Digital Cooperation Organization

# DIGITAL ECONOMY TRENDS 2025

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# Foreword

**By capturing perspectives from business leaders, policymakers, and experts, the DCO Digital Economy Trends report combines quantitative rigor with qualitative depth to explore not just the 'what' of digital trends, but the 'why', 'when', and 'how' behind them.**

The digital economy is a driving force behind global innovation, reshaping industries, societies, and everyday lives at an unprecedented pace. Transformative trends, from the meteoric rise of artificial intelligence and blockchain technologies to the growth of the platform economy and sustainability driven innovation, are redefining how businesses operate, consumers engage, and governments govern.

In this dynamic environment, staying ahead of the curve requires actionable insights, robust analysis, and a deep understanding of emerging patterns. This second edition of the annual DCO Digital Economy Trends report serves as a trusted guide, offering a comprehensive overview of the digital economy's ongoing developments and their potential to shape businesses, governments, and individuals in 2025 and beyond.

Drawing on insights from a diverse survey of stakeholders across industries and regions, this report reflects the voices and experiences of those navigating the digital economy daily. By capturing perspectives from business leaders, policymakers, and experts, it combines quantitative rigor with qualitative depth to explore not just the 'what' of digital trends, but the 'why', 'when', and 'how' behind them.

Beyond analysis, the report emphasizes actionable recommendations that empower stakeholders, from policymakers to business leaders in DCO Member States and beyond, to translate insights into meaningful strategies. It delves into the motivations driving digital adoption, the potential economic, social, and environmental impacts, and the strategies needed to unlock new opportunities.

We hope these insights empower readers to make informed decisions, anticipate market shifts, and seize emerging opportunities. As the digital economy evolves, this report provides a valuable tool to navigate its complexities with clarity and foresight.

**Deemah AlYahya**

*Secretary-General*
*The Digital Cooperation Organization*

# Preface

**What makes this report particularly different is its focus on socio-economic impacts. By identifying the most impactful trends and evaluating their real-world significance, we aim to provide a path for navigating the complexities of the fast-moving digital economy.**

As stakeholders are making decisions for the future, understanding the practical implications of digital economy trends for both their organizations and the sectors in which they operate is essential. This report is designed to provide more clarity on the impact of the digital economy, offering actionable insights grounded in robust data and focused analysis.

The second edition of the DCO Digital Economy Trends report adds a new element to provide more robust information and collects novel data to shed light on the interconnected digital economy trends. What makes this report particularly different is its focus on socio-economic impacts. An extensive global survey of businesses, policymakers, and experts was carried out to quantify the economic, social, and environmental impacts of 12 current and six emerging digital economy trends.

For each identified trend, we present detailed data, analyze its implications for businesses, policymakers, and society, and evaluate each trend's potential economic, social, and environmental impact. The insights are structured around three overarching themes and presented by trend to help decision-makers, strategists, and innovators translate knowledge into action.

By identifying the most impactful trends and evaluating their real-world significance, we aim to provide a path for navigating the complexities of the fast-moving digital economy. Through the lens of different stakeholders, the report highlights opportunities to create meaningful change while staying competitive in a dynamic environment.

We would like to thank the experts and stakeholders, including from DCO Member States, who participated in the expert panels and the survey for generously contributing their time and knowledge.

We hope this report will serve as a practical guide, empowering stakeholders in DCO Member States and other countries to leverage the transformative power of the digital economy responsibly and effectively.

***Alaa Abdulaal***

*Chief of Digital Economy Foresight*
*The Digital Cooperation Organization*

# Acknowledgements

This report represents a collaborative effort that would not have been possible without the dedication and contributions of numerous individuals. We extend our heartfelt gratitude to all those who played a pivotal role in bringing this research to fruition.

We express our thanks to the research teams, analysts, and contributors who worked on designing, analyzing, and presenting the research in this report. Their commitment to excellence is evident throughout these pages.

Our appreciation goes to the experts from the DCO Member States who contributed their valuable time to the research by participating in the expert panel workshops. In the same vein, we extend our gratitude to the DCO Digital Economy Trends 2025 expert panel:

» **Mr. Bruce Armstrong Taylor**
Non-Exec Chair and Research Fellow, The Digital Economist

» **Ms. Cristina Bueti**
Counsellor on Metaverse, IoT, and Smart Sustainable Cities, International Telecommunication Union

» **Prof. Jamil El-Imad**
Honorary Senior Research Fellow, Faculty of Engineering, Imperial College London

» **Prof. Samir El-Masri**
Chairman of the Board, Digitalization

» **Mr. Pieter Geldenhuys**
Director, Institute for Technology Strategy & Innovation

» **Ms. Mia Haffety**
Policy Manager – Digital Economy, techUK

» **Prof. Yasmin Ibrahim**
Professor of Digital Economy and Culture, Queen Mary, University of London

» **Prof. Vu Minh Khuong**
Associate Professor, Lee Kuan Yew School of Public Policy, National University of Singapore

» **Dr. Yan Liu**
Senior Economist, The World Bank

» **Ms. Samiah Melhem**
Lead Digital Policy Specialist, The World Bank

» **Prof. Carolien van den Berg**
Chair of Department of Information Systems, University of the Western Cape

Their support and guidance have been instrumental in shaping the direction and focus of this report.

We would also like to express our sincere gratitude to the following DCO technical team members for their unwavering support, review, feedback, guidance, and dedication throughout this report.

» **Dr. Syed Iftikhar Shah**
Digital Research Director, Digital Economy Foresight (DEF), DCO

» **Mr. Fabrice Nkusi**
Digital Research Manager, Digital Economy Foresight (DEF), DCO

# Executive Summary

The digital economy in 2025 presents unprecedented opportunities for innovation and growth, alongside complex challenges. Both long-term vision and near-term pragmatism are needed to shape a digital economy that is fair, resilient, and sustainable for all. Now in its second edition, this report analyses 18 trends that are shaping the digital economy in 2025 and beyond. It aims to build a shared understanding among diverse stakeholders to enable better decision-making, and foster collaboration and change.

The digital economy is defined as economic activity reliant on, significantly enhanced, or enabled by digital technologies and their applications. This includes activities that increase human well-being or lead to social or environmental benefits.[1] The digital economy is projected to grow three times faster than the global economy to reach approximately US$24 trillion in 2025, representing 21% of global GDP.[2] However, this report does not consider only the potential economic impacts of digital economy trends. Equally significant is the potential for digital economy trends to drive positive social and environmental impact, as well as the risk of adverse effects if technological advancements are not managed responsibly.

