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in progress

Innovating for our future

AI, quantum, and an all-electric and connected society

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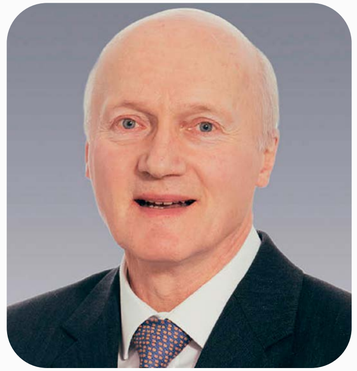

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Director-General,
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In October 2024 BSI, the UK national standards body, will host the General Assembly of the International Electrotechnical Commission (IEC), together with its associated technical meetings and events, for the first time in the UK for 35 years. The theme we have chosen for the IEC week is our global journey towards an all-electric and connected society, which we see all around us through the energy transition and the development and deployment of digital technologies, including Artificial Intelligence (AI).

During the week in Edinburgh, we will engage the IEC delegates and UK based industry, academic and government representatives and interested members of the general public in a series of exciting and high-profile events and functions. We will host a large and innovative outreach programme of industry talks, visits, expo activities, seminars and research and innovation events focused on Smart Cities, Sustainability and the net zero transition and emerging digital technologies (AI and Quantum).

We want to create a legacy from the event that will deliver a significant uplift in public understanding and awareness of how new and emerging technologies can be managed through international standards and assurance to ensure sustainable economic growth and real public benefit.

To stimulate the widest possible discussion during and after our week in Edinburgh, BSI commissioned the surveys and research in this report to better understand the public perception of our global journey towards an all-electric and connected society. I commend this report, *Innovating for Our Future*, to you and hope it will stimulate a lively and informed debate amongst our national and international stakeholders.

Introduction to IEC GM

When the IEC was established in the UK in 1906, within five years of BSI's creation, it was a time of great technological transformation. Motor cars were starting to be seen on our roads, it was the early days of cinema, and the first radio stations were beginning to broadcast.

Nearly 120 years later, the IEC serves to ensure quality infrastructure around the globe and promote international trade in electrical and electronic goods. As this year's IEC GM returns to the UK for the first time since 1989, we are beginning to grapple with new technologies that are shaping society, from artificial intelligence to quantum computing and beyond. The question is how we can move safely and securely towards this all-electric and connected society.

As the UK member body of the IEC, BSI is proud to host this year's event at a time when standards and conformity assessments have a unique opportunity to deliver real impact for the electrotechnical, electronic, and data-driven sectors. Critically, they have a role to play in ensuring that the transition to a digital and electrified future ultimately accelerates progress towards a fair society and a sustainable world.

To mark this year's IEC GM and to understand public perception regarding the use of technology, we have revisited topics covered in research BSI conducted in 2023 and expanded our focus to explore evolving technological advancements. Covering the views of over 4,000 people in four countries, the UK, India, China and Germany[1], this report aims to enhance understanding of the public's perception of what an all-electric and connected society entails.

The research explores the perceived risks and opportunities of technologies like AI and quantum in twofold. First, by gauging how people believe these technologies are already being used. Second, by examining how they think these technologies could be used in the future, and what they perceive as the biggest risks and benefits of widescale technological implementation, leading to the digitization of society.

Technology has immense potential to transform lives for the better and be a force for good. Building trust in this by establishing vital safeguards can help us realize this vision. At BSI, we are committed to partnering across society to navigate the opportunities and considerations of the global transition to an all-electric and connected society.

[1] The research was independently conducted by Censuswide in August 2024, with 4,013 respondents (aged 18+) surveyed across the UK, Germany, India, and China

About the IEC

The IEC is a global, not-for-profit membership organization, whose work underpins quality infrastructure and international trade in electrical and electronic goods. It brings together the NSBs of 170 countries providing a global, neutral and independent standardization and conformity assessment platform for 30,000 experts globally.

Between 21st and 25th October 2024, Edinburgh will host 80 national IEC members, along with representatives from up to 75 affiliate member countries. Around 1,500 experts from businesses, academia, governments, regulators, consumer bodies, and other organizations will gather to discuss the event's theme, *Towards an All-Electric and Connected Society*.

