

Deloitte.

Unlimited Reality™

The responsible internet imperative

Earning trust in AI and xReality

HOW MIGHT C-SUITE EXECUTIVES ...

- Learn from unintended consequences of past technological advancements?
- Explore how to develop xReality strategies to capture opportunity responsibly?
- Get started to evolve toward a more responsible internet?



We are at a profound moment in human history.

Widespread digitization of human intelligence and the physical world is driving seminal shifts in how people create, interact with each other, and experience the world. While the vision of an online world indistinguishable from the physical world may be years away, the outlines of where we are headed are visible today.

Deloitte refers to this next revolution of the internet as Unlimited Reality (xReality). xReality represents a convergence of shifting behavior and several technologies rapidly maturing for mainstream use, including AI, AR/VR devices, 3D rendering, Internet of Things, blockchain, digital assets, and advances in connectivity and computing power.

Much like the introduction of the Internet, social media, and smartphones, the age of xReality generates new opportunity to create value—as well as harm.

60%

of the world's population is online¹

50%

of American Millennials and Gen Z connect in video games and social media as much as the real world²

25%

of people worldwide are predicted to spend at least 1 hour per day in xReality experiences by 2026³

Advances in technology have created immense benefits, but also unintended consequences

xReality may bring about an online integration between physical identity, data ownership, and daily life at a level we do not experience with the internet of today. But it also presents barriers—accessibility constraints, cost-prohibitive devices, and connectivity requirements.

Unintended consequences to individuals, society, and the environment will likely increase in frequency and complexity. Executives across every industry should be prepared with a strategy to navigate xReality responsibly.

Organizations without a strategy should expect to face the loss of stakeholder trust, billions of dollars in fines, and increased media and regulatory scrutiny many technology companies are facing today.

INDIVIDUALS

79% of Americans report being concerned about the way their data is being used by companies⁴



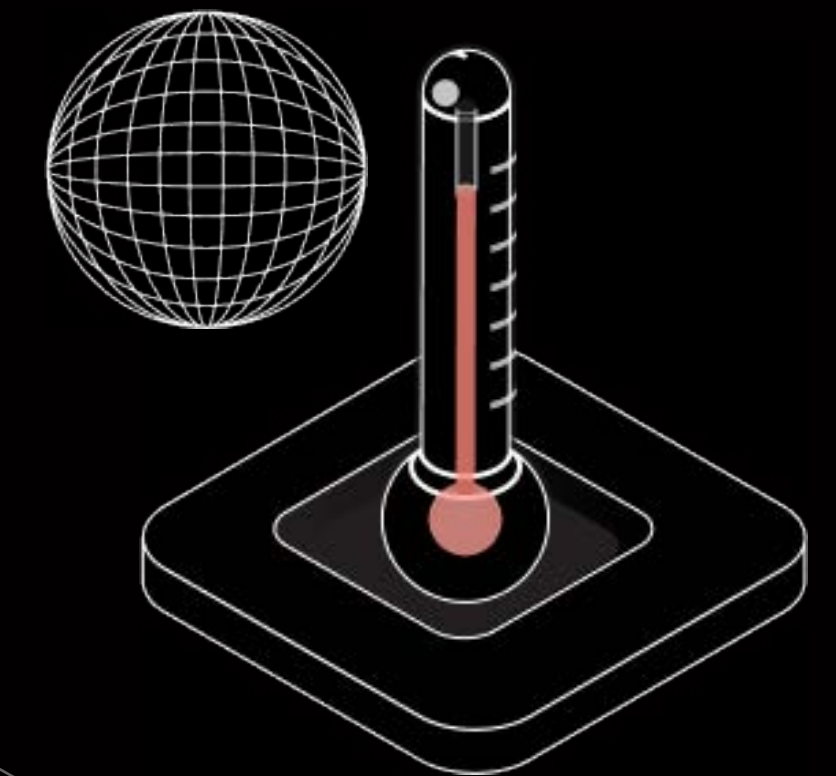
SOCIETY

Up to 39% of 'facts' in 2 major databases underpinning artificial intelligence models were found to be biased⁵



ENVIRONMENT

Training one AI model results in 5x the lifetime carbon emissions of one American car⁶

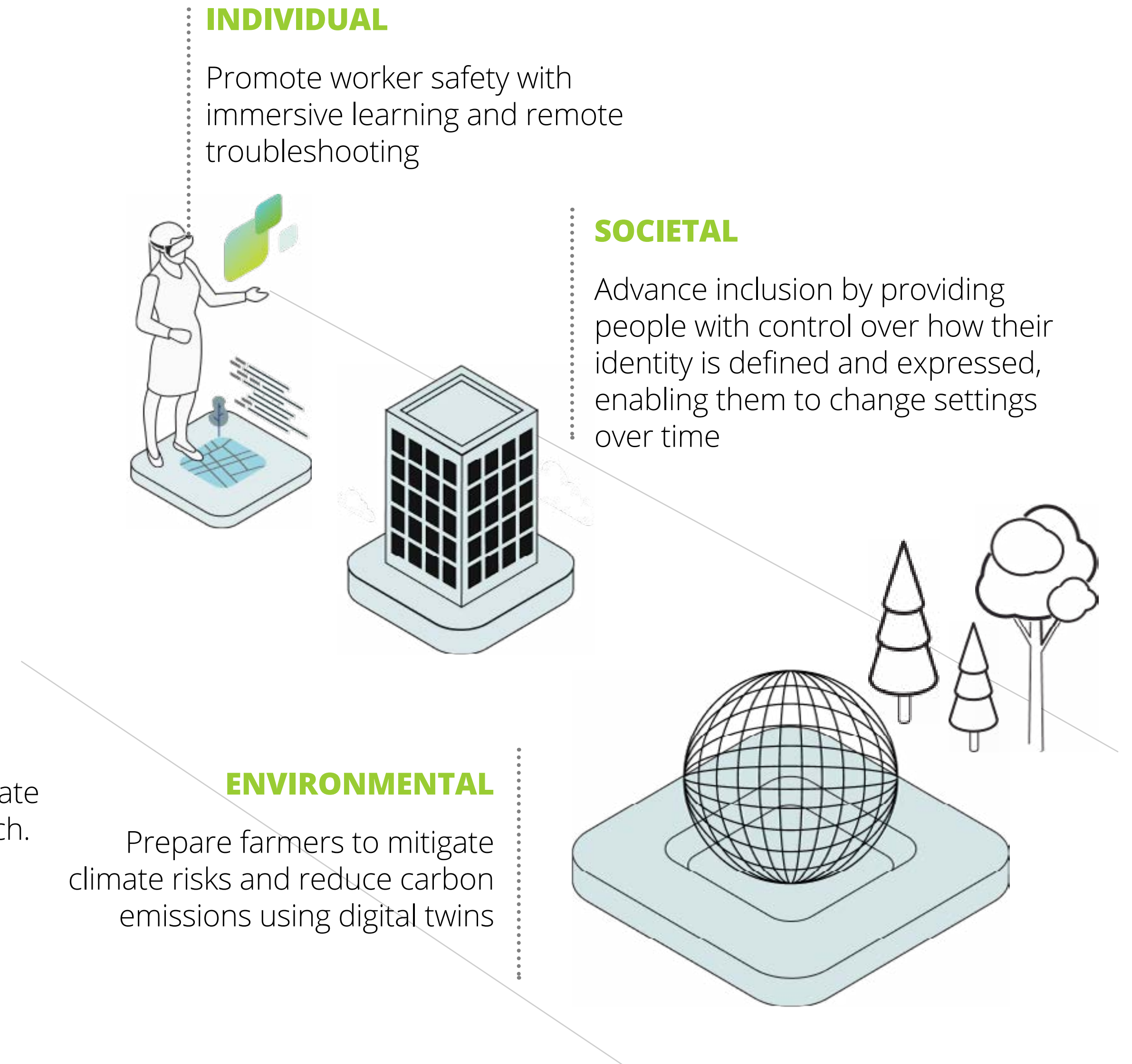


Executives have an opportunity (and responsibility) to design xReality strategies that center their desired societal impact from the outset.

xReality experiences, fueled by AI, are expected to become more integrated, immersive, and energy intensive. But, we can build from a foundational understanding of unintended consequences from previous technological advances.

This is an opportunity for leading companies to stay ahead of disruption and reimagine how to promote the well-being of people and families, advance equitable economies, and sustain our planet. Many organizations are already beginning to explore responsibility as a lever for value creation in xReality. And emerging technologies such as generative AI are making it even easier to simulate new concepts, anticipate potential harms, and develop guardrails prior to launch.

But, a shared vision is needed to responsibly guide the individuals, organizations, and systems building for xReality.



A shared vision for a responsible xReality

We believe **responsible xReality** drives measurable progress toward positive outcomes for safety and well-being, privacy and security, transparency and understanding, equity and accessibility, and environmental sustainability, alongside business objectives through a set of guiding principles.