The insights in this report draw from the DCO Digital Economy Trends (DET) Survey 2025, a unique global survey of about 300 Chief Technology Officers and senior technologists from large companies, together with 60 policymakers and 40 digital economy experts. The findings offer actionable insights for stakeholders from the public and private sector, along with international organizations and civil society.

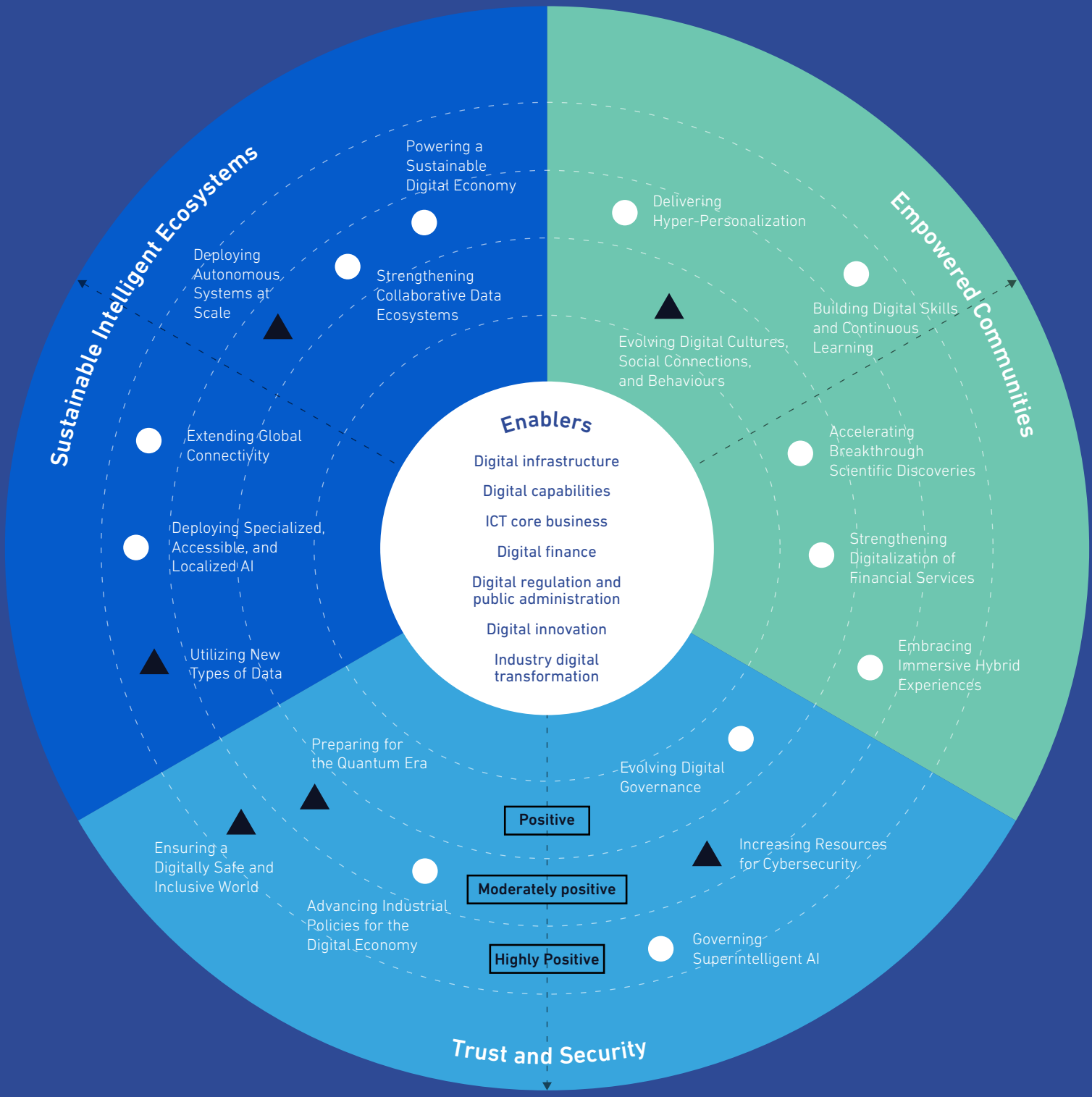
The research identified 18 digital economy trends for 2025. Among these, 12 are classified as 'current' trends, which are already demonstrating impact on stakeholders across various fields and are expected to accelerate in the next 12-18 months. The remaining six trends are considered 'emerging', meaning that, while they have not yet shown significant impact, they have the potential to be disruptive within the next 3 to 5 years. The trends are grouped under three themes: Sustainable Intelligent Ecosystems, Empowered Communities, and Trust and Security.

In addition to the 18 digital economy trends, the DET framework includes a set of enablers essential for accelerating these trends. They are inspired by the pillars of the DCO's Digital Economy Navigator (DEN) and include: digital infrastructure, digital capabilities, ICT core business, digital finance, digital regulation, and public administration, digital innovation and industry digital transformation. In addition, seven digital technologies complete the DET framework: artificial intelligence (AI) and advanced analytics, digital connectivity, digital devices and the Internet of Things (IoT), cloud services, encryption and cybersecurity, blockchain and decentralized technologies, and automation and robotics. They are foundational catalysts that shape and drive digital economy trends.

The DCO Digital Economy Trends Blueprint (as shown in Figure E1) visualizes the trends shaping the digital economy in 2025 by their socio-economic impact. The trends are presented by theme and categorized into three levels of positive impact based on findings from the DET survey. The current trends anticipated to have the biggest impacts in 2025 are: Extending Global Connectivity; Deploying Specialized, Accessible, and Localized AI; and Building Digital Skills and Continuous Learning. Additionally, the emerging trends anticipated to have the greatest impact in the next 3-5 years are: Ensuring a Digitally Safe and Inclusive World, Utilizing New Types of Data, and Governing Superintelligent AI.

Listen to the DET 2025 AI-generated podcast by clicking this QR code.

*Figure E1: DCO Digital Economy Trends Blueprint 2025*




**LEGEND**

**Dotted circles:**
Expected potential impact
*(average socio-economic impact)*
**Central circle:** Enablers

**Digital economy trends**
○ current
▲ emerging

*Source: DCO DET Survey 2025*

## Theme 1 | Sustainable Intelligent Ecosystems

AI and data play a pivotal role in creating value within the digital economy. This theme advocate for collaboration among businesses, governments, and civil society to balance rapid innovation with resource sustainability and equitable access to technology.

