countries are farmers[12], creating a cognitive distance between the food we eat and its production. As such, knowledge of the technologies underpinning modern foods systems is limited.

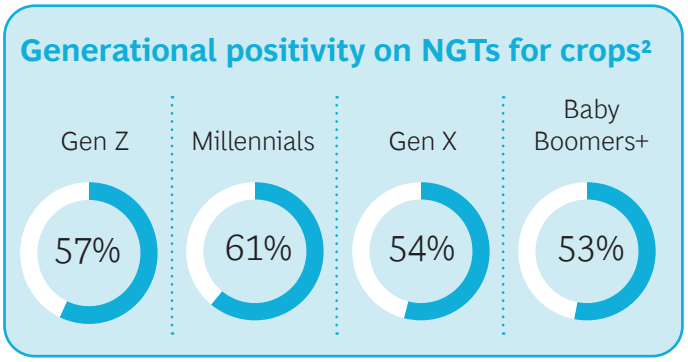
Familiarity with new genomic techniques (NGTs) as a term and technology is thin across geographies, it draws a more neutral public opinion. With prompting, most participants understand these as innovative tools (including CRISPR) that can introduce small genetic changes to crops, similar to those occurring naturally or through conventional breeding, but few understand this makes them distinct from genetically modified organisms (GMOs). There is some awareness that NGT crops are being developed to address food systems threatened by climate change, among other applications. Rather than outright rejection, the dominant reaction is cautious observation, coupled with a view that farming should be 'natural' rather than novel.

The broader context

31% of respondents hold a neutral opinion toward NGTs compared to 56% positive and 8% negative[2].

This large neutral middle represents opportunity rather than opposition – people waiting for clearer understanding before forming strong views. While 61% of respondents recognize that farmers have long used crossbreeding to create desirable traits[2], this familiarity with traditional methods doesn't translate into understanding of NGTs specifically.

Generational openness to NGTs is broadly similar across generations, with only a modest decline from younger to older groups.



Geographic differences are more pronounced: In lower-middle-income countries, 72% of respondents who understand NGTs feel positive, compared to 47% in high-income countries[2]. This may be due to a stronger perceived need for climate-resilient food solutions, as lower-income countries typically employ a larger share of their population in agriculture and rely more heavily on farming as a source of GDP[5]. Interviews with participants in China suggest that proximity to food insecurity increases openness to innovation in agriculture.

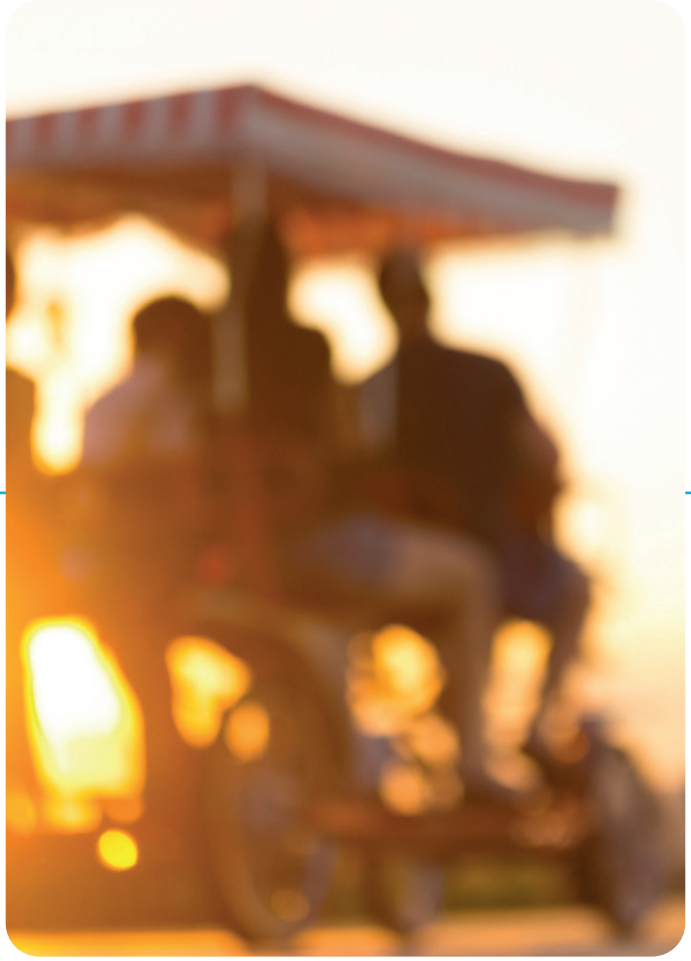
Mindsets toward new genomic techniques

Optimists

Optimists have a clearer understanding of NGTs and view them as a breakthrough tool to tackle climate change, food insecurity, and sustainability: making crops more resilient to heat and drought, reducing food waste, and improving nutrition. They see NGTs as a smarter, faster version of traditional breeding, recognizing humans have long selected and crossed plants, with genome editing seen as a more precise way to do the same job.