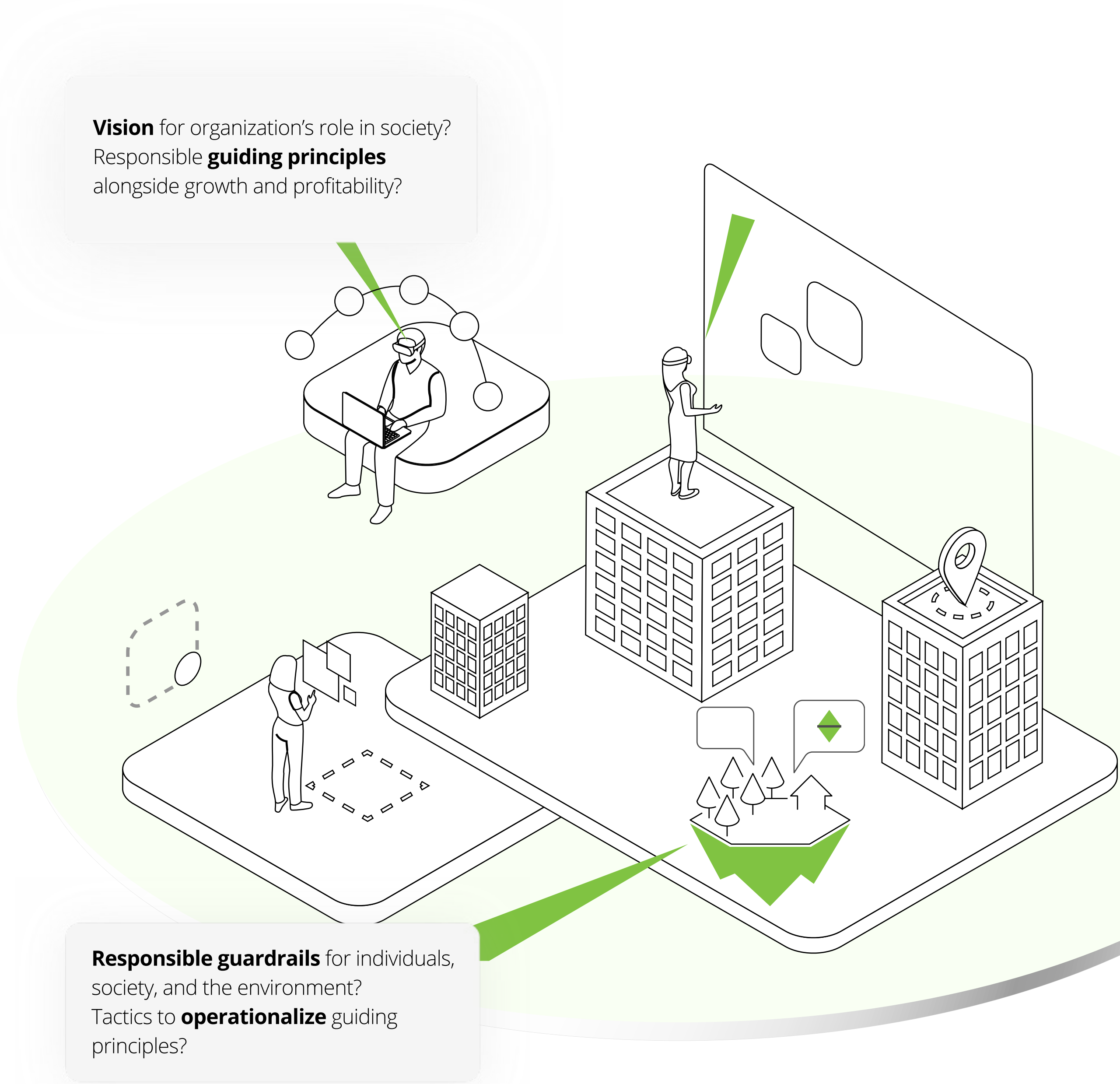
Organizations that integrate their role in society into their business strategies benefit from a 'Purpose Premium':

↑40%
Pricing Premium

↑78%
Brand Recognition

↓64%
Lower supply chain
and logistic costs

Avoid reductions in market capitalization from adverse trust-related events



Privacy and security

Real-world rights and expectations of privacy over personhood and IP are protected, so collection, storage, and use of personal data is minimized, and data security is evidently valued by companies at all times. [Learn more](#)

Transparency and understanding

How xReality technologies and business models work is clearly explained for the general public to understand, and transparency of intentions and decisions by both humans and machines is auditable and open to inspection. [Learn more](#)

Transparency and understanding

xReality technologies are universally accessible and accommodate the fundamental needs of all people. They are built with and for individuals from systematically disadvantaged groups. Harmful biases are mitigated (or absent) in both the underlying data and technological components. [Learn more](#)

Safety and well-being

xReality technologies and business models consider potential interactions, decisions, and context of the experience to minimize physical and psychological harm, incorporate active and meaningful consent, and make well-being assurances evident by design. [Learn more](#)

Environmental sustainability

xReality technologies and business models minimize carbon emissions and consumption of non-renewable energy and natural resources in organizations and promote sustainable behaviors in individuals. [Learn more](#)



Building xReality responsibly is a collective imperative.

No one organization can or will build xReality alone, but many will play a part. Interoperability between technology partners will be critical. But, so will interconnectedness with various stakeholder groups and existing environmental and social systems.



Responsible **xReality Ecosystem**

Companies may play many key roles, but roles may also be driven by individuals or technology itself. Individuals may seamlessly shift between multiple roles as a customer, creator, developer, employee, or investor.



Content, Services & Experience Creators

Individuals, AI, and brands create immersive xReality applications that can be experienced safely as self or avatars that promote inclusive representation



Device Manufacturers

Create universally accessible entry points for individuals and/or enterprises to safely and securely experience xReality



Societal Institutions & Climate Systems

Shape culture, technology, and business decisions, and are shaped by individual and institutional behaviors and interactions



Marketplaces

Create universally accessible xReality platforms that support secure exchange of digital and/or physical goods and services



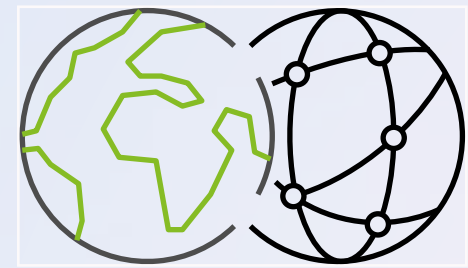
Hyperscalers & Infrastructure

Develop energy-efficient technologies and enabling infrastructure that bring xReality experiences to life with data privacy and security at their foundation

Getting started

CEOs should learn from some of the missteps from companies that drove the last wave of technological disruption and sponsor development of responsible xReality strategies **now**.

Those that do could expect to benefit from new sources of competitive advantage—premium pricing, greater brand **trust**, and improved operational efficiency.



Align the leadership team:

Assemble a diverse leadership team with deep understanding of the technological, societal, and business implications of xReality to help define the organization's strategy and align priorities.



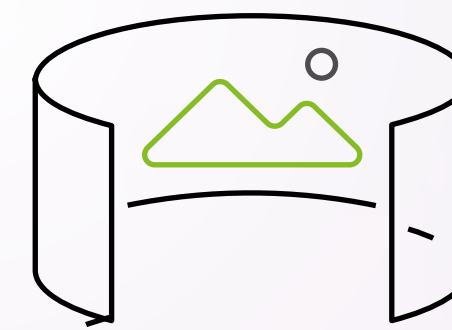
Prioritize value-added use cases:

Lead with human behavior and needs. Learn from past lessons and future scenarios to uncover opportunities, while understanding potential risks. Include plans for how guiding principles will be infused into what is being built and how.



Articulate a responsible vision:

Consider the organization's purpose, mission, and values. Horizon scanning across a set of potential scenarios is a great place to start.



Establish responsible guardrails:

Establish cross-functional governance and feedback loops to monitor ongoing activity and escalate issues. Determine the right operational tactics such as metrics and incentives, including executive compensation, as well as processes and tools to align desired outcomes internally and externally.



This vision was informed by Deloitte's research on trust and ethics in technology and early experience helping executives across industries scenario plan and develop xReality strategies. We seek to engage thought leaders, futurists, academics, executives, creators, and more around the most challenging topics related to responsible xReality.

Continue the conversation



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The evolution of the Internet

Personal computer revolution

At-home personal computers change the methods and tools people use to work and communicate



1980-1990

1980s
Birth of the modern internet²⁰

Information & connection goes digital

Widespread adoption of the internet began shift in information sharing and communication from physical world to virtual world



1990-2000

1994
Early web-based forums are founded, creating virtual channels for people to connect²¹

1995
Haptic technology leverages forces, vibrations, and motions to blend technology with the senses, paving the way for modern capabilities in smartphones and more²²

Internet becomes mobile

High-speed internet connections became widely available, enabling faster and more efficient online activities. Mobile devices enable the internet to be constantly accessible



2000-2010

2001
Websites become repositories for information on detailed topics, positioning the internet as an authoritative source of information²³

2002
3G introduced, shifting online behavior towards mobile web browsing²⁴

2003
Birth of online virtual worlds with mass appeal where people can socialize, collaborate, and role play with others²⁵

2007
Companies gain the ability to own social media pages where they can interact directly with people²⁵

2007
Search engines are simplified into Universal search, lowering the barriers for people to get information quickly²⁶

Global connectivity

Social networking empowers people to make virtual interactions a part of everyday life on a global scale



2010-2020

2008
User generated content proliferates and the creator economy is born

2009
4G introduced, opening the door to a range of on-demand mobile applications and communication methods²⁷

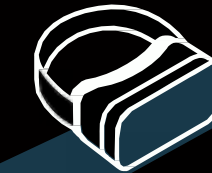
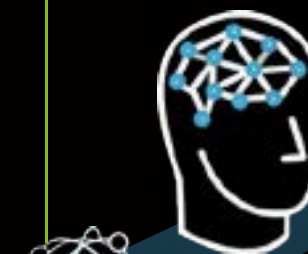
2009
Blockchain is introduced, opening the door to decentralized, digital transactions at scale²⁸

2010
More smartwatch and wearable device brands launch and increase in popularity²⁹

2010
Commercialization of LIDAR spatial measurement technology creating more virtual and augmented experiences in gaming³⁰

Cognitive and spatial web converge

Virtual interactions increasingly become more human and more closely resemble the physical world through AI and other technology advances