The focus will be on the industry's commitment to facilitating the transition to a digital and electrified future. Key topics include Smart Cities, AI, quantum technology, and achieving net-zero emissions, as well as the electrification and digitization of sectors such as energy, industrial production, healthcare, and mobility – all aimed at creating economically vibrant living conditions for all.

Exploring the data

AI and the workplace

As the possibilities of AI have become apparent, the discussion of the likely impact AI will have on jobs has stepped up. Nearly half of us expect people in our sector to be working alongside AI 'colleagues' by 2050 (49%) rising to 62% in India. Optimism that AI will ultimately create more jobs than it displaces is highest in India (52%) and lowest in the UK (20%).

While many of us will be working alongside AI already, under one in ten across markets think AI could do their entire job (9%) although this rises to 15% for India. Yet people do see a role for AI, with more than half (51%) suggesting AI could do some parts of our role. This is higher than a year ago, when the average for the markets surveyed was 38%[2], suggesting rising understanding of AI's capabilities. There are clear divergences between markets on this point, with 35% of Britons saying AI could do some parts of our jobs, but two thirds of Chinese respondents saying the same.

People also recognize the limitations of AI, with three fifths saying there are parts of their job that rely on skills like inter-personal relationships and communication that AI cannot replicate. In line with this, the general understanding is that AI can be used most effectively to take on tasks that humans do not have time to do (57% say this) and that it requires human oversight (62% make this argument, a slight fall on 2023).

What is clear is that the current pace of AI development and adoption shows no sign of slowing, impacting all elements of life including our work. 57% say we need to be training young people now for working in an AI powered world, rising to 71% in India.

[2] Trust in AI poll, BSI / Cenuswide, October 2023

Figure 1: Expect people in my sector to be working alongside AI 'colleagues' by 2050

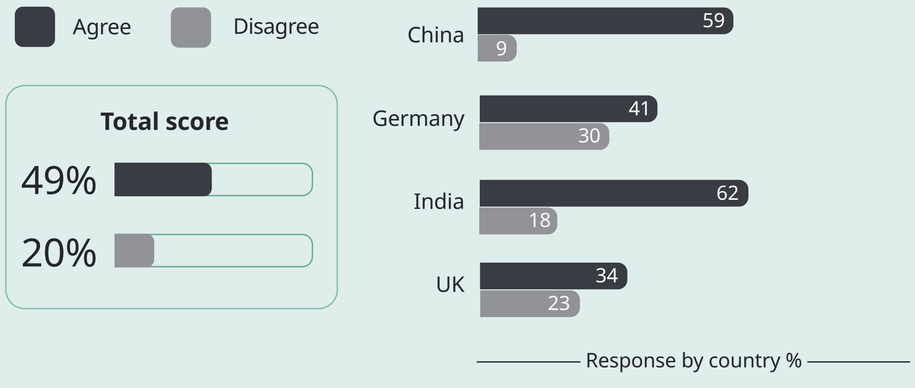
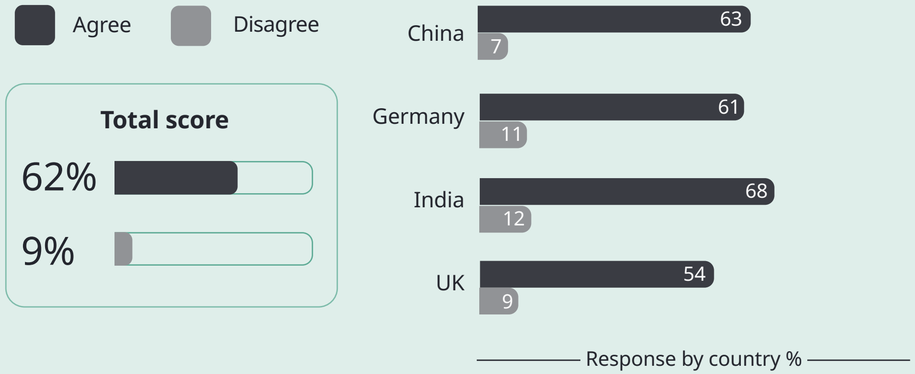