> *I think it's the only way we can address continuing to try to feed the planet.* ***Technology is going to be the only thing that helps us keep limping along.***
>
> **Female Gen X, US**

> *We can't change these [climate] challenges. [..] If ordinary seeds struggle to survive,* ***we definitely need to use new technologies to ensure sustainable development.***
>
> **Female Gen Z, China**



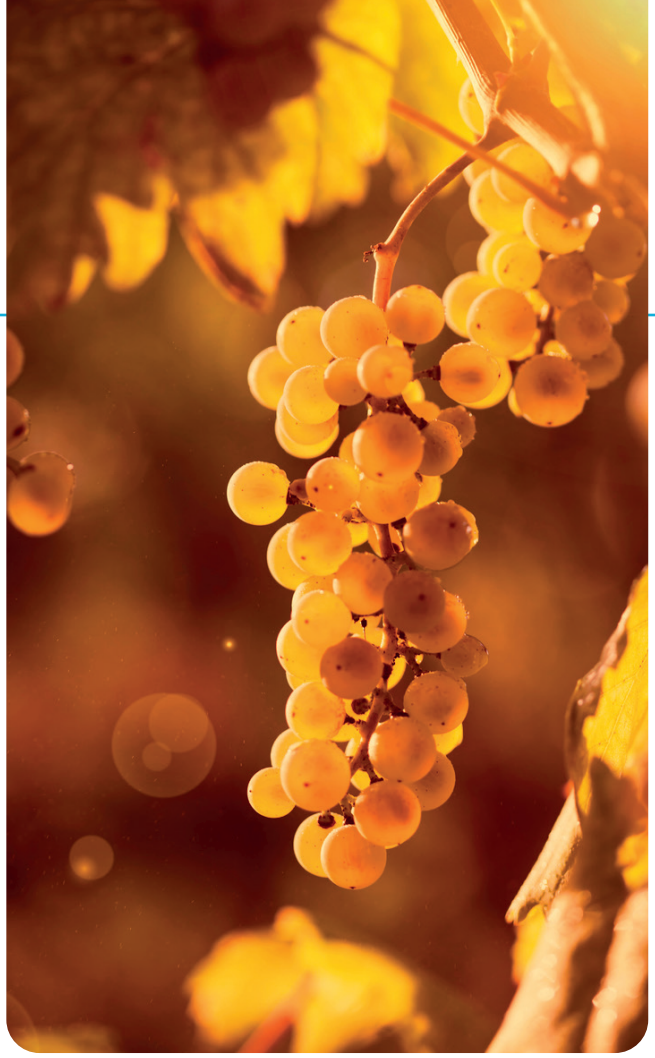
They generally trust scientists and regulators to manage risks, assuming safety testing, regulation, and oversight will catch problems before products reach the market. Their support strengthens when NGTs are framed in terms of concrete benefits – climate-resilient crops, less need for pesticides and water, and more reliable harvests for farmers.

> *It feels like it maps nicely onto a continued human story; we've been selectively breeding plants and animals for millennia, and now we're doing it with more precision and accuracy and ability and understanding. [..]* ***It feels a continuation of a broad human project.***
>
> **Male Gen Z, US**

Rationalists

Many Rationalists voice a preference for 'natural' foods but are open to technologies like NGTs if proven safe, effective, and sustainable. They see potential for NGTs to solve problems related to climate change & food availability, but their support comes with conditions.

> *Ordinary people just want to have enough to eat and eat well. If they don't have enough to eat, you cannot talk about anything else.* ***Therefore people would accept the technology if it helps fill their stomach.***
>
> **Male Baby Boomer, China**



Climate and food security benefits are compelling to Rationalists, especially if NGTs hold the promise for higher yields, resilience to heat and drought, and longer shelf life. However, this is secondary to independent oversight and evidence that NGTs genuinely reduce inputs, such as water, fertilizer and pesticides.