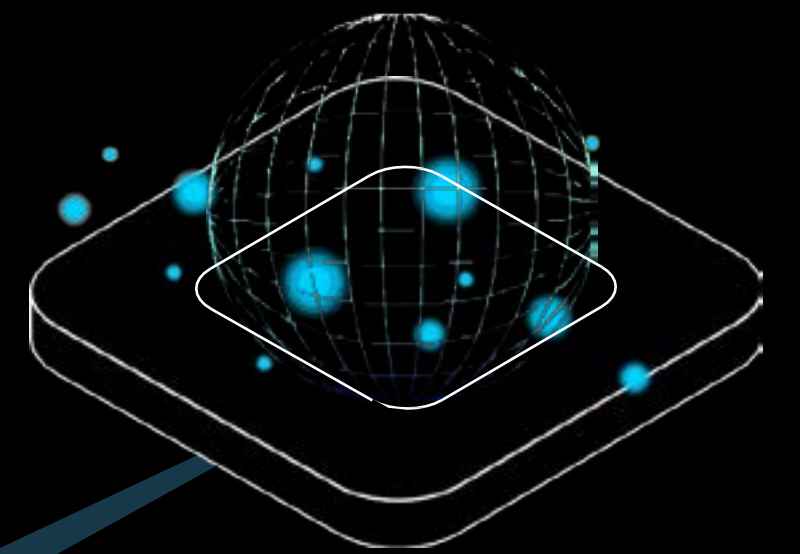
2020-2030



2020
Major technology companies begin launching edge computing zones, enabling low-latency and real-time data processing³³

2021
NFTs go mainstream and multiple brands launch their own projects, becoming an entry point into blockchain technology for the general public³⁴

2023
Large Language Models (LLMs) are released for public use, igniting widespread interest in AI and its future³²



Note: Timeline is not exhaustive, but instead represents key milestones in evolution towards xReality.

Past is prologue

As seen with past technological advancements, issues present in existing societal and environmental systems persist without focused intervention.



INDIVIDUAL

Nearly
90%

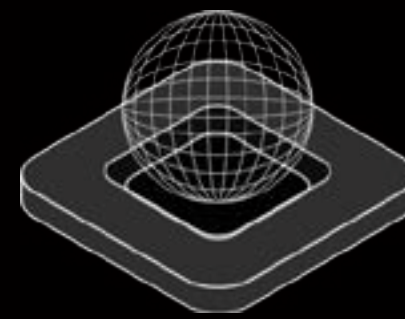
Of people aged 18-34 have witnessed or received **harmful content** online, with potential worsened impacts as experiences become more visceral and immersive⁷



SOCIETAL

6X

Speed that **fake news spreads** versus factual stories on social media platforms, which is eroding trust in companies and institutions⁸



ENVIRONMENTAL

3-4%

Annual growth in electronic waste⁹ polluting natural resources¹⁰, which is predicted to hit 81.6 million tons by 2030 as devices proliferate and new models are more frequently introduced

TAKEAWAY



Executives should develop guardrails now based on greatest risks posed by existing digital technology, while also considering potential misuse of new technologies.

Responsibility is tablestakes

A growing number of people in various roles across sectors consider responsible guardrails to be fundamental to a company's license to operate.



of people say they would boycott a brand due to irresponsible business practices¹¹



higher retention relative to competitors when companies articulate how their business strategy impacts society¹²



of investors are using non-financial performance such as ESG ratings on a weekly basis¹³



decline in trust in the technology sector between 2020 to 2021¹⁴, as sector undergoes increased regulatory scrutiny¹⁵

TAKEAWAY



Responsible governance that considers an organization's broad ecosystem of stakeholder impacts and sentiment is foundational to any xReality strategy.

Human centricity > user centricity

Companies will be out-competed by organizations that exercise Digital Empathy™, viewing people as more than “users” of narrow products or features.



22%

Connected devices in the average U.S. household¹⁶



8+

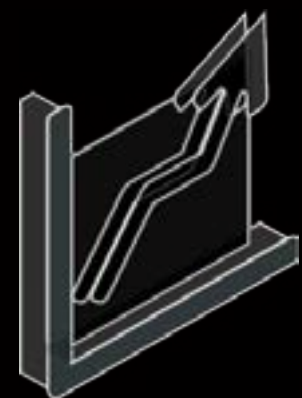
Hours of screen time per day on average, a 1.9% increase from 2021 to 2022¹⁷

More human-centric organizations experience ...



9x

faster revenue growth¹⁸



60%

higher profitability¹⁹

TAKEAWAY



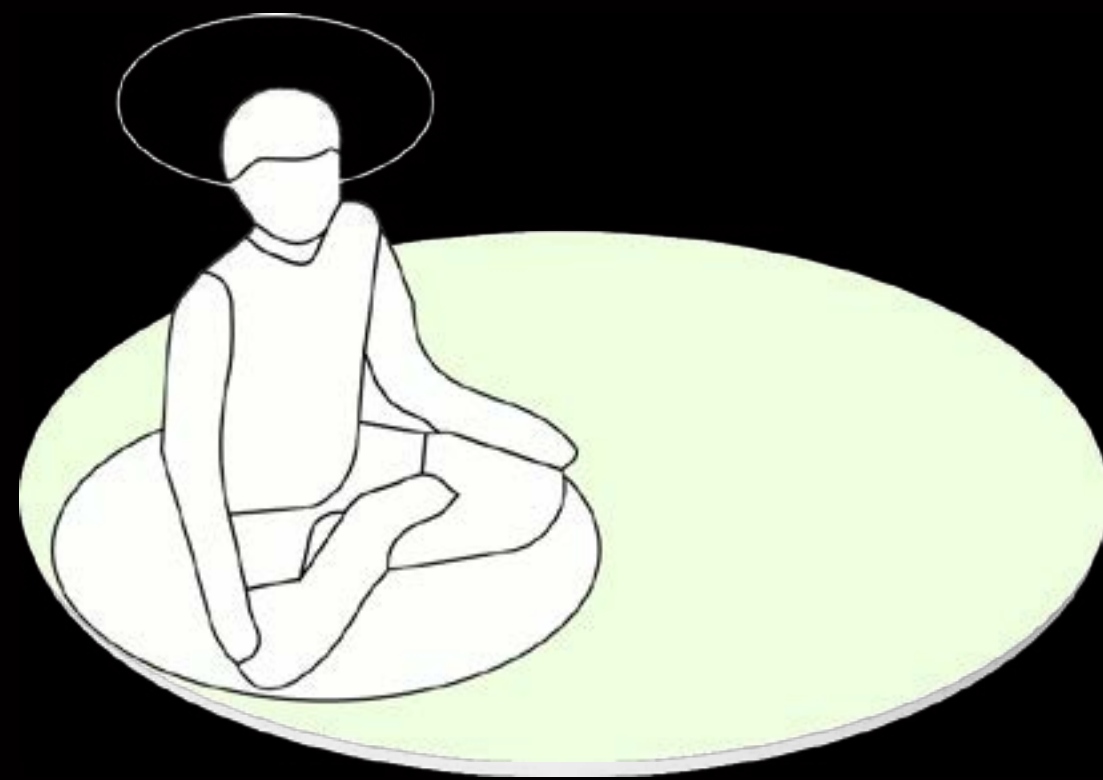
Embed Digital Empathy™ by exploring the complex system of individual interactions, cultural values, and social systems that inform technology use to unlock new ways to create and capture value responsibly.

The Outcome

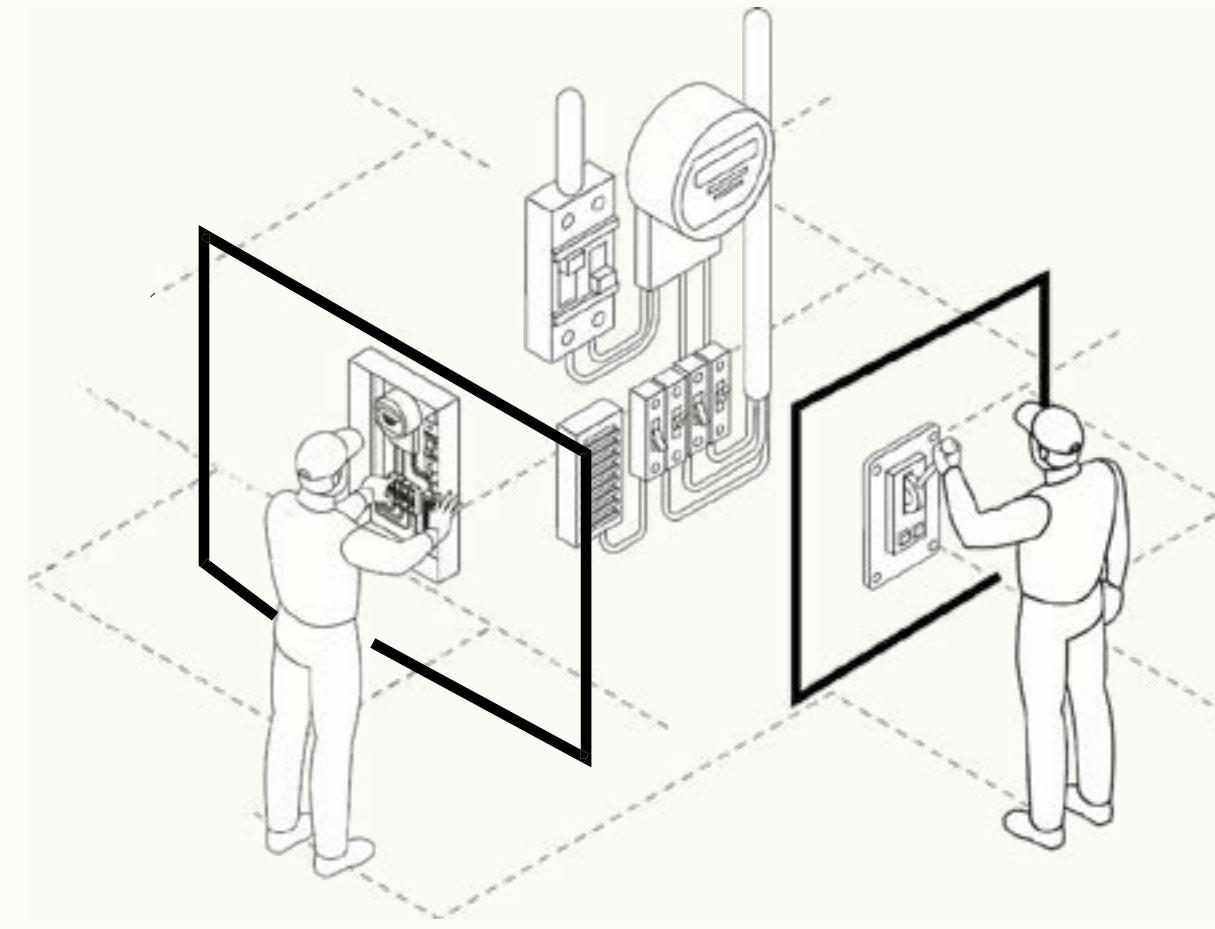
Safety and well-being

GUIDING PRINCIPLE

xReality technologies and business models consider potential interactions, decisions, and context of the experience to minimize physical and psychological harm, incorporate active and meaningful consent, and make well-being assurances evident by design.