### Current trends

1.1 **Deploying Specialized, Accessible, and Localized AI:** Small and open-source models are expanding access to organization-specific AI technology.

1.2 **Extending Global Connectivity:** 5G networks and satellites are reshaping global connectivity, unlocking opportunities while also posing challenges such as exacerbating the digital divide.

1.3 **Powering a Sustainable Digital Economy:** AI has the potential to improve energy efficiency, but its own demand for power is growing quickly.

1.4 **Strengthening Collaborative Data Ecosystems:** Data is key to digital innovation, however, data privacy and security concerns must be addressed.

### Emerging trends

1.5 **Deploying Autonomous Systems at Scale:** Autonomous systems will reshape industries, creating efficiencies while also disrupting labor markets.

1.6 **Utilizing New Types of Data:** Emerging data collection and generation technologies will transform our understanding of diverse fields and sectors.

## Recommendations

#### Private sector

Implement an integrated approach to AI and digital infrastructure deployment by incorporating localized AI solutions, adopting sustainable technology practices, and ensuring universal access. This includes:

- Developing energy-efficient digital systems and data centers powered by renewable energy and innovative cooling systems.
- Creating region-specific data and AI applications that process data locally while respecting sovereign data and privacy regulations.
- Establishing business models for sharing digital public infrastructure to expand coverage in rural, remote, and economically underserved areas.
- Engaging local communities, particularly in lower and middle-income countries, with human-centered principles and solutions.

#### Public sector

Create harmonized and adaptive regulatory frameworks that balance innovation with equity, sustainability, and public safety, focusing on:

- Harmonizing cross-border data protection and AI regulation policies to encourage regional digital infrastructure investment.
- Implementing performance-based incentives that reward providers for meeting standardized and measurable connectivity goals and socio-economic outcomes and impacts.
- Developing digital policies that mandate and enforce energy efficiency for AI and digital infrastructure.
- Ensuring regulatory frameworks for AI are inclusive by incorporating feedback from marginalized and vulnerable populations as well as local communities.

#### IGOs, IOs, and others

Foster a collaborative global ecosystem for a sustainable, and inclusive digital economy through:

- Establishing global standards for responsible AI and frontier technologies that respect cultural diversity, environmental stewardship, and human flourishing.
- Creating platforms for knowledge sharing between developed and developing economies.
- Advocating for equitable access to digital infrastructure, services, and the benefits of an AI-driven digital economy.
- Supporting digital infrastructure and capacity building initiatives in underserved regions around the world.

## Theme 2 | Empowered Communities

This theme explores how the digital economy can transform the lives of individuals and communities. It requires stakeholders to collaborate on tackling challenges such as skill building, financial inclusion, and cultural adaptation with a focus on boosting equitable, inclusive, and sustainable development.

### Current trends

**2.1 Delivering Hyper-Personalization:** Hyper-personalized experiences across digital platforms and industries offer empowerment; however, they also raise concerns about privacy, bias, and exclusion.

**2.2 Building Digital Skills and Continuous Learning:** Education and training programs within holistic frameworks are empowering individuals with new digital skills for the digital economy.

**2.3 Accelerating Breakthrough Scientific Discoveries:** The rapid advancement of AI is revolutionizing scientific research, offering the potential for groundbreaking innovations.

**2.4 Strengthening the Digitalization of Financial Services:** Digital Technologies are empowering underserved populations through inclusion in the financial system.

**2.5 Evolving Digital Cultures, Social Connections, and Behaviors:** Virtual communities are reshaping both personal and professional networks.

### Emerging trends

**2.6 Embracing Immersive Hybrid Experiences:** Advances in extended reality will democratize access to immersive experiences across diverse sectors of the digital economy.

## Recommendations

#### Private sector

Drive inclusive digital transformation through personalized solutions and continuous learning by:

- Investing in privacy-enhancing technologies for secure, ethical personal data use.
- Developing industry-relevant digital skills training programs.
- Create inclusive financial services that enhance financial literacy.
- Ensuring products and services support digital well-being across diverse communities.

#### Public sector

Establish comprehensive frameworks for digital inclusion and innovation, such as:

- Creating national digital skill frameworks that recognize formal and informal learning.
- Supporting lifelong learning through targeted funding and public-private partnerships.
- Implementing regulatory sandboxes for digital economy innovation while ensuring environmental and consumer protection.
- Prioritizing digital literacy programs for underserved communities.

#### IGOs, IOs, and others

Promote global standards and best practices to foster digital empowerment by:

- Developing universal frameworks for digital skills assessment and credentials.
- Supporting financial inclusion initiatives in developing regions.
- Facilitating cross-cultural dialogue on digital well-being between all stakeholders.
- Advocating for accessible and inclusive digital services.

## Theme 3 | Trust and Security

The digital economy can only achieve its full potential if people have confidence in their ability to interact and transact online. Cybersecurity is a growing challenge, while the rise of business models that profit from preying on users' vulnerability points to the need to revisit incentive structures.

### Current trends

**3.1 Evolving Digital Governance:** Adaptive and holistic digital governance frameworks are essential for building trust and ensuring security in the digital economy.

**3.2 Increasing Resources for Cybersecurity:** As cyber threats become more advanced, adapting security measures is essential for maintaining public trust.

**3.3 Advancing Industrial Policies for the Digital Economy:** Strategic funding, investment incentives, and policy frameworks are critical to the digital economy.

### Emerging trends

**3.4 Preparing for the Quantum Era:** As the race toward quantum computing accelerates, the demand for 'post-quantum' security measures will grow.

**3.5 Ensuring a Digitally Safe and Inclusive World:** New business models and digital policy frameworks will be needed to reduce socio-economic inequalities.

**3.6 Governing Superintelligent AI:** The potential for deploying superintelligent systems across the digital economy raises significant challenges.

## Recommendations

#### Private sector

Strengthen digital resilience while preparing for emerging digital technologies such as quantum and generative AI. Actions could include:

- Implementing quantum-ready security measures and sharing threat intelligence.
- Aligning business practices with evolving global digital governance frameworks.
- Investing in research and development for emerging digital technologies.
- Adopting transparent AI development practices with regular capability reporting.

#### Public sector

Develop forward-looking governance frameworks that address current and future cybersecurity challenges. Examples of such actions include:

- Establishing specialized oversight bodies with enforcement authority.
- Creating collaborative cyber defense centers and threat sharing platforms.
- Developing adaptive regulatory approaches that balance innovation in digital technologies with public interest.
- Ensuring policy frameworks incorporate diverse industries and different stakeholders' perspectives.