> *I think these genomic techniques are a very useful tool because they can be used for many positive things.* ***Of course, there are always ethical concerns, but within a regulated framework, they can be used for many positive purposes.***
>
> **Female Gen Z, Germany**

Skeptics

Skeptics worry about erosion of traditional food and farming, emphasizing that technological change brings trade-offs rather than purely positive outcomes.

> *... Changes don't always just bring positive things ... Everything always has its pros and cons.*
>
> **Male Millennial, Germany**

They articulate a strong preference for 'naturalness' in food production, arguing that food should be produced as it 'always has been', without interference from technologies. They see technologies as inherently linked to corporate interests, including in agriculture.

> *Food should be natural. If you grow it yourself at home, you would make sure that it is organic [...] The more the changes, the lower the trust.*
>
> **Male Gen Z, China**

Outlook

There is clear opportunity to shift the current widespread neutral attitude toward NGTs into active support. This, however, can best be achieved if innovators demonstrate how climate-smart breeding tools make food systems more resilient, nutritious, and less wasteful, delivering data that validates outcomes.

Over the next decade, acceptance in high-income nations will likely depend on governance: robust regulation, transparent business practices, and proven benefits for farmers, consumers and food systems, while data reinforces the safety, efficacy, and value of NGTs.

However, amidst rising climate and geopolitical risk, food security may become more salient, hastening urgency for agricultural innovation.

3.3 Cultivated meat:
Lower acceptance despite ethical appeal

Cultivated meat stands out as the most emotionally charged food innovation examined in this study, provoking reactions ranging from ethical enthusiasm and curiosity to an immediate 'gut-level no'. The technology creates a distinctive tension: intellectually, many recognize its potential to reduce animal suffering and environmental harm, yet emotionally, something about meat grown through cell cultivation rather than traditional animal rearing creates deep unease.

The broader context

More optimistic participants connect cultivated meat to compelling environmental and animal-welfare benefits, especially the idea of reducing harm without giving up meat. However, the environmental link is not universally familiar. Fewer than half (46%) agree conventional meat production harms the environment; 26% neither agree nor disagree[10].

In conversation, more knowledgeable participants noted environmental benefits of cultivated meat – although some mention it's too early to tell how reduced land, water and feedstock balances against increased energy consumption until full scale life cycle assessments are possible.

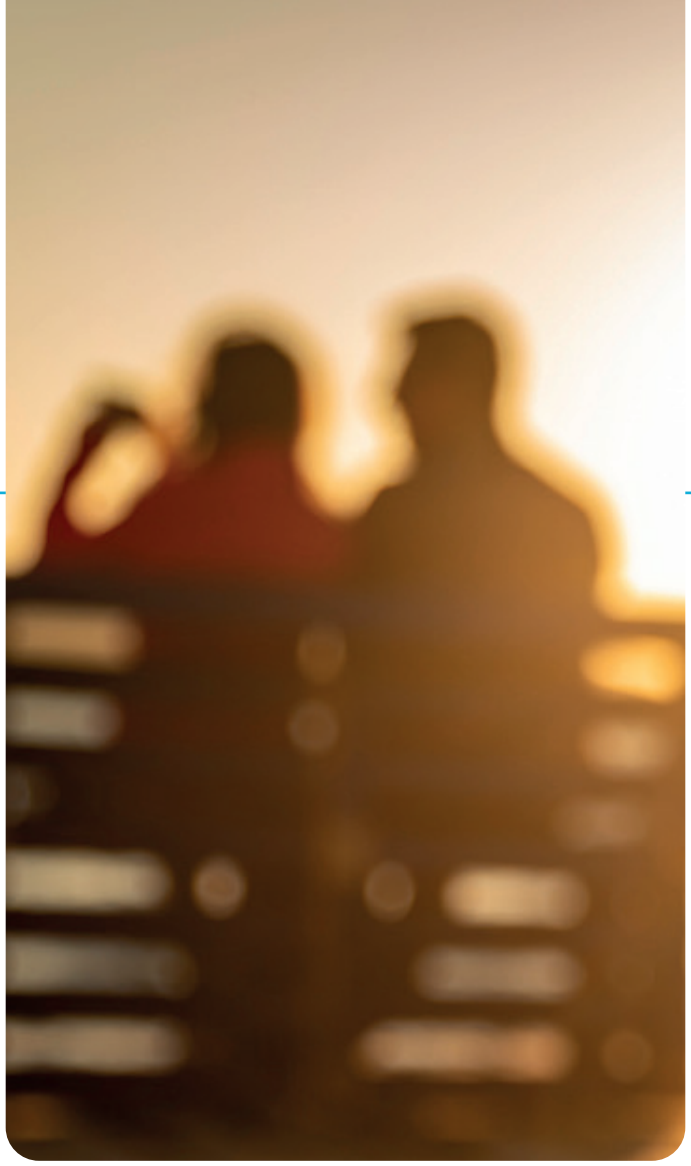
Concerns cluster around concrete and experiential factors. Taste, texture, and potential health effects are frequently mentioned, but the most persistent barrier is the perception that cultivated meat is "unnatural" or overly engineered, creating a psychological hurdle that is stronger than for other innovations in this study.