CLIENT USE CASE SPOTLIGHT



Exelon

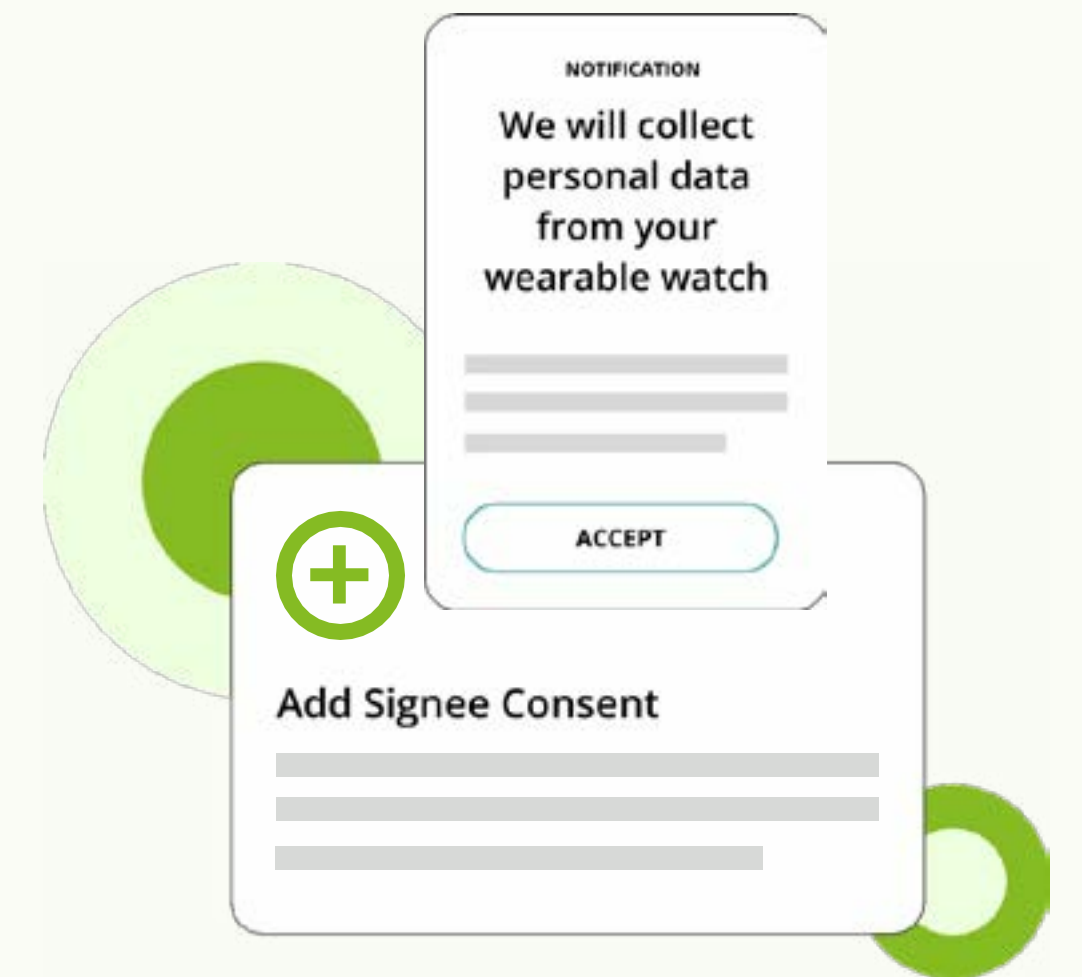
Exelon, the largest utility in the United States, created a virtual version of its electrical substations for training purposes. The trainings are designed to help Exelon's staff build muscle memory for donning protective gear and solving electrical issues without risking their safety, which has reduced safety incidents.

OPERATIONAL TACTICS



Implement technical tools and mechanisms that monitor, detect, and enforce against potential harms. These tactics include rewards, predictive analysis, and/or organization wide ethics policies and practices.

Note: This is not an exhaustive list of tactics.



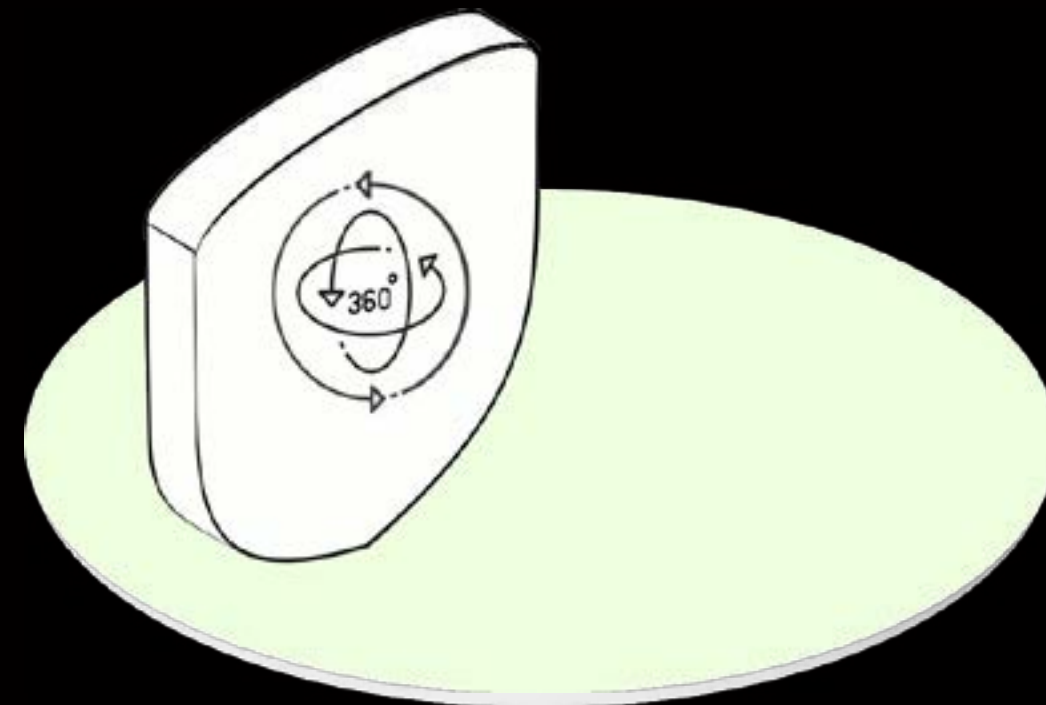
Use concrete documentation, agreements, and terms for ensuring ongoing stakeholder consent as product features change.