#### IGOs, IOs, and others

Build global cooperation frameworks for digital governance through:

- Driving the harmonization of security standards and governance frameworks.
- Supporting security capacity building in developing nations.
- Facilitating knowledge sharing on emerging technology governance.
- Promoting inclusive dialogue on AI governance and digital rights.
- Fostering trust among stakeholders by encouraging transparent, accountable and ethical practices in the development and deployment of digital technologies.

# Key Results of Digital Economy Trends Survey

**8.5%**

digital economy growth rate expected in 2025—**three times faster** than the global economy

**Top two expected benefits**

- **41%** better access to goods and services
- **30%** greater goods and services affordability

**Top two expected challenges**

- **43%** increased industry concentration
- **33%** increased gap between capital and labor income

## Top trends by impact:

### Economic

1. Deploying Specialized, Accessible, and Localized AI
2. Building Digital Skills and Continuous Learning
3. Extending Global Connectivity

### Social

1. Building Digital Skills and Continuous Learning
2. Extending Global Connectivity
3. Increasing Resources for Cybersecurity

### Environmental

1. Powering a Sustainable Digital Economy
2. Accelerating Scientific Discovery
3. Strengthening Collaborative Data Ecosystems

**72%**

of private sector respondents feel prepared to **leverage digital economy trends**

**67%**

of respondents expect digital economy **regulations to increase** in 2025

**53%**

of private sector respondents see **regulation as a catalyst** for digital economy growth

## Top priorities for policymakers:

1. Enhancing data privacy and cybersecurity protections
2. Supporting public and private investment in digital infrastructure
3. Aligning regulations and standards on emerging digital economy areas

**49%** of respondents expect the finance industry to **benefit most from the digital economy**

**59%** of companies' digital strategies are driven by **efficiency gains and cost reductions**

**21%** of companies are currently realizing benefits from AI use—**2025 is set to be a pivotal year**

## Top trends by region:


Source: Digital Economy Trends Survey 2024

# Introduction

In the digital era, change is inevitable. Every day, new digital technologies reshape the way we live, work, and interact. From the rise of AI to the spread of connectivity, innovations are reshaping the global economy at an unprecedented pace. Policymakers, business leaders, and civil societies need timely data to inform decisions and thrive in our interconnected world.

The Digital Economy Trends (DET) 2025 report meets this need by examining key trends, challenges, and opportunities in the digital economy. An annual flagship publication of the Digital Cooperation Organization (DCO), it aims to equip digital economy stakeholders with in-depth analysis and comprehensive insights to adapt, plan ahead, and foster resilience.

This second edition of the DET report investigates the changes that have unfolded over the past year following the success of the first edition. With a data-driven approach, it highlights emerging digital technologies, evolving business models, and innovative practices. It offers a roadmap for the future, advocating for collaboration across borders, industries, and sectors to ensure inclusive and sustainable growth.

The report seeks to inspire action and support stakeholders in navigating the complexities of the digital age aligning with the DCO's mission to create an equitable digital future for all.

**Digital economy definition:**
The economic activity reliant on, significantly enhanced by, or enabled by digital technologies and their applications. This includes activities that increase human well-being or lead to social or environmental benefits.

"New technologies require new and innovative forms of governance — with input from experts building this technology and from those monitoring its abuses. And we urgently need a Global Digital Compact — between governments, regional organizations, the private sector and civil society — to mitigate the risks of digital technologies and identify ways to harness their benefits for the good of humanity."[4]

*UN Secretary General António Guterres*

## Digital Economy Trends Research Process

The research process employed a purpose-built methodology to define, identify, and measure the key digital economy trends for the short and medium term. The process involved five stages:

1. Definitions and objectives
2. Literature review and secondary data collection
3. Validation by multi-stakeholder experts (business, government, international organizations, non-governmental organizations, and academia)
4. Collection of primary data via the DET survey and expert consultations
5. Data analysis of primary and secondary data

In the first stage, the DET framework elements were defined to align with the report's strategic objectives, establishing a foundation for the research process. The second stage involved a comprehensive literature review and secondary data collection to map digital economy trends. In the third stage, the list of trends was narrowed to the most impactful ones and validated with experts representing different stakeholder groups. The fourth stage gathered specific insights through the Digital Economy Trends survey (DET survey) 2024, which collected the opinions of nearly 300 Chief Technology Officers and senior technologists from large companies (250+ employees) operating in at least two countries, alongside 100 experts (60 policymakers and 40 digital economy experts). Consultations with policymakers and experts were also carried out to ensure that recommendations were grounded in reality and aligned with the latest developments. Finally, in the fifth stage, data analysis of both primary and secondary data was conducted.

The list of experts is provided in the acknowledgement section, and the methodology, including the DET survey, is detailed in the Appendix.

# Digital Economy Trends Framework

The DET framework evolved over the past year to reflect the rapidly changing digital economy. The research process identified 18 trends for 2025 — of which 12 are 'current' and six are 'emerging' (see sidebar for definitions).

The trends are grouped under three themes:

## Theme 1: Sustainable Intelligent Ecosystems

AI and data play a pivotal role in creating value within the digital economy. This theme calls for collaboration among businesses, governments, and civil society to balance rapid innovation with resource sustainability and equitable access to technology.

### ◯ Current trends

**1.1** **Deploying Specialized, Accessible, and Localized AI:** Small and open-source models are expanding access to organization-specific AI technology.

**1.2** **Extending Global Connectivity:** 5G networks and satellites are reshaping global connectivity, unlocking opportunities while also posing challenges such as exacerbating the digital divide.

**1.3** **Powering a Sustainable Digital Economy:** AI has the potential to improve energy efficiency, but its own demand for power is growing quickly.

**1.4** **Strengthening Collaborative Data Ecosystems:** Data is key to digital innovation, however, data privacy and security concerns must be addressed.

### ▲ Emerging trends

**1.5** **Deploying Autonomous Systems at Scale:** Autonomous systems will reshape industries, creating efficiencies while also disrupting labor markets.

**1.6** **Utilizing New Types of Data:** Emerging data collection and generation technologies will transform our understanding of diverse fields and sectors.

**Digital trend definition:** In the context of this report, a digital economy trend results from the emergence or deployment of a digital technology or platform that supports or accelerates innovation, access to information and services, and connects individuals, communities, and markets. A digital economy trend has a discernible direction, and offers measurable, positive financial, social, and/or environmental benefits. Trends are differentiated into:

- **Current trends:** Ongoing trends that have already demonstrated various impacts for stakeholders, and their effects are expected to continue accelerating in the next 12-18 months.
- **Emerging trends:** Trends that may not yet have had a significant impact, but their materialization in the next 3-5 years is potentially disruptive for the global economy.