Geography appears to further shape acceptance patterns. Reluctance is strongest in countries with higher GDP and higher meat-consumption, whereas regions where meat is less accessible show greater willingness to try it[2].

In the three countries selected for deeper qualitative exploration, **reluctance to try cultivated meat is higher in Germany and the US, both at 35% compared to the global average, at 26%, and lower in China, 17%[2].**

There is a comparatively high level of neutrality toward cultivated meat (40%) relative to other innovations examined in our reports (23% on AI in healthcare, 21% on CGT, and 34% on NGTs)[2], reflecting that many remain undecided rather than opposed to this technology. This indicates knowledge is limited and opinions are still forming, creating opportunities to shape them through clear communication and data-driven reassurance.

Mindsets toward cultivated meat



Optimists

Optimists are eager to try cultivated meat and see it as a major innovation that can spare animal lives and improve meat sustainability. For them, the ethical argument outweighs any discomfort about production methods.

> *(I feel) hopeful because I know that whatever meat that I'm eating on my plate isn't actually coming from an actual animal that has to have their life be taken.*
>
> **Female Gen Z, US**

They believe it can become mainstream if quality and affordability improve and are open to consuming it in daily life.

> *If it's maybe $1 or $2 more expensive, I would be willing to incorporate into my everyday life.*
>
> **Female Gen Z, US**

Rationalists

Rationalists want rigorous testing, transparent labeling, and clear safety evidence before forming opinions. They tie acceptance to real world experience, saying they'd consider trying cultivated meat if taste, price, and nutritional value are comparable to conventional meat and if its environmental benefits are supported by robust and verified lifecycle data.

> ***If it's something where it's a protein and my body is going to denature that and I'm going to end up consuming it, there's no liability quite frankly.*** *It's not really any different than eating a farm-raised cow.*
>
> **Male Millennial, US**

> *I wanted to try it, but have not had the chance. [...]* ***Regardless of nutrition, at least the taste and texture must be good.***
>
> **Female Millennial, China**

Skeptics

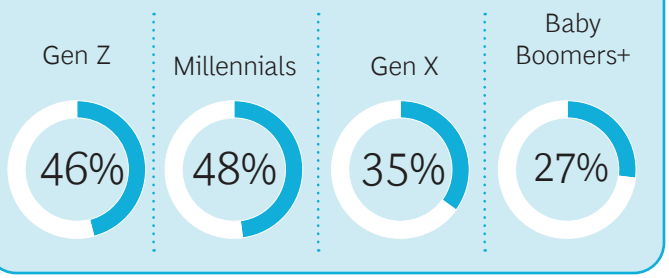
Skeptics distrust the very concept of meat produced outside conventional methods and animal rearing. They express strong concerns about processing and "messing with nature", viewing cultivated meat as a step too far from traditional food systems.

> ***I actually feel that we're moving further and further away from nature*** *– or rather from human nature, from how we're supposed to live. We have so many things shipped in, so much is artificially created, and I think that in the places where we are born, nature basically provides us with everything we need to live.*
>
> **Male Baby Boomer, Germany**

Gen Z in focus

Appeal toward the idea of cultivated meat varies by generation. Similarly to NGTs, young people are more accepting than older generations.

Generational positivity toward cultivated meat[2]



But their openness is conditional curiosity more than endorsement. Ethical and environmental motivations resonate strongly with this cohort, especially around animal welfare.

> ***[I am] mainly hopeful – that animal suffering could be prevented and that livestock farming could be reduced**, which also has many further positive effects, such as on the climate and the environment.*
>
> **Male Gen Z, Germany**

> ***It doesn't feel right. [...] I think it's taking advantage of science and using it for the wrong reason.***
>
> **Female Gen Z, US**

Alongside older generations, Gen Z share unease around artificiality and distance from nature.