The Outcome

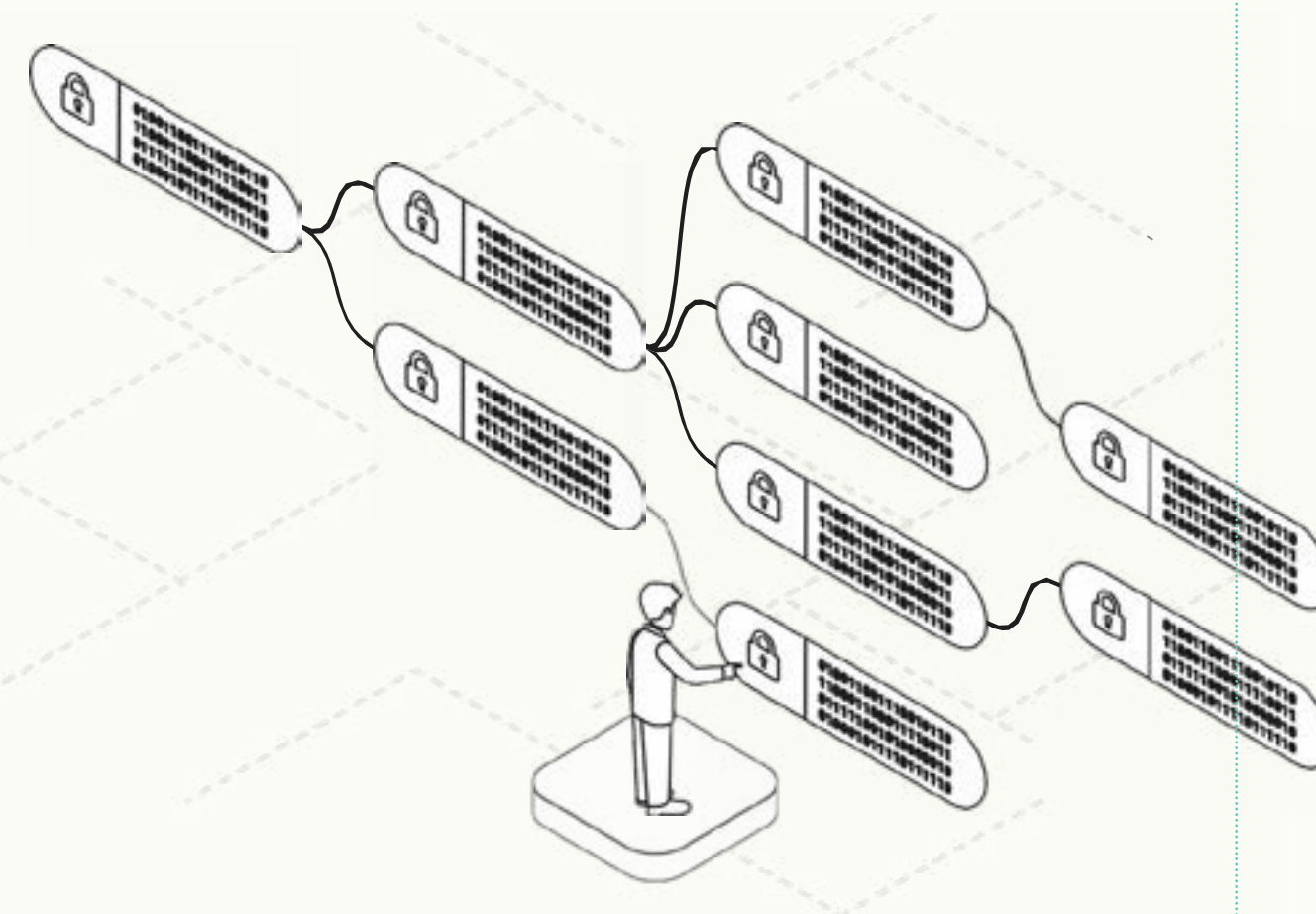
Privacy and security

GUIDING PRINCIPLE

Real-world rights and expectations of privacy over personhood and IP are protected, so collection, storage, and use of personal data is minimized, and data security is evidently valued



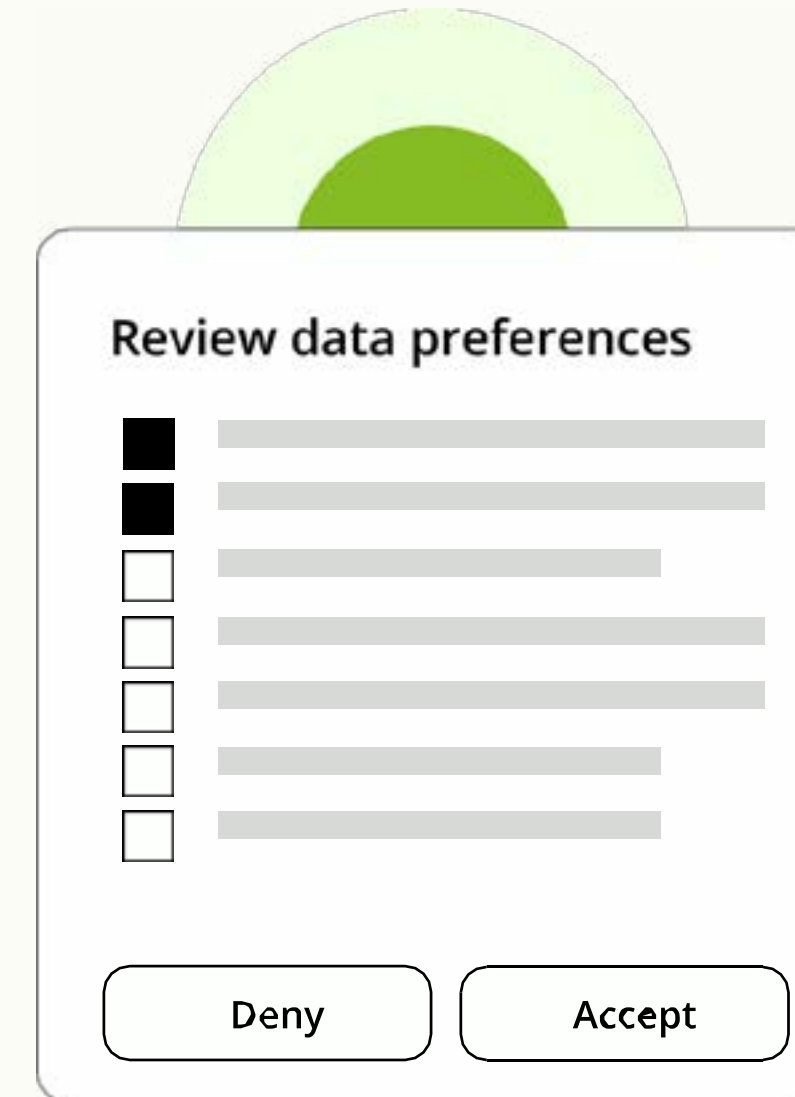
CLIENT USE CASE SPOTLIGHT



New York State

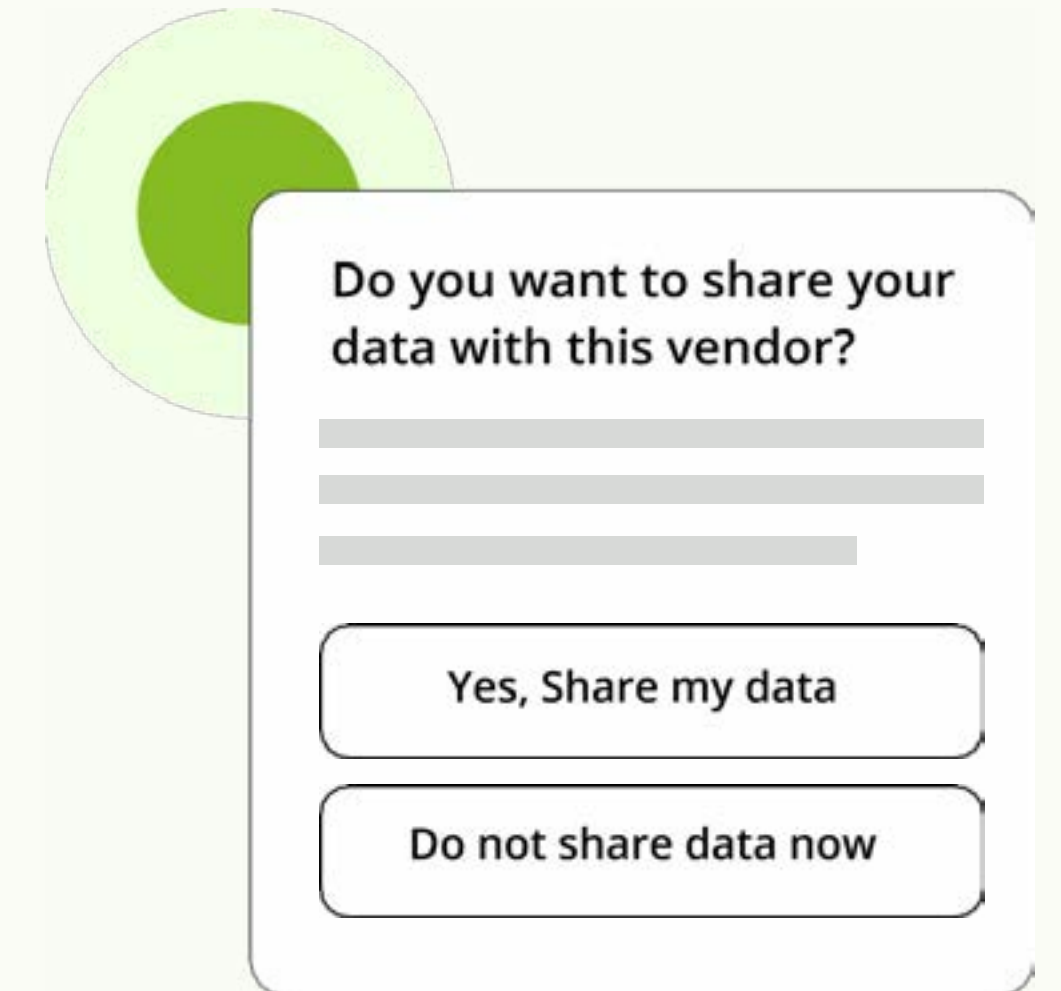
New York State is using blockchain to securely verify identity and credentials, such as Excelsior Pass. The digital health credential allows New Yorkers to securely store and verify negative COVID-19 test results and vaccination records on their mobile phones without sharing other personal health data.

OPERATIONAL TACTICS



Only collect functionally necessary data and abide by stated purposes and durations for storage and use.

Note: This is not an exhaustive list of tactics.