## Theme 2: Empowered Communities

This theme explores how the digital economy can transform the lives of individuals and communities. It requires stakeholders to collaborate on tackling challenges such as skill building, financial inclusion, and cultural adaptation with a focus on boosting equitable, inclusive, and sustainable development.

### ◯ Current trends

**2.1** **Delivering Hyper-Personalization:** Hyper-personalized experiences are empowering some, but raising concerns about privacy, bias, and exclusion.

**2.2** **Building Digital Skills and Continuous Learning:** Education and training frameworks are equipping individuals with new skills for the digital economy.

**2.3** **Accelerating Breakthrough Scientific Discoveries:** The rapid advancement of AI is revolutionizing scientific research, promising significant breakthroughs.

**2.4** **Strengthening the Digitalization of Financial Services:** Technologies are empowering underserved populations through inclusion in the financial system.

**2.5** **Evolving Digital Cultures, Social Connections, and Behaviors:** Virtual communities are reshaping personal and professional relationships.

### ▲ Emerging trend

**2.6** **Embracing Immersive Hybrid Experiences:** Advances in extended reality will democratize access to immersive experiences from education to industry.

## Theme 3: Trust and Security

This theme acknowledges that the digital economy cannot realize its potential unless people feel confident in their ability to interact and transact online. Cybersecurity is a growing challenge, while the rise of business models that profit from preying on users' vulnerability points to the need to revisit incentive structures.

### ◯ Current trends

**3.1** **Evolving Digital Governance:** Adaptive and holistic digital governance frameworks are needed to build trust and ensure security in the digital economy.

**3.2** **Increasing Resources for Cybersecurity:** As threats grow more sophisticated, adapting security measures is crucial for maintaining public trust.

**3.3** **Advancing Industrial Policies for the Digital Economy:** Strategic funding, investment incentives, and policy frameworks are critical to the digital economy.

## Emerging trends

**3.4** **Preparing for the Quantum Era:** As the race toward quantum computing accelerates, so will efforts to ensure 'post-quantum' security measures.

**3.5** **Ensuring a Digitally Safe and Inclusive World:** New business models and policy frameworks will be needed to reduce socio-economic inequalities.

**3.6** **Governing Superintelligent AI:** The potential for deploying superintelligent systems across the digital economy raises significant challenges.

The impact of digital economy trends is shaped by countries' enabling environments, as assessed by the DCO's 2024 Digital Economy Navigator (DEN) report, which measures the maturity of the digital economy at the country level. The seven critical enablers of the DET framework correspond to the following DEN pillars:[5]

**1. Digital infrastructure**

The telecommunications and internet infrastructure that enables people and businesses to access digital activities.

**2. Digital capabilities**

People's digital literacy and competencies to engage and participate in the digital economy.

**3. ICT core business**

The level of economic activity of the hardware and software businesses that form the core of the internet economy.

**4. Digital finance**

Access to digital banking and other financial activities that contribute to developing the wider digital economy.

**5. Digital regulation and public administration**

The regulatory framework and processes that govern a country's digital activities.

**6. Digital innovation**

How a country supports startups and researchers to use digital technologies for new products, services, and business models.

**7. Industry digital transformation**

The degree to which traditional industries are being transformed by digital technologies and services.

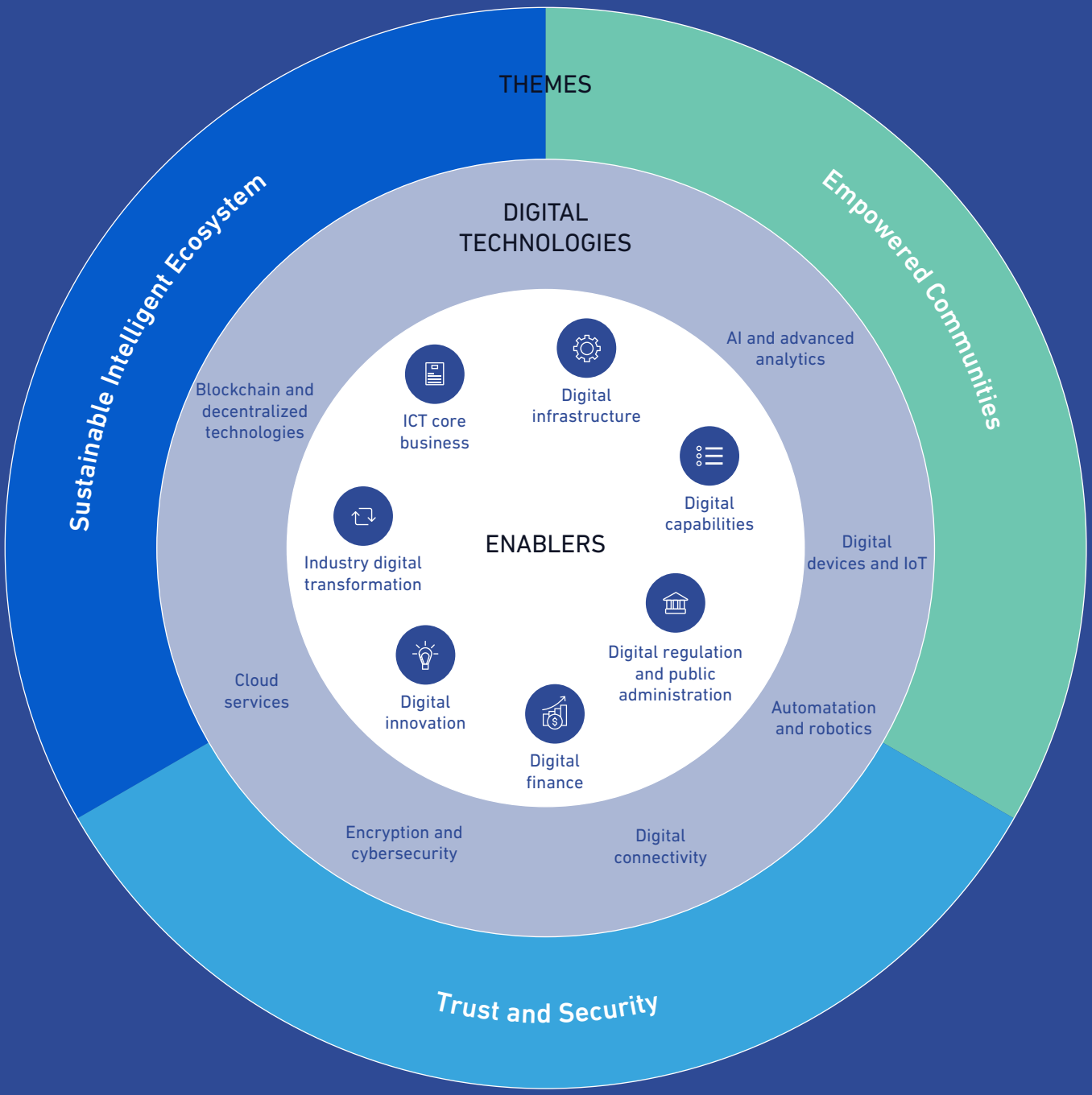
**Enablers definition:** An enabler is a physical, human, financial, policy, or regulatory factor necessary to establish and/or accelerate the evolution and impact of a trend, e.g. physical communication networks, data storage, or data regulations. Generally, enablers fall under the powers of the state or public-private agreements.