However, unlike older skeptics, Gen Z's hesitation is forward-looking rather than nostalgic. Their concerns focus less on tradition or upbringing, and more on potential health effects, processing, transparency, and governance. This younger cohort is less worried about what may 'no-longer happen', and more about production processes, consequences over time, and who will ensure safety as it unfolds.

This makes Gen Z more open to persuasion, if addressed through transparency – clear labeling and honest explanations on production processes and responsibility are essential premises toward Gen Z's further approval.

Outlook

Cultivated meat has the potential to move from emotional flashpoint to cautious mainstream if it can match conventional meat on taste, price and convenience, while making its safety, nutritional value, and climate/animal-welfare benefits visible and independently verified.

The large neutral middle remains undecided, but could move toward openness with clear labeling, honest communication about how cultivated meat is made, and reassurance that farmers and rural economies will be meaningfully supported through transition. However, should rollout feel opaque or corporate-driven, cultivated meat risks solidifying as a symbol of “unnatural food” across markets, instead.

04

Building Trust in Breakthrough Science:
The Innovator's Toolkit

Perspective by:
Aaron F. Mertz, Ph.D., Jylana L. Sheats, Ph.D., M.P.H., and Sejal Goud

Aspen Institute Science & Society Program

Breakthrough science advances through cycles of failure and iteration, yet even promising discoveries stall during the transition from clinical success to widespread societal adoption. Researchers, innovation leaders, and policymakers must therefore consider scalability, regulatory stability, and trustworthiness alongside rigorous scientific validation.

Trust and its precursor, trustworthiness, are distinct concepts, with no universal definition across disciplines[13]. Here, we describe trustworthiness as a function of long-term investment in institutional qualities that make an organization reliable under uncertainty: rigor, transparency, accountability, ethical guardrails, and clarity of public purpose. Trust, by contrast, is a human response—a willingness to accept risk and rely on an organization or technology despite uncertainty.

Breakthrough innovation unfolds within uncertainty. Drug development illustrates this clearly: Approximately 90% of drug candidates entering clinical trials never reach commercialization. Even the most promising science can fail to meet standards of efficacy, safety, or commercial viability[14]. Clinical testing takes place within a well-established system for evaluating efficacy, safety, and risk overseen by health authorities, forming a foundation for societal trust in research and development. Yet regulatory oversight alone does not ensure public confidence.

Companies translating scientific discoveries into real-world applications carry responsibility to demonstrate through organizational structure, governance, and practice that innovation can be trusted and adopted at scale. Capital decisions, governance structures, partnership strategy, and communication practices shape public perception long before controversy arises. The call for multi-stage responsibility emerged clearly in national dialogues[1,14,15] convened by the Aspen Institute Science & Society Program examining declining public confidence in science: trustworthiness, not just reputation, is a precondition for trust

and impact. Participants in Aspen roundtables across public health, climate, food systems, and AI emphasized that treating credibility as a communications problem rather than a structural one reaches limits. The experience from our convenings is that breakthrough science requires leadership willing to design institutions worthy of confidence before external pressure demands reform.

Evidence competes in a fragmented information environment

As described in an analysis published in *Nature Reviews Immunology*[16], scientific rigor operates within a crowded information environment where evidence-based findings often compete with alternative interpretations. Research examining the drivers of public trust[16] further shows that perceptions of transparency, shared values, and institutional integrity shape whether evidence receives serious consideration or gets dismissed.

Work emerging from Aspen's INFODEMIC initiative[17] illustrates how emotionally resonant narratives often travel farther online than peer-reviewed scientific research. This competition for attention is intensified by algorithms designed to reward outrage over nuanced explanation. The consequences of a highly fragmented digital ecosystem were emphasized at Building Trust in Science for a More Informed Future[18], a conference convened by the Aspen Institute in collaboration with The MIT Press. In a keynote discussion, former NIH Director Francis Collins reflected on how scientists "missed the chance to use the pandemic as a teachable moment about how science works," because "guidance changed without clearly naming uncertainty upfront, feeding confusion and mistrust."

Rigorous science demands leaders who can distinguish evolving evidence from manipulative narratives, articulate uncertainty clearly, and anticipate vulnerabilities and reputational risks before they escalate and require reactive communication. As innovations such as AI, gene editing, advanced materials, and climate intervention move from abstract promise to everyday reality, reactions often shift from optimism to conditional acceptance or neutrality, depending on perceived agency, safeguards, and accountability.