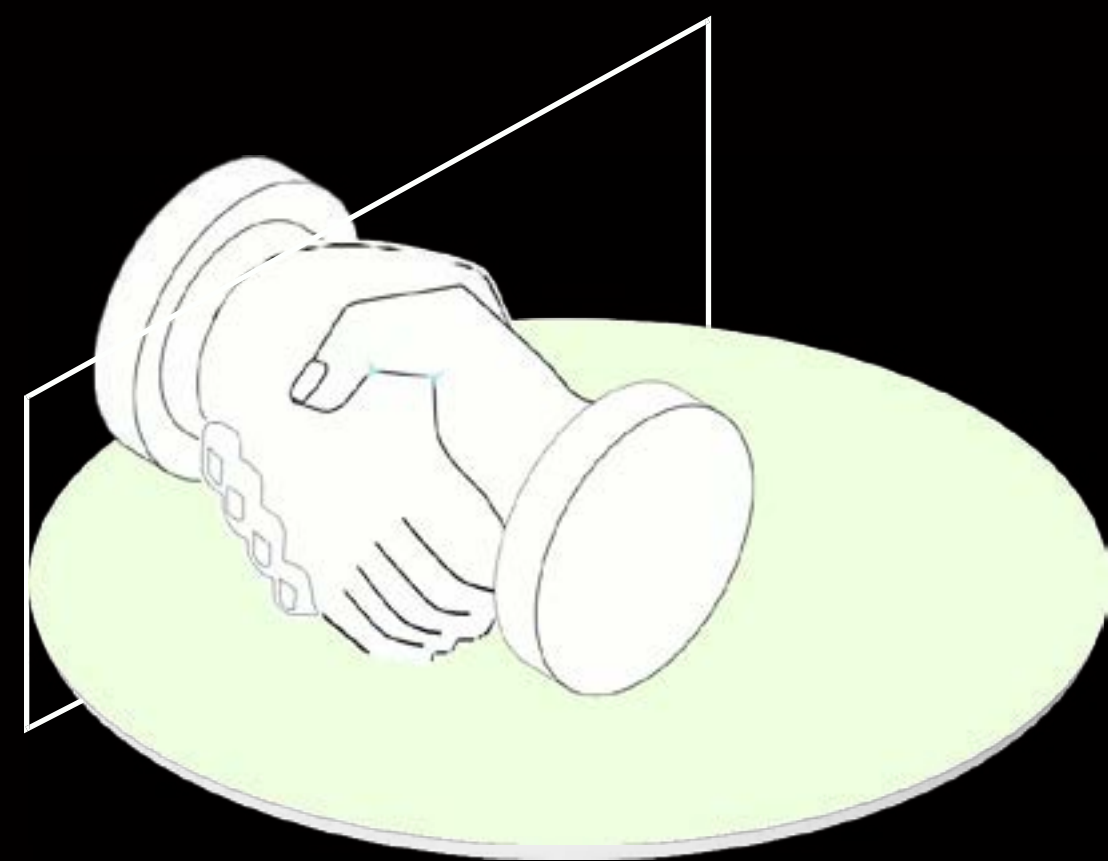
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The Outcome

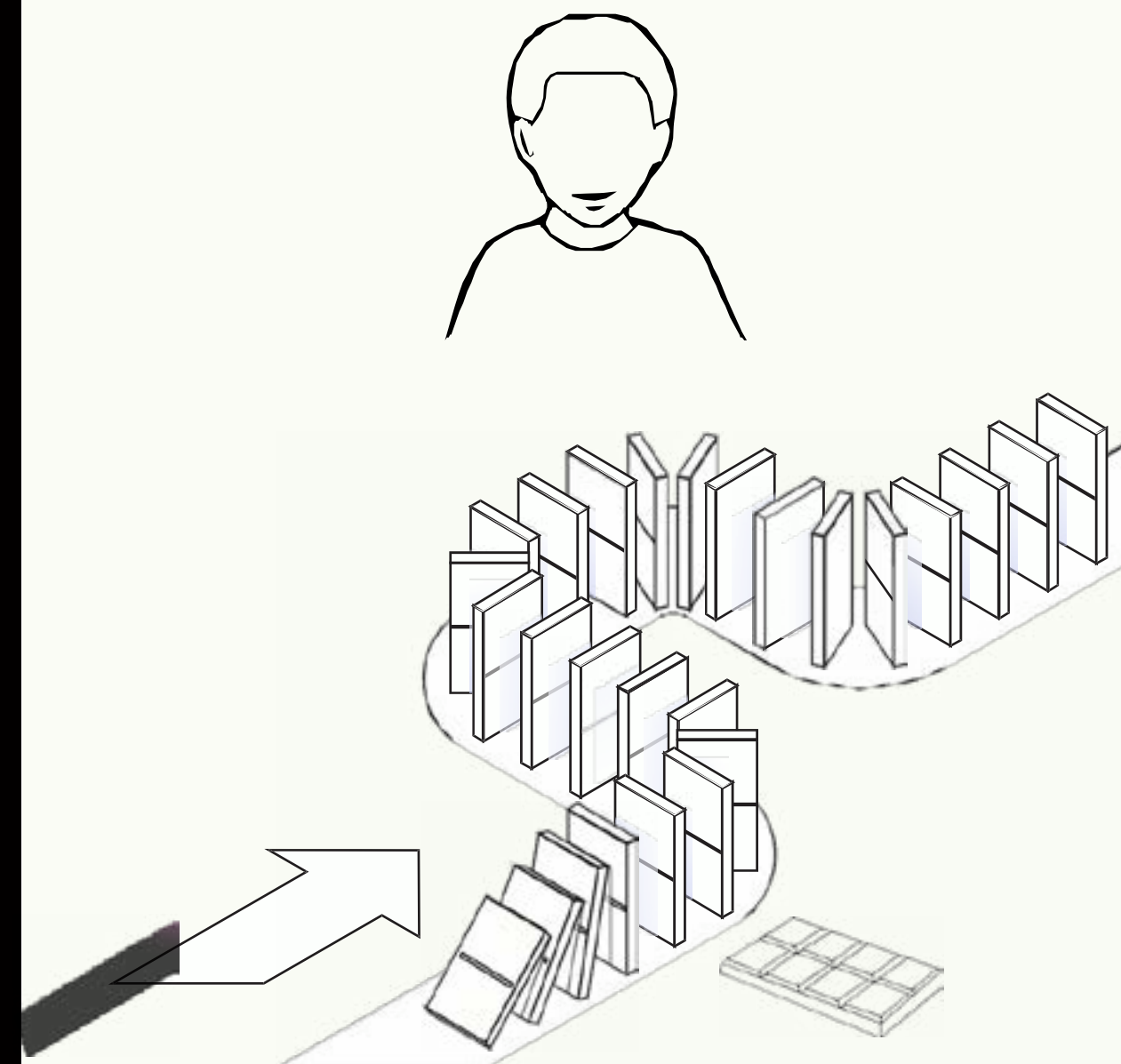
Transparency and understanding

GUIDING PRINCIPLE

How xReality technologies and business models work is clearly explained for the general public to understand and transparency of intentions and decisions by both humans and machines is auditable and open to inspection.



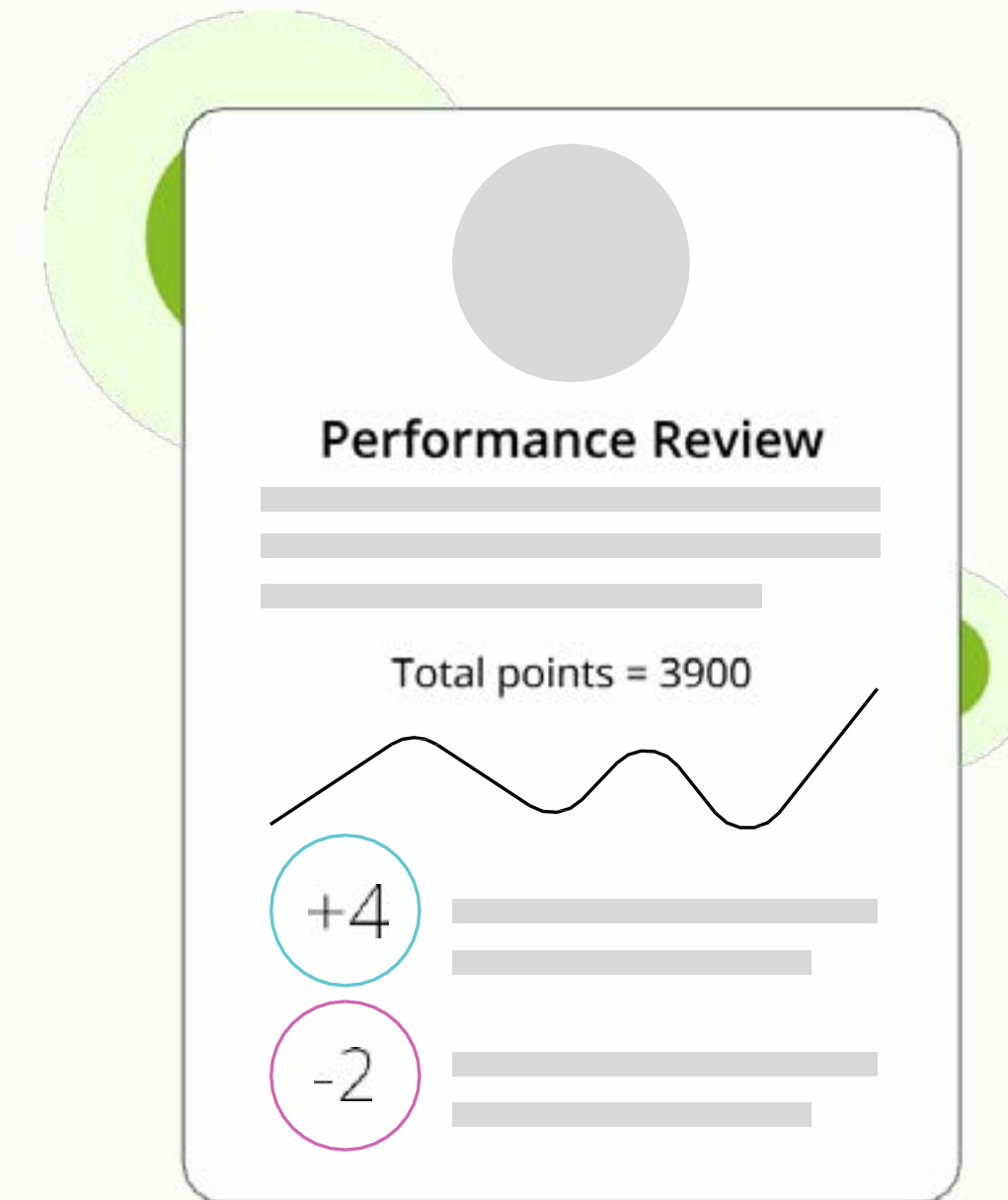
CLIENT USE CASE SPOTLIGHT



Japan International Cooperation Agency (JICA)