Figure 2: AI can be used most effectively when it is combined with human oversight



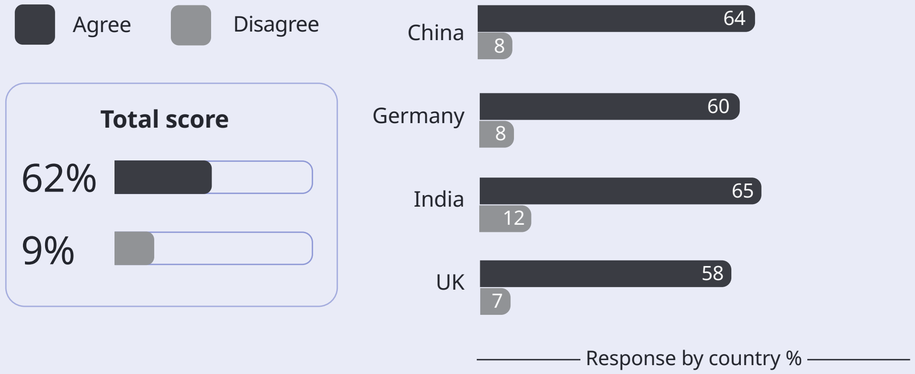
Trust in AI

AI has the potential to disrupt all aspects of society and bring considerable benefits, but questions abound regarding its safety, the use of data, and ethical implications, with more than half (53%) worrying that AI risks exacerbating social divides between those who have access to skills/ technology and those who don't – a fall from 56% last year. Nearly six in ten (57%) express concern about the privacy of their data when interacting with AI-driven technologies such as chatbots or virtual assistants, but this does not necessarily mean they are not having those interactions.

At the core of this is a need to build trust in AI so that people will be willing to take up the opportunity it offers. Notably, nearly two thirds (62%) want a standard way of flagging concerns, issues or inaccuracies with AI tools so they can be addressed, while 57% say vulnerable people need protections to ensure they can benefit from AI (albeit representing a slight fall from 63% last year).

Asked where they needed the greatest level of trust for using AI, medical diagnosis or treatment was the top priority with 31% selecting this. Other areas of focus for trust were operating autonomous or driverless vehicles, which utilize AI (27%), or identifying or responding to a cyber security breach (26%). Conversely, trust was seen as comparatively less of a priority for areas such as recruitment (16%) or planning leisure activities (15%).