Expectations of credibility vary across generations and contexts

Trust is unevenly distributed across society. Younger generations often evaluate institutions through transparency, alignment with societal values, and opportunities for participation. Their questions go beyond technical performance: Who benefits? Who governs? Which tradeoffs are acknowledged? Findings emerging from Aspen's work on informal STEM education show that authenticity and visible alignment with social purpose shape credibility more than publication record alone[19].

For companies developing breakthrough science, leaders must anticipate scrutiny from multiple directions. Regulatory compliance provides basic legitimacy, but innovators must go beyond requirements to meet public expectations. Integration of ethics into research strategy, engagement with external expertise, and consistency between stated values and internal practice strengthen resilience. These generational expectations also influence recruitment and retention, as scientists and engineers increasingly seek employers whose innovation strategies align with their stated values. Designing for trustworthiness strengthens internal culture alongside public standing.

The Innovator's Toolkit

Breakthrough science earns confidence through deliberate institutional practice. Across sectors, innovators benefit by implementing four practices:

1. **Name uncertainty early.** Credibility grows when leaders distinguish near-term deliverables from long-range exploration. Acknowledging unknowns and explaining revision processes strengthens resilience when surprises arise, whereas overstatement breeds skepticism.

2. **Make governance visible.** Intent and oversight should be visible from the outset. Funding sources, incentive structures, independent review mechanisms, and acknowledged tradeoffs deserve clear articulation. Operational transparency outweighs abstract value statements, as outlined in Aspen's practitioner guidance[22].

3. **Share guardrails pre-competitively.** Durable legitimacy rarely emerges from isolated actors. Fields like biotechnology build durability when competitors collaborate—with the help of trusted intermediaries—on standards and shared norms before a crisis forces alignment under scrutiny.

4. **Tell evidence-grounded stories.** Data alone rarely persuade. Responsible storytelling connects discovery to societal relevance without distortion[23]. Public engagement initiatives[24] and civic science communication programs[25] expand narrative capacity while maintaining methodological integrity. A growing ecosystem of science communicators and "science influencers" use social media, video, and creative content to make information about emerging technologies accessible to communities that may not encounter peer-reviewed journals.

These fundamentals demand sustained leadership attention. Investment in trustworthiness may appear indirect compared with scientific milestones. However, legitimacy crises impose far greater costs.

Trust operates as a form of strategic capital

Research-intensive industries operate within shared systems of trust and credibility. Fields like biotechnology, advanced computing, climate technologies, and materials science depend on regulatory stability, informed talent pipelines, and broad societal acceptance—conditions that ultimately rest on sustained investment in basic or "pure" science[20]. In this sense, trust functions as a form of strategic capital.

Corporate investment in scientific literacy, transparent standards, independent convening spaces, and broad talent development reflects strategic foresight. Such investment reduces volatility and accelerates adoption of new technologies. Collaborative support for younger generations[21] in STEM also reinforces long-term capacity across sectors. With sustained effort across generations, breakthrough discovery can serve society at scale.

How Society Feels About Breakthrough Science, the series of reports and analyses by our colleagues at Leaps by Bayer, BCG, and Ipsos, advances understanding of how the public evaluates specific emerging technologies and aims to provide actionable learnings. The broader imperative for innovators is clear: growing trustworthiness is essential infrastructure that determines whether breakthroughs take hold. Building that foundation has never been more essential.

05

Implications

Implications:
Strategies for building social alignment

Taken together, the findings show that societal reactions to breakthrough innovation are shaped not only by awareness and scientific knowledge but also lived experiences, values, and a broader sense of trust in the systems that govern them. These reactions are shaped by distinct – but fluid – mindsets that people move between depending on the technology and context. Across technologies, acceptance hinges less on scientific promise than on accountability, clear boundaries, trustworthiness of organizations pursuing innovation and confidence that risks are understood and managed.

But how can innovators work together with policymakers and other stakeholders to build the trustworthiness that cements societal alignment around breakthroughs, enabling innovations to create impact? Which channels and messages can be most impactful, and what is at the core of an effective engagement strategy?

Understand the audience: speak to distinct mindsets

Cultural, local, and demographic targeting (e.g., age, income, and education) remain critical to defining an effective communication strategy, but the mindsets defined here can provide meaningful framing. Optimists, Rationalists, and Skeptics, may respond distinctively to levels of detail, messaging and types of proof to feel comfortable with the same innovation.

Optimists: turn early enthusiasm into advocacy. Optimists are ready to support AI, CGT, NGTs, cultivated meat, and likely other emerging tech, if they see concrete benefits and trust the guardrails. They are more likely to respond to reporting, case studies, and pilots that demonstrate the potential of solutions (earlier diagnoses, climate-resilient crops, reduced animal suffering). They tend to be more educated and informed on scientific topics and as such, may command trust and influence on digital channels where they can amplify messages.