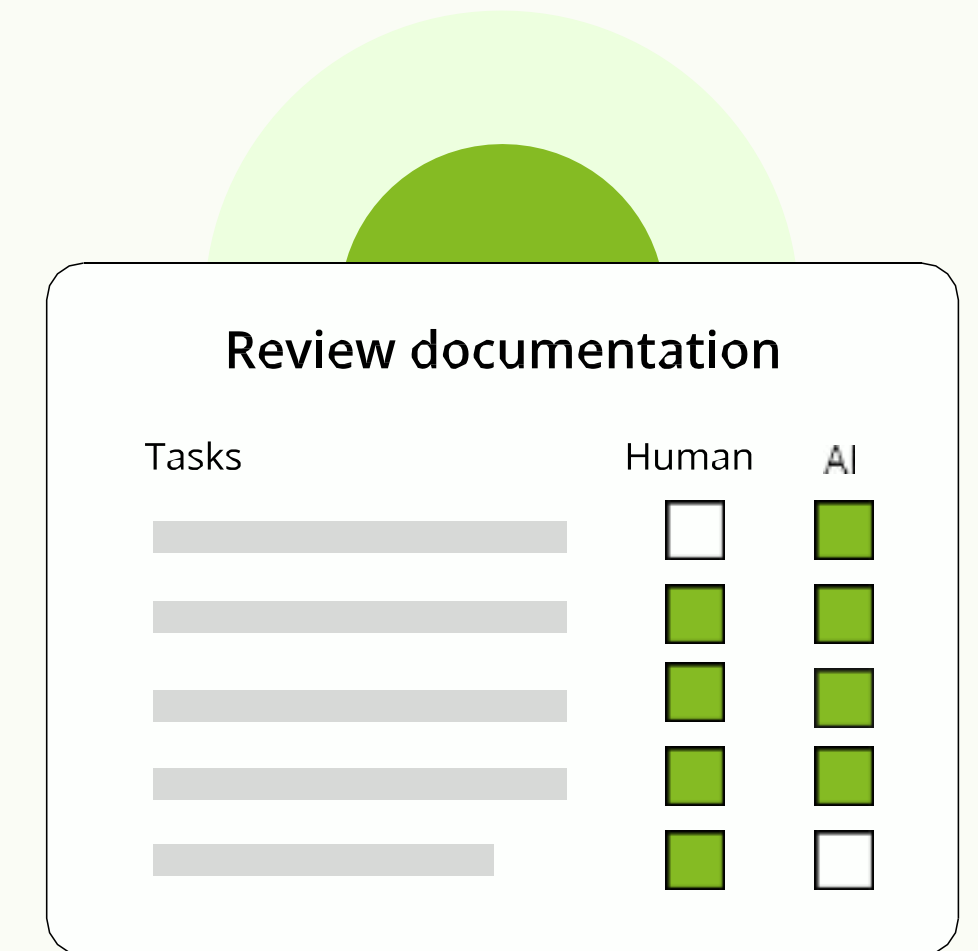
JICA used a blockchain-based system to monitor child labor on cocoa farms and make the entire production process more transparent.

OPERATIONAL TACTICS



Reward teams that develop digital reality technologies that explain decisions in a way that is easy to understand by general audiences, auditable, and open to inspection.

Note: This is not an exhaustive list of tactics.



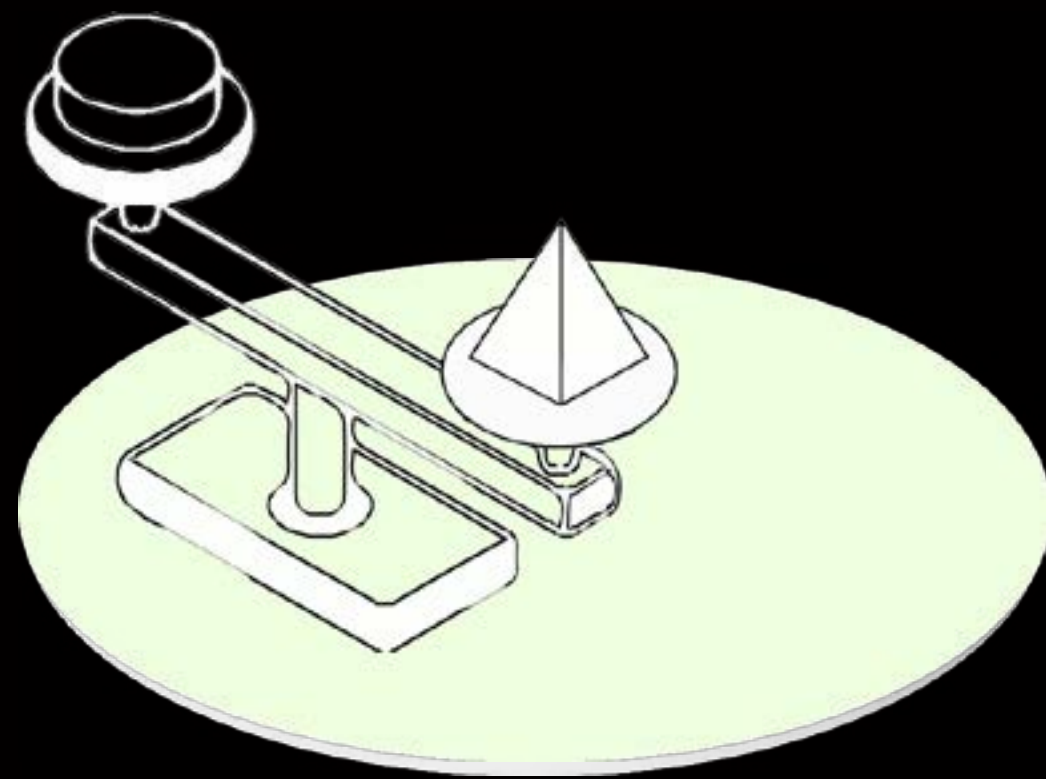
Through guideposts in user interfaces and documentation, identify decision architectures and aspects of digital realities that are automated and AI-driven versus human-driven.

The Outcome

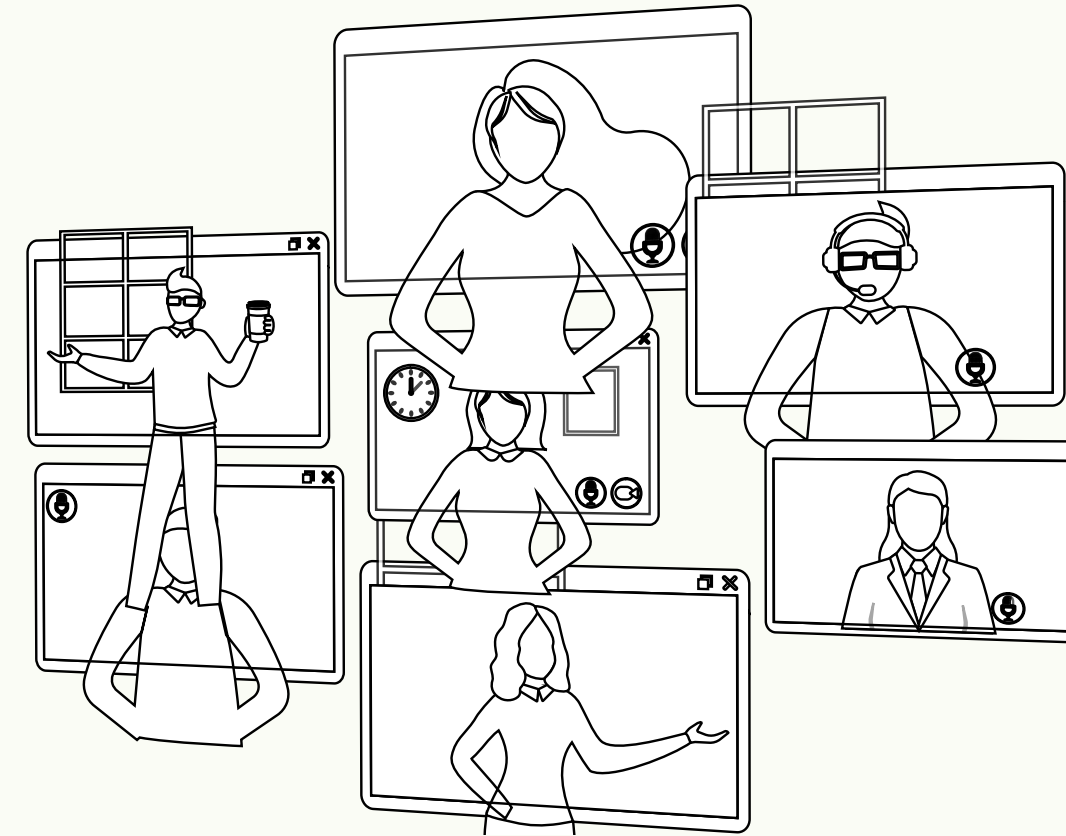
Equity and accessibility

GUIDING PRINCIPLE

xReality technologies are universally accessible and accommodate the fundamental needs of all people. They are built with and for individuals from systematically disadvantaged groups. Harmful biases are mitigated (or absent) in both the underlying data and technological components.



CLIENT USE CASE SPOTLIGHT



Equity-centered design in technology

Several themes have been uncovered in Deloitte's work with technology companies. For content, people expect that it represents diverse identities accurately and makes them feel they belong. From platforms, they value when their safety is clearly promoted and being given agency to tailor the experience to their preferences and needs. Agency could be incorporated by letting individuals select which identity dimensions matter most to them and allowing them to change them over time.