Alongside these enablers, seven digital technologies shape digital economy trends. They are at different stages of development in their capacity to drive innovation and growth. The glossary at the end of the report provides descriptions of main terms used.

- AI and advanced analytics
- Digital connectivity
- Digital devices and IoT
- Cloud services
- Encryption and cybersecurity
- Blockchain and decentralized technologies
- Automation and robotics

The DET framework is visualized in Figure 1.

*Figure 1: Digital Economy Trends Framework*



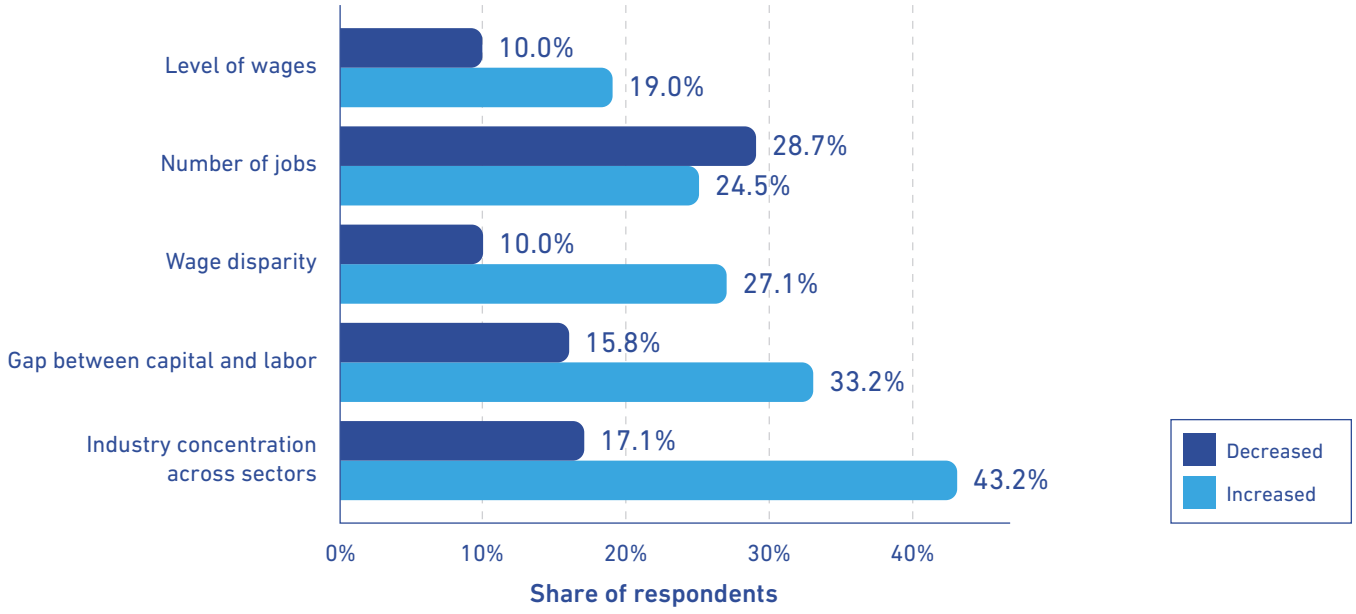

*Source: DET Report*

# The Digital Economy in 2025

The DET survey respondents project that in 2025 the digital economy will expand three times faster than the global economy overall — by 8.5% compared with 2.7%.[6] Based on this projection, the digital economy is expected to reach **approximately US$24 trillion in value in 2025,[7] accounting for 21% global GDP.**

When asked how the digital economy will change over the next 3-5 years, 41% of respondents expect better access to goods and services and 30% highlight the greater affordability of goods and services. However, 43% expect increased industry concentration — which could lead to market dominance and reduced competition — while 33% expect an increased gap between income from capital and labor, pointing to concerns about the potential for wage stagnation to undermine economic equity.