Rationalists: build the backbone of durable support. Rationalists want to 'trust but verify'. They seek evidence, independent oversight, and clear explanations of how technologies are tested, reviewed, and monitored. For them, the most persuasive messages come from independent experts, regulators, and news sources rather than companies, and from formats that explain mechanisms, not just outcomes. At the same time, they can't be overloaded with data – they want support in interpreting evidence rather than exhaustive detail. The medium matters. Scientists, researchers, and other experts who communicate clearly and convincingly can have meaningful impact[1].

> *If some regulatory body [...] would give me more security, that someone neutral is evaluating and monitoring it [...] I think it's good that these things exist. There should just be more independent research to increase acceptance.*
>
> **Male Baby Boomer, Germany**

Skeptics: aim for reassurance, not full conversion. Skeptics are driven more by gut feeling and nostalgia for a more 'natural' past than by data. They are most open when communication emphasizes continuity with what they value (human care, natural food, traditional farming) and provides concrete red lines (e.g., no enhancement uses of CGT, strict limits on AI autonomy). When their buy-in is a high priority (e.g., adoption of AI tools to monitor their chronic condition) expert explanations that clearly outline benefits/consequences can be effective.

Tailor engagement by generation

Younger generations: digitally fluent, cautiously sophisticated. Gen Z and Millennials are more positive about many innovations, but also more vocal about risks like bias, privacy, affordability, job loss, and fairness. High familiarity with digital technologies[6] appears to increase scrutiny rather than engender blind trust: younger respondents are quick to spot limitations, exaggeration, or mismatches between promise and lived experience.

As a result, Gen Z in particular tend to respond poorly to polished, one-directional messaging and is more persuaded by transparency, evidence, and acknowledgment of uncertainty that enables them to form their own judgments. Thus, they are more likely to respond well to authentic content that shows how technologies work, who oversees them, and where limits are set; to formats that enable verification (links to studies, regulatory decisions, independent explainers); and to opportunities to participate rather than merely consume (youth panels, patient councils, or climate and food forums). Expert voices matter, but credibility depends on clarity, authenticity, and openness about trade-offs, not authority alone.

Older generations: value continuity, human contact, and institutional assurance. Older respondents are more cautious – particularly toward food-related technologies – and more likely to worry about erosion of human skills, relationships, and established practices. Engagement is likely most effective when innovations are framed as extensions of familiar systems rather than radical disruptions, with clear emphasis on human oversight, institutional responsibility, and the ability to opt out or choose alternatives. Traditional channels (TV, radio, print) remain important alongside digital channels, especially when paired with trusted intermediaries such as doctors, farmers, or regulators.

Channels: bridge the gap between where people are and who they trust

In today's attention economy, evidence-based messages compete with entertainment and emotionally compelling misinformation. Making innovation feel human, relevant, and transparent – rather than distant or institutional – becomes a prerequisite for being heard and trusted[16].

Respondents say they trust doctors, scientists, and regulators most – but discover and consume most science and innovation content via other sources. Platforms like TikTok, Instagram, YouTube etc., deliver content algorithmically, often without users actively searching for it[1].

> *I do not specifically search for that on social media.* ***I actually let my algorithm guide me.***
>
> **Male Gen Z, Germany**

Design for verification, in order to build trustworthiness. Especially younger 'digital natives' expect to double-check information from several sources before acting; they already describe cross-checking social posts with articles or studies. Communication should make this easier by linking to primary studies, regulatory decisions, and independent explainers – not expecting single-source trust.

> ***Well, especially on social media there's a lot of misinformation.*** *That's why, if I see something new that interests me, I usually try to find out first, for example, through other online articles or studies, whether it's actually true, because there are a lot of people who just want attention with statements that aren't even backed up.*
>
> **Female Gen Z, Germany**

Effective strategies layer channels so that the same information appears in a TV interview, a newspaper op-ed, a social media explainer by a doctor, and a podcast conversation with a scientist.

> *Podcasts (alongside friends and family are one of my sources of information), it's partially the topics and then partially I like the organization, or I trust the person speaking. And so,* ***I'll seek out the people I trust and have interesting things to say.***
>
> **Male Gen Z, US**

Credibility strengthens when experts step beyond formal channels and engage directly with communities, telling rich stories to show how discovery connects to daily life[15].

