What if quantum theory inspired innovative solutions to global challenges?

20 Quantum X

UNCERTAINTIES

Systems, Technology

MEGATREND (Most significant)

Future Humanity

TRENDS

Cross-Sectoral Partnerships Future of Purpose & Work Mobilising Innovation

TECHNOLOGIES

Artificial Intelligence Quantum Technologies

SECTORS IMPACTED

All Sectors

KEYWORDS

Artificial Intelligence Climate Change Mental Health Quantum Theory Uncertainty Within Reach

Transitional

Visionary

Quantum theory provides a unique way to address and unpack complex global challenges, from climate and health to urban development and logistics, inspiring a new set of innovative solutions.



WHY IT MATTERS TODAY

The need for innovative solutions to global challenges is pressing. Increasingly borderless, the information and communications technology sector grew by an average of 6.3% between 2013 and 2023, three times faster than the economies of 27 out of 38 countries in the Organisation for Economic Co-operation and Development. 809 Challenges in this increasingly digital world include security, digital literacy, misinformation, disinformation, polarisation and cyberattacks. 810

The way that AI is both complementing and replacing jobs is also creating a sense of generalised uncertainty. Investment in generative artificial intelligence (GenAI) grew from \$1.3 billion in 2022 to \$17.8 billion in 2023,811 and there has been a parallel 53-fold increase in cyber incidents and hazards related to GenAI since late 2022.812 AI is expected to affect 40% of global jobs — up to 60% in high-income economies compared with 26% in low-income countries.813 Although the actual impact of AI on jobs is not clear, there is a risk that AI may increase problems relating to income and wealth inequalities.814

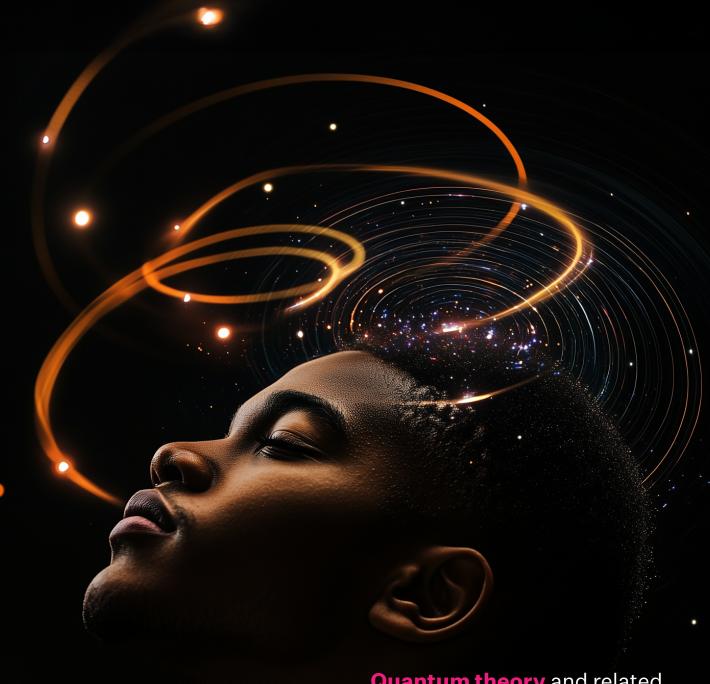
Other global challenges include both mental health and climate change. Approximately 14% of children and adolescents aged 10 to 19 years experience mental health conditions, 815 and across 31 countries, mental health is people's top health concern. 816 In terms of the climate, global temperatures are increasing more than 1°C annually on average and are expected to surpass 1.5–2°C target in the next two decades. 817 A million species are at risk of extinction, 818 and infectious diseases, deforestation and pollution are expected to continue to proliferate. 819 Nonlinear and deeply interconnected, complicated multiscale models are key to understanding the impacts and developing potential solutions. 820

Climate change is accelerating, with global temperatures rising over

1°C

annually, threatening species and exacerbating health issues





Quantum theory and related concepts help unpack how communities evolve in different ways within different contexts and spheres, offering new ways of thinking and creative ways to disentangle increasingly complex challenges



THE OPPORTUNITY



BENEFITS

Application of creative thinking across domains; innovative breakthroughs.



DICKS

Misapplication of quantum principles because of their complexity.

While quantum theory is a branch of physics, related concepts such as entanglement ⁸²¹ and superposition ⁸²² serve as metaphors for an era of rapid shifts, interconnected change, and complex societal challenges. As a result, quantum theory offers a unique lens to explore how communities evolve in different ways within different contexts and spheres providing new ways of thinking to solve increasingly complex challenges.

Quantum theory has been explored in various domains, from philosophy⁸²³ and international relations⁸²⁴ to explaining cognitive processes⁸²⁵ and mental health.⁸²⁶ For example, superposition reflects how human traits exist on a spectrum, shaped through intentional effort and deliberate choices.⁸²⁷ From climate change and healthcare to urban development and logistics, quantum theory helps integrate diverse perspectives, balancing technical, social, environmental and economic factors for robust, sustainable policies and solutions. Beyond quantum technologies,⁸²⁸ quantum principles could guide the redesign of physical and digital working spaces to facilitate collaboration and creativity.⁸²⁹ Quantum theory could offer a deeper understanding of climate patterns and the complex connections between climate mitigation, adaptation and resilience as well as providing insights into emissions for improved carbon accounting.