***Figure 2: How will digital technologies shape the digital economy?***



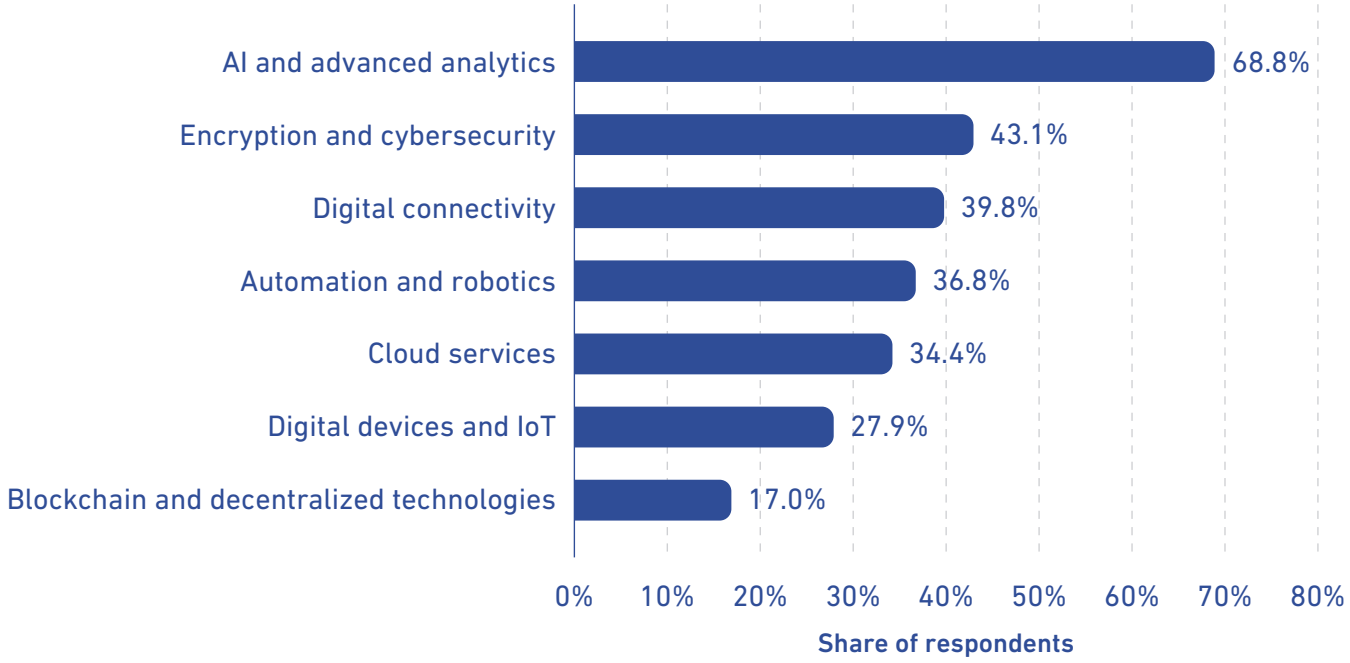

**Source:** *DCO 2024 Digital Economy Trends Survey*
**Q:** *Select up to three areas where you anticipate the most significant impact of digital technologies in the next 3-5 years?*
**Respondents:** *293 CTOs and senior technologists working in large companies (+250 employees), 59 policymakers, and 40 digital economy experts.*

These results show that the digital economy in 2025 stands at a critical inflection point. While technological advances promise unprecedented opportunities for innovation and growth, they also present complex challenges that urgently demand attention. Both long-term vision and near-term pragmatism are needed to shape a digital economy that is fair, resilient, and sustainable for all.

As technologies become more sophisticated and resource intensive, the digital divide between advanced and developing economies could widen. This is particularly evident in areas requiring substantial infrastructure investment, such as edge-based broadband connectivity, AI systems, and quantum-safe cryptography.

Survey respondents identified **AI and advanced data analytics** as their top digital technology priority, followed by **encryption and cybersecurity**, and **digital connectivity** (as shown by Figure 3). These priorities reflect the need for robust, secure, and trustworthy systems.

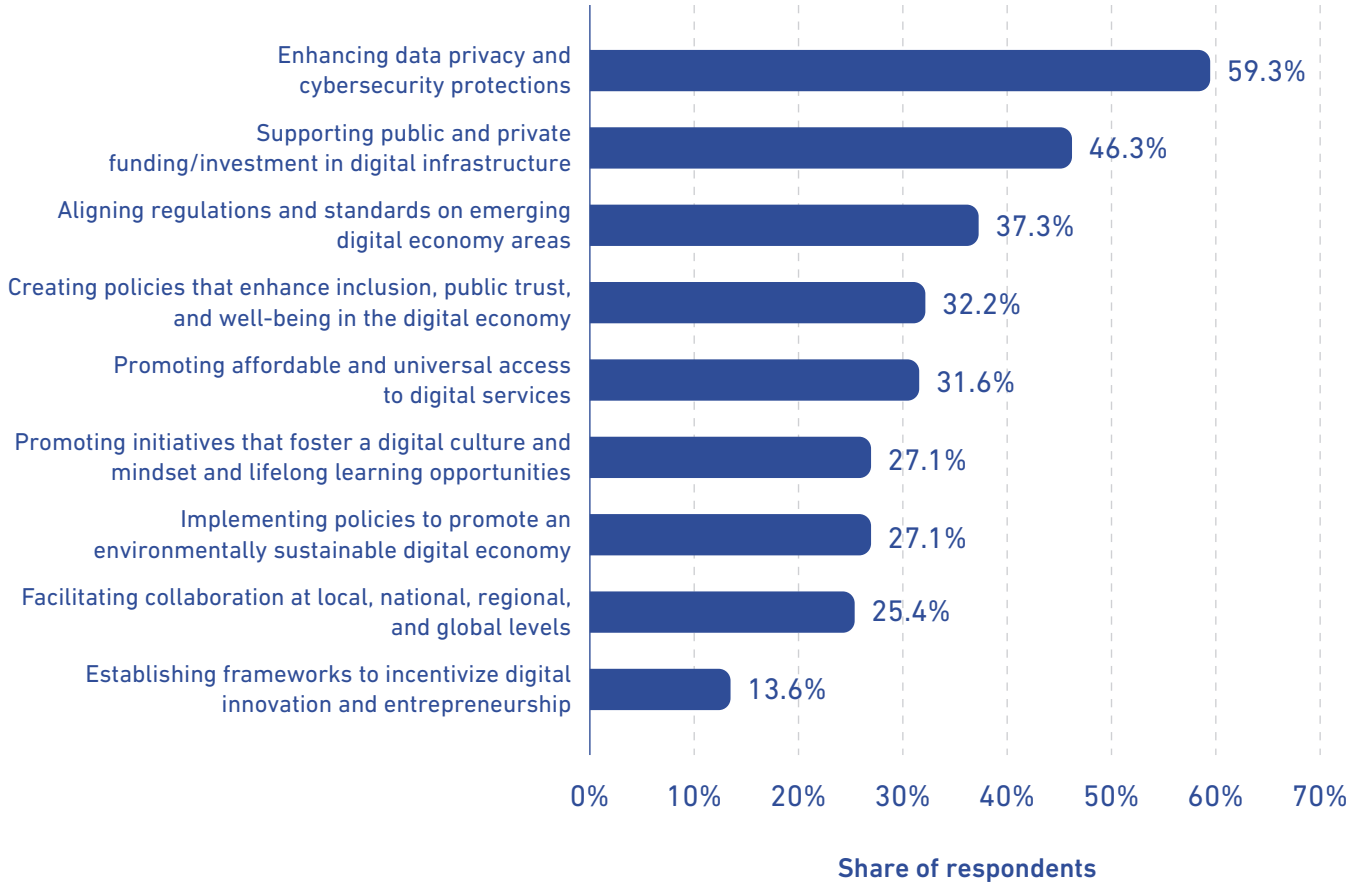
*Figure 3: Highest priority technologies for the digital economy*




**Source:** *DCO 2024 Digital Economy Trends Survey*
**Q:** *Select the three digital technology areas you see as necessary for people, businesses, and governments to benefit from the digital economy trends in the next 12-18 months?*
**Respondents:** *293 CTOs and senior technologists working in large companies (+250 employees), 59 policymakers, and 40 digital economy experts.*

Governments see enhancing data privacy and cybersecurity protections as their most critical policy priority for 2025 as shown in Figure 4. While their role is critical, ultimately the digital economy will be shaped by how effectively stakeholders can balance multiple priorities — including ethical governance, developing commercial incentives to address the digital divide, and strengthening the commitment to ensure the digital economy serves the broader interests of both our planet and society.