Figure 3: There should be a standard way of flagging issues with AI tools



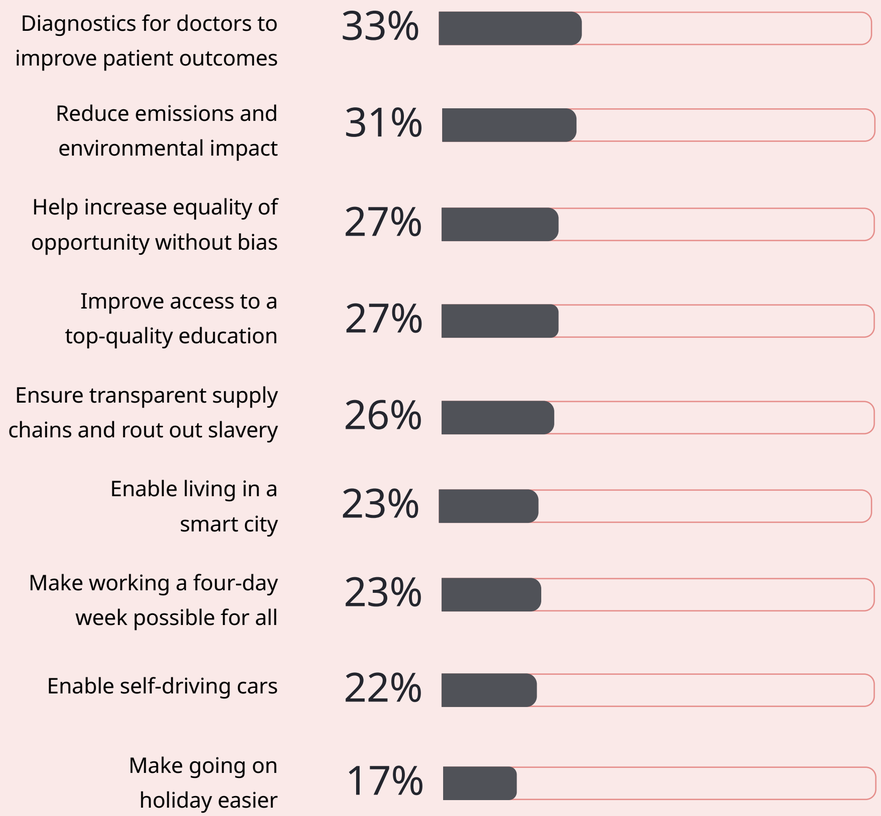
The AI opportunity

Whilst those surveyed are rightly aware of the risks associated with AI, there are clear signs of optimism and belief that it can be a tool with the power to accelerate progress towards a fair society and a sustainable world. When asked about what they would like to see AI used for in the next quarter century, people were most keen to see AI make it easier for doctors to diagnose medical conditions and improve patient outcomes (33%, up from 28% year on year). Encouragingly, BSI is already seeing increasing use of AI in medical devices for a range of applications.

There was also enthusiasm for AI's potential to help reduce emissions and society's impact on the environment (31%) and the ways in which it could improve access to, and the delivery of, a top-quality education (27%). A careful balance must be struck between this potential force for good in addressing environmental and societal challenges, and the risk of exacerbating them. For example, there is the intense energy requirements of AI algorithms, or the risk of inequality in influence and access. Balancing these elements must remain front and centre in the development of AI governance.

A fifth (22%) said they would like AI to enable them to live in a smart city – up from 17% last year. A smart city is a municipality that uses information and communication technologies (ICT) to increase operational efficiency, share information with the public and improve both the quality of government services and citizen welfare. One potential use of AI in smart cities is AI-powered visibility and optimization of infrastructure resources, allowing preventative maintenance.

Figure 4: Areas where people would most like to see AI shape our future by 2050



Technology and innovation driving our future

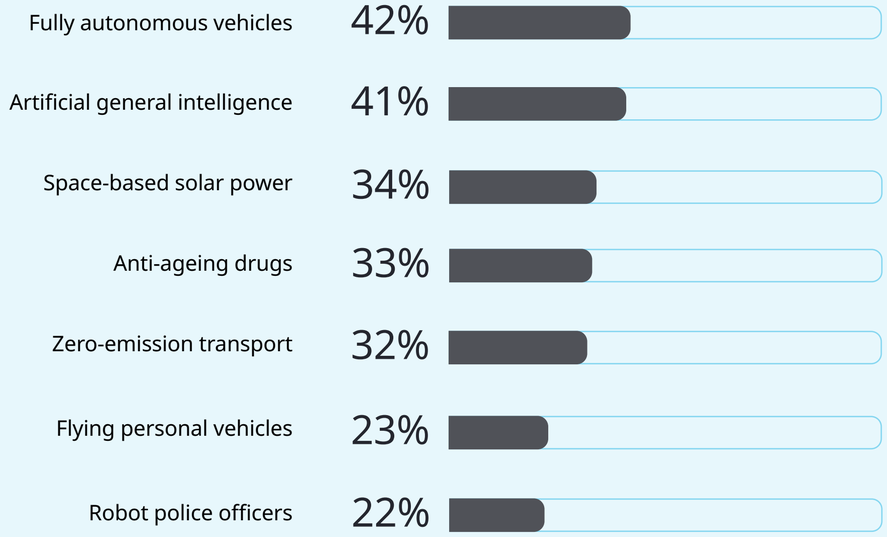
People have long made predictions about the future and how technology and innovation is set to transform the world, with some coming true and others eventually shown to be wide off the mark. But it is notable to see that within 30 years, in the four countries surveyed, more than a fifth expect there to be robot police officers (22%) and 23% expect there to be flying personal vehicles. Expectation in this regard varies widely by market, falling to 11% and 14% respectively for the UK and rising to 34% and 35% for India.