OPERATIONAL TACTICS



Co-create new offerings, policies, and business models with the diverse range of people who will use them in participatory design sessions.



Include accessibility features in first iterations of any new development rather than as a subsequent compliance activity.

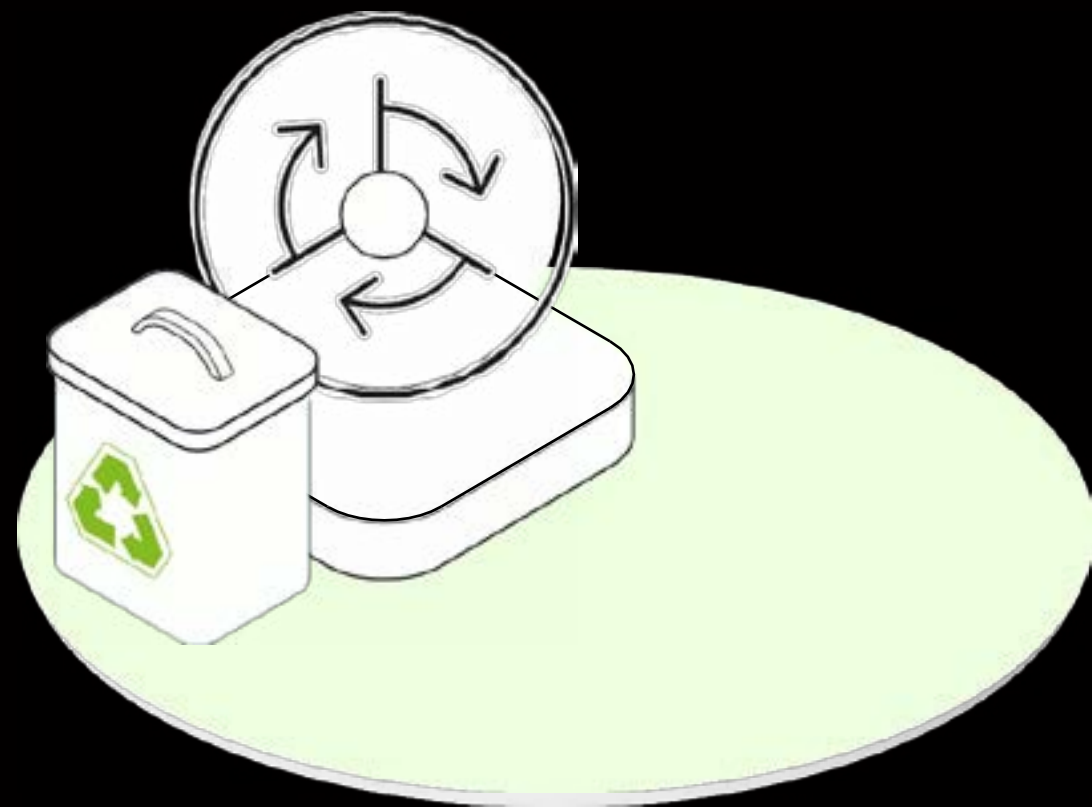
Note: This is not an exhaustive list of tactics.

The Outcome

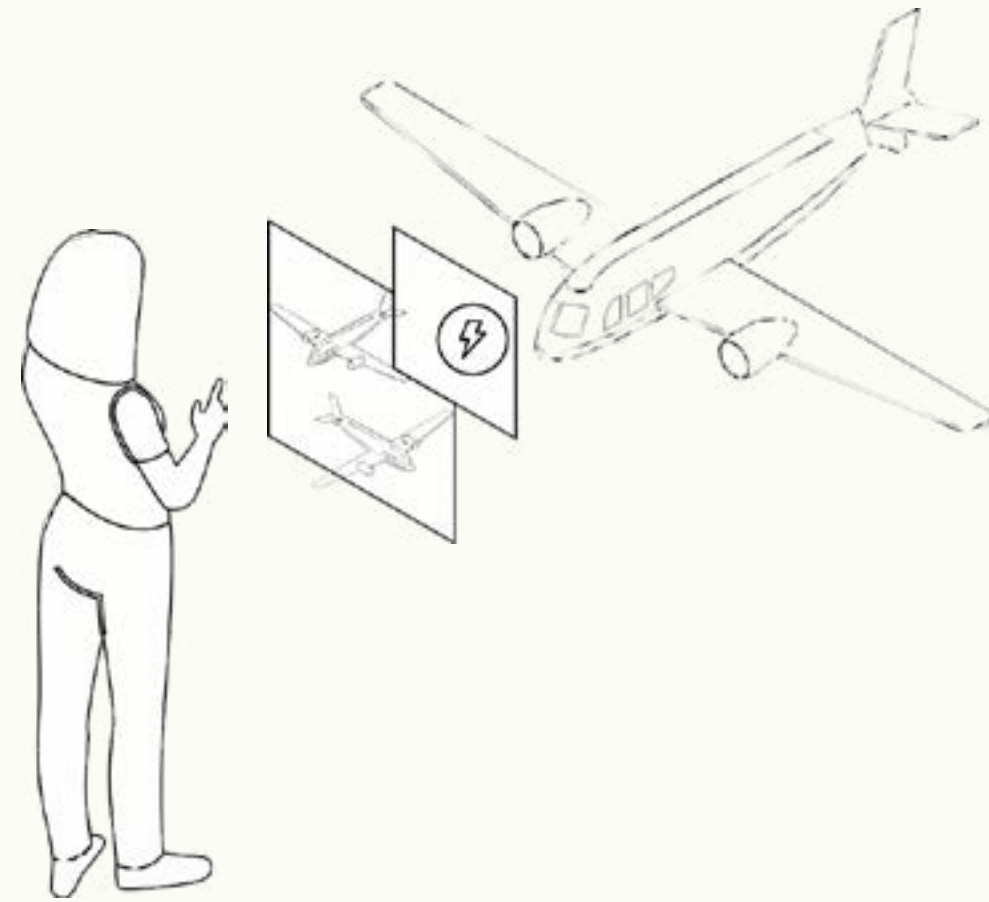
Environmental sustainability

GUIDING PRINCIPLE

xReality technologies and business models minimize carbon emissions and consumption of non-renewable energy and natural resources in organizations and promote sustainable behaviors in individuals.



CLIENT USE CASE SPOTLIGHT



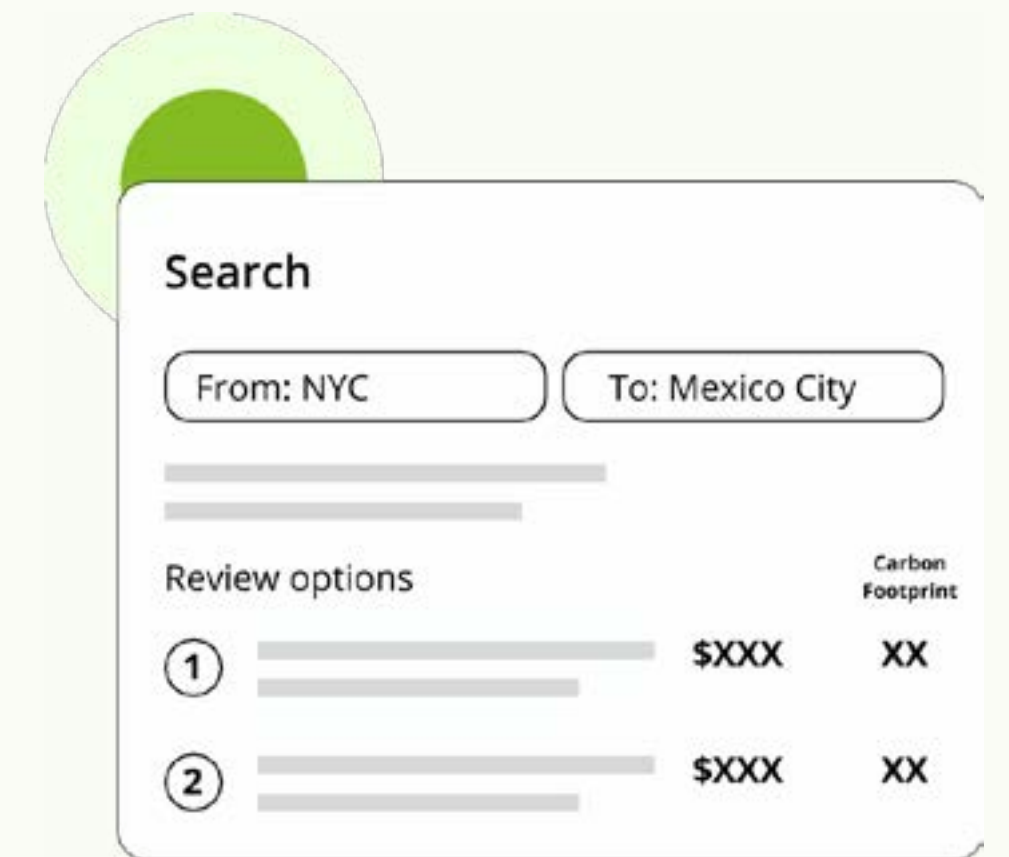
Deloitte Optimal Reality

The Sustainability Sense solution combines observation technologies with climate projections and adaptation options to help people understand and better prepare for environmental challenges. These insights are being leveraged to build digital twins so Australian farmers can make real-time decisions, the aviation sector can decarbonize through improved fuel efficiency, and ground transport operators can safely reroute drivers during climate events such as wildfires or floods.

OPERATIONAL TACTICS



Build and/or select data centers that prioritize minimizing carbon footprint by filtering them through climate impact assessments.



Build mechanisms (rewards, financial compensation, restrictions) that incentivize positive behavior and educate stakeholders internally and externally around opportunities to reduce their environmental footprint.

Note: This is not an exhaustive list of tactics.

End notes

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