*Figure 4: Policy priorities for governments according to policymakers*




**Source:** *DCO 2024 Digital Economy Trends Survey*
**Q:** *Select the three most critical policy actions, in order of importance, needed for people, businesses, and governments to benefit from the digital economy trends?*
**Respondents:** *59 policymakers from G20 economies.*

# Digital Economy Trends Blueprint

How the digital economy evolves will depend on the expected socio-economic impact of trends and stakeholders' decisions in response to them. The DCO Digital Economy Trends Blueprint (Figure 5) visualizes the trends shaping the digital economy in 2025. Based on the DET survey, the trends are categorized into three levels of expected socio-economic impact. The trends anticipated to have the biggest impacts in 2025 are:

## Extending Global Connectivity

## Deploying Specialized, Accessible, and Localized AI

## Building Digital Skills and Continuous Learning

### Extending Global Connectivity

Increased connectivity can strengthen socio-economic impact by empowering marginalized communities, improving healthcare access, enhancing educational opportunities, and boosting economic productivity. However, significant regional disparities remain in affordability, rural access, and enabling policy environments. For the benefits of extending global connectivity to be fully realized, addressing the digital divide remains a stakeholder priority. Extending global connectivity is not just about providing internet access, but laying the groundwork for a digital economy powered by secure, trustworthy, data-driven intelligence. As the global economy becomes increasingly reliant on AI-driven tools, extending 5G networks and satellite connectivity is crucial for the successful implementation of edge AI, the IoT, and autonomous systems.

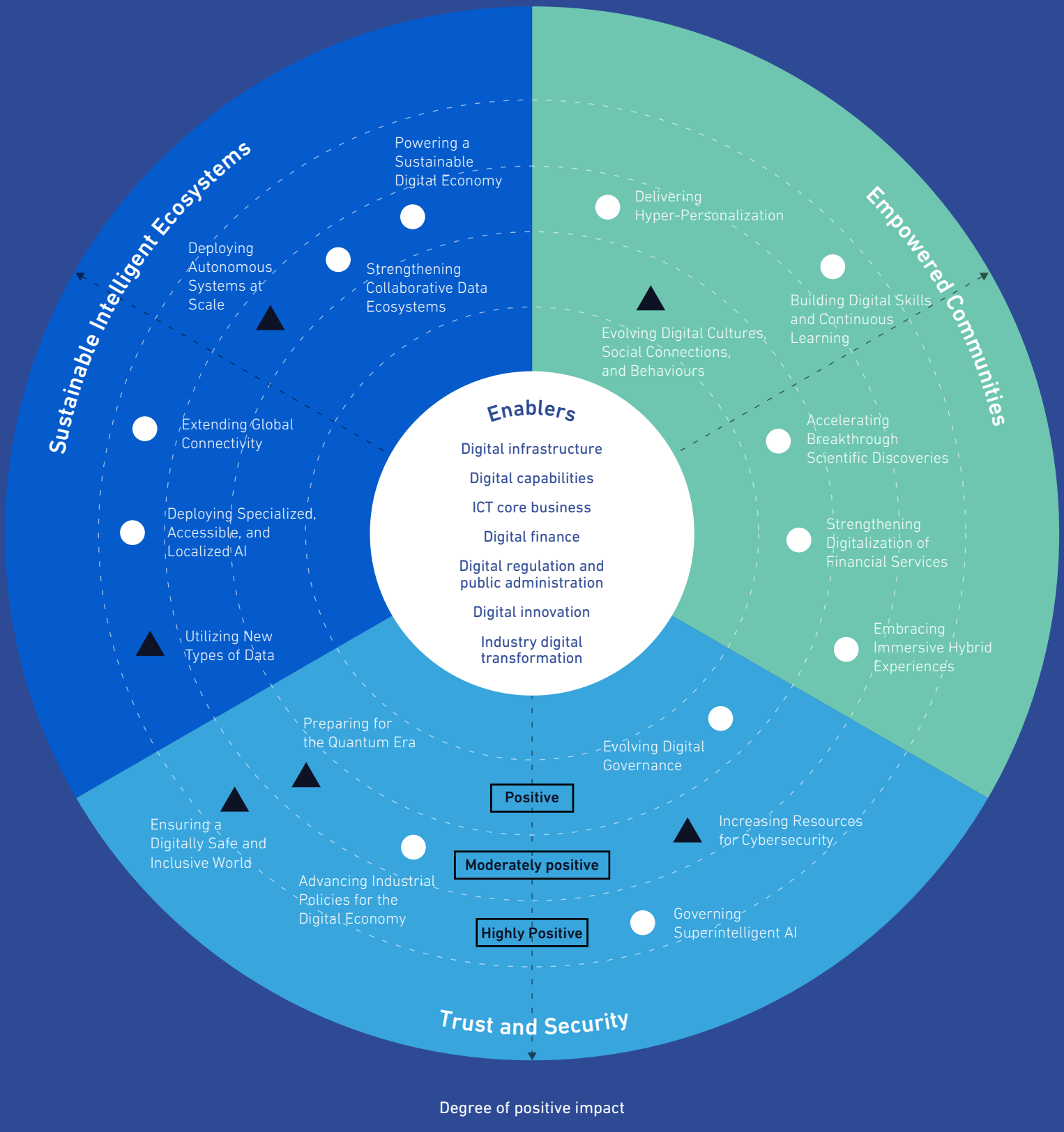
### Specialized, Accessible, and Localized AI

The shift toward AI models tailored for specific industries, non-technical users, and local contexts offers organizations an unprecedented opportunity to leverage the power of AI while adhering to domain-specific requirements. Respondents in 60% of the industry sectors surveyed chose this trend as one of their top three priorities. From a social impact perspective, access to AI technology is expanding beyond large technology companies. The proliferation of open-source models, publicly available training datasets, and low-code/no-code platforms is empowering smaller organizations and communities to develop and deploy their own AI solutions to address their own specific challenges.

### Building Digital Skills and Continuous Learning

With frontier digital technologies fundamentally reshaping