41% say that by 2055 they expect to see Artificial general intelligence (AI systems that learn and perform tasks in a similar way to humans). Already, advances in AI technology mean automated vehicles, trains and aeroplanes are now realities, albeit that their roll-out is largely constrained by regulatory and safety considerations. Within 30 years, two fifths expect to see fully autonomous vehicles (42%).

In 2024 the UK Automated Vehicles Act passed to enable the deployment of self-driving vehicles on public roads, one of the world's first such laws. Despite this, predictions of this are much lower in the UK (only 28% expect fully autonomous vehicles).

A third (33%) expect to see anti-ageing drugs - therapies which affect the root cause of ageing and age-related diseases, thereby lengthening lifespans – as a feature of society by 2055. A similar proportion (34%) anticipate space-based solar power (i.e. solar panels deployed off-world in space which harvest solar energy and beam it to earth) and 32% are optimistic about the prospect of zero-emission transport.

Figure 5: Technologies people expect to be in use by 2055



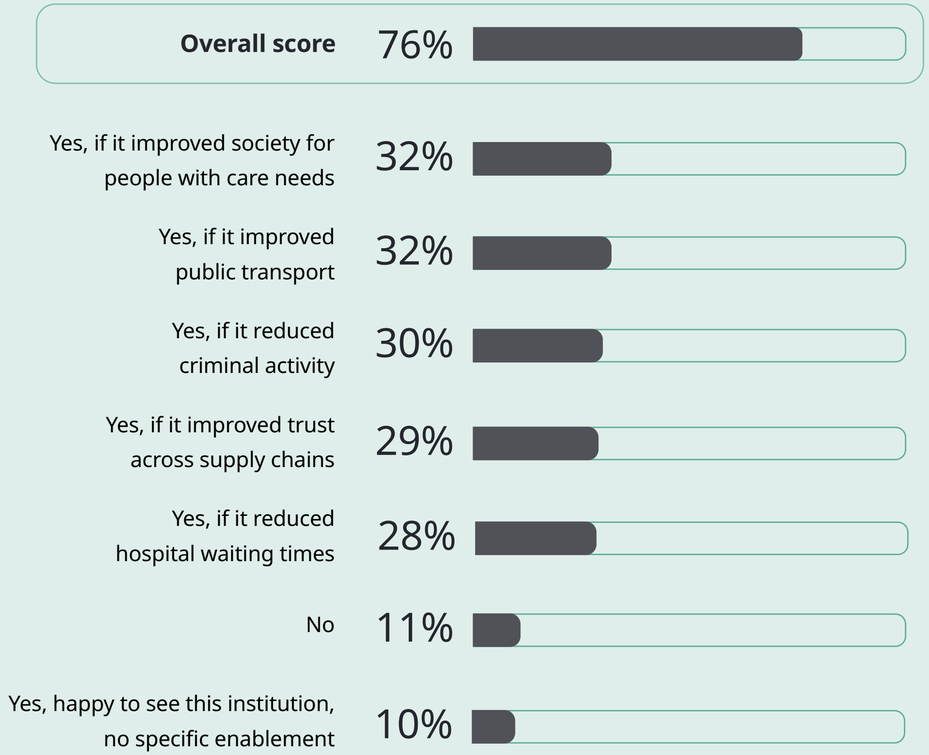
Enabling an all-electric and connected society

An all-electric and connected society means a society free from reliance on fossil fuels. It is one in which people are connected to other people and to objects using digital technology. This is something that an overwhelming proportion of those surveyed said they would like to see (76%) even if it meant submitting to an increase in the amount of personal data that you had to share – with support highest in China (96%) and India (89%) and falling to just half in the UK (54%).

Looking more at the benefits of an all-electric and connected society, a third say they would like this specifically to improve participation in society for people with specific care needs, such as a disability, vulnerable state of mental health (32%). The same proportion back this to improve public transport, both in terms of lowering emissions and reducing unreliability (32%).

A third of people believe an all-electric and connected society should be achieved jointly through private and public sector investment, while 30% say instead it should be achieved primarily through public sector investment. More than half of people (54%) say that, as we move towards an all-electric and connected society, we need internationally aligned safeguards to ensure its safe and ethical widescale implementation.