Build trustworthiness at the core of governance

Move from communication to participation. Prioritize listening over debate and invite communities to take part in a genuine two-way dialogue. People want chances to ask questions, voice concerns, and see that their input matters. Patient advisory boards, farmer roundtables, public Q&A sessions, livestreamed lab tours, and community tastings can all reduce psychological distance and increase perceived legitimacy.

Build continuity of engagement. Trust grows when the same organizations and people show up over time, update information as evidence evolves, acknowledge limitations, and report both successes and setbacks. This is especially important for CGT (where long-term follow-up is critical) and AI (where models change rapidly).

Align, as far as possible, the narratives of companies, regulators, and independent experts. People notice when companies promise disruption, regulators promise caution, and scientists emphasize uncertainty in uncoordinated ways. Where feasible, co-developed language on benefits, risks, and boundaries can help Optimists, Rationalists, and Skeptics hear consistency rather than spin.

Trust in breakthrough technologies is shaped early – often before a product reaches the market. Clear, consistent communication must therefore be designed into the scientific and regulatory journey from the outset. Whether in AI, CGT, NGTs, or cultivated meat, explaining purpose, limits, and safeguards with rigor and honesty is essential to durable acceptance. When communication and development move in tandem, innovations are far more likely to be understood, evaluated fairly, and ultimately adopted.

06

Appendix

Technical note / Methodology

On behalf of Leaps by Bayer, Ipsos conducted 21 60-minute web-assisted in-depth interviews with adult consumers in 3 countries: 7 in the US, 7 in Germany, and 7 in China. Fieldwork took place between 22nd September – 7th November 2025. Participants were recruited via online market research panels.

The study aimed to explore the reasoning behind some of the key findings from a previous global online 30-minute quantitative survey (data available in *How Society Feels About Breakthrough Science (2025)*[2]), focusing on understanding what factors drive hopes and fears toward breakthrough technologies.

Specifically, the interviews focused on 4 technologies:

- Artificial Intelligence (AI) tools to advance medicine and health
- Cell and Gene Therapies (CGT)
- New Genomic Techniques (NGTs)
- Cultivated Meat

Topic definitions* were used throughout the interview to avoid any bias due to misunderstanding of technical terms.

To qualify for the interviews, participants had to:

- Be between 18 and 80 years old
- Must be at least somewhat knowledgeable about Artificial Intelligence (AI) in healthcare, and at least one other breakthrough technology (Cell and gene therapy, New genomic techniques (NGTs), Cultivated meat)*

- Be comfortable to talk about at least Artificial Intelligence (AI) in healthcare and one other breakthrough technology in a 60-minute interview setting
- Not be affiliated with relevant industries
- Have access to a desktop or laptop computer to participate in the interview

Firm quotas were set to recruit respondents across generations, with a focus on Gen Z (due to their 'digital native' status and research suggesting they have an outsized influence trends and media compared to other generations):

- n=4 Gen Z respondents (aged 18-27) per country
- n=1 Millennial respondent (aged 28-43) per country
- n=1 Gen X respondent (aged 44-57) per country
- n=1 Baby Boomer+ respondent (aged 58+) per country

Flexible quotas were also used to recruit respondents with varied opinions about the four breakthrough technologies and other topics of interest e.g. trust in health authorities.

* Topic definitions:

- **Artificial intelligence (AI)** tools to advance medicine and health, e.g. AI tools that augment the work of physicians to interpret patient data to accelerate diagnosis.
- **Cell therapies** transfer living cells to a patient to prevent or treat diseases caused by damaged or malfunctioning cells. Gene therapy uses genetic material to address genetic diseases including Sickle Cell Disease, as well as some acquired diseases, like heart failure. There are thousands of cell and gene therapies in clinical trials globally. If successful, many of these therapies aim to deliver permanent or curative treatments.
- **New genomic techniques (NGTs)** are innovative tools that can introduce small, precise genetic changes to crops, like those that occur naturally or through conventional breeding techniques, unlike Genetically Modified Organisms (GMOs). Scientists use NGTs, such as CRISPR technology to edit genes, or RNA Interference (RNAi) to 'mute' genes. These methods are used to develop crops with improved resilience to climate change, increased freshness to reduce food waste, enhanced nutrition, and other benefits.
- **Cultivated meat** is genuine animal meat that is produced by growing animal cells directly. This production method eliminates the need to raise and farm animals for food. Cultivated meat is made of the same cell types that can be arranged in similar structure as animal tissues, thus replicating the taste, texture, and nutrition of conventional meat.

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