Figure 6: Happy to see the institution of an all-electric and connected society, even if it meant more personal data being shared



The quantum opportunity

Quantum technology[3] uses the principles of quantum mechanics to go beyond existing computer power to enable them to solve complex problems, from modelling weather to encrypting data, much faster than 'classical' computers. The data suggests the opportunity of quantum is not well understood by the general public and its potential benefits are being poorly communicated. For example, only 40% say the government and experts in the field are proactively communicating enough about the opportunities and risks of supercomputing, falling to a fifth in the UK (21%).

While 44% overall say computing technology developed and used by society to date has made the world a better place, that falls to 34% in the UK and 29% in Germany. Similarly, only 38% globally say the opportunities of supercomputers and quantum technology outweigh the risks – a number that falls to 24% in the UK and 30% in Germany. One in ten Britons say they do not think society should use quantum technology at all.

Figure 7: The opportunities of supercomputers and quantum technology outweigh the risks

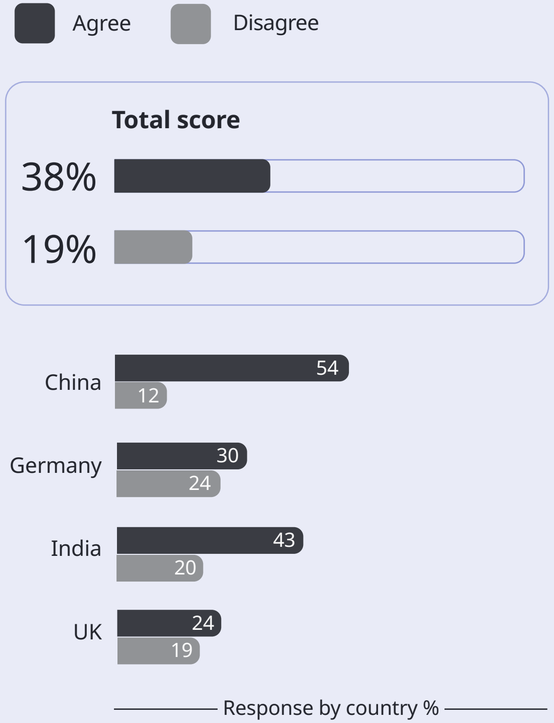
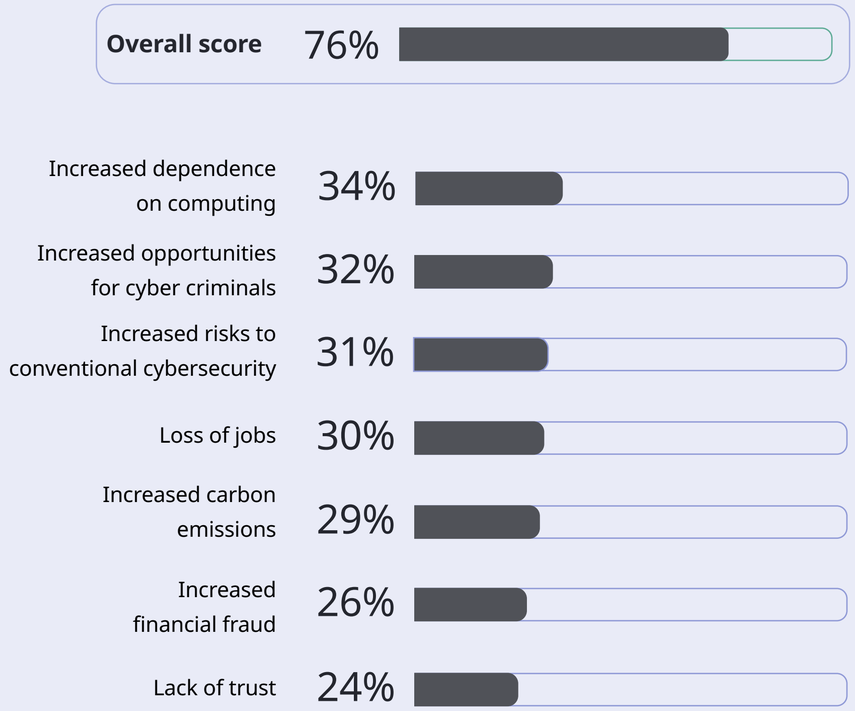


Figure 8: Biggest concerns about quantum technology



[3] Quantum Technology comprises quantum computing, communication and sensing. Whilst some see Quantum Computing as the next phase of supercomputing, given the fundamental differences in the technology to 'classical' computing, others see it as a new field entirely.

People’s biggest concern about the wider adoption of supercomputing (i.e. quantum technology) is that it will increase society’s dependence on computing, with a third expressing this worry. There is also apprehension regarding the potential for it to increase opportunities for cyber criminals (32%) or lead to reduced privacy from increased risks to conventional cybersecurity (31%).

In light of growing focus on the environmental impact of AI and data centres, it is notable that three in ten worry quantum technology will dramatically increase carbon emissions and in turn climate change and natural disasters. Already, quantum computing and AI have dramatically increased power demand, which has seen emissions from the sector rise dramatically in recent years.

Yet there are some suggestions that people see the opportunity of quantum as well. A third say they want quantum used for better research into drugs and chemicals, while 35% say they want to see quantum computing used to enhance cybersecurity by enabling more powerful cybersecurity and encryption.

Conclusion

Our research reveals that while there is global optimism about the broader benefits of technological advancements — such as reducing carbon emissions, minimizing environmental impact, and improving access to public services like high-quality education and healthcare — trust remains a critical factor in ensuring the safe and ethical use of these technologies. More than half of respondents believe that, as we move towards an all-electric and connected society, internationally aligned safeguards are needed to ensure the safe and ethical implementation of technology on a large scale.

Nearly six in ten people globally (57%) are concerned about data privacy when interacting with AI-driven technologies, such as chatbots or virtual assistants, and over half (53%) worry that AI could deepen social divides between those who have access to technology and skills and those who do not.

In other areas, such as quantum technology, the data suggests the technology is not well understood by the general public, and its potential benefits are not being effectively communicated. For example, globally, only 40% of respondents feel that governments and experts are sufficiently communicating the opportunities and risks of supercomputing, with that figure dropping to just 21% in the UK.

To bridge these knowledge gaps and help build trust, industry collaboration to implement the appropriate safeguards is key. This collaboration can help to ensure that emerging technologies are developed and deployed in ways that prioritize safety, ethics, and inclusivity. By addressing public concerns, enhancing communication, and by establishing and complying with international standards, those at the vanguard can foster confidence in the shift toward an all-electric and connected society and the possibilities this brings.

About the IEC and BSI

IEC

The IEC's work facilitates technical innovation, affordable infrastructure development, efficient and sustainable energy access, smart urbanization and transportation systems, climate change mitigation, and increases the safety of people and the environment.

The IEC brings together ~170 countries and provides a global, neutral and independent standardization and conformity assessment platform for 30,000 experts globally. It administers four conformity assessment systems through which members certify that devices, systems, installations, services and people work as required.

The IEC publishes around 10,000 IEC International Standards which together with conformity assessment provide the technical framework that allows governments to build national quality infrastructure and companies of all sizes to buy and sell consistently safe and reliable products in most countries of the world. IEC International Standards serve as the basis for risk and quality management and are used in testing and certification to verify that manufacturer promises are kept.

IEC work directly underpins the targets of all 17 UN Sustainable Development Goals.

BSI

BSI is a business improvement and standards company that partners with more than 77,500 clients globally across multiple industry sectors. BSI provides organizations with the confidence to grow by working with them to tackle society's critical issues – from climate change to building trust in AI and everything in between - to accelerate progress towards a fair society and a sustainable world.

For over a century BSI has been recognized for having a positive impact on organizations and society, building trust and enhancing lives. Today BSI engages with a 15,000 strong global community of experts, industry and consumer groups, organizations and governments to deliver on its purpose by helping its clients fulfil theirs.

BSI is appointed by the UK Government as the National Standards Body and represents UK interests at the International Organization for Standardization (ISO), the IEC and the European Standards Organizations (CEN, CENELEC and ETSI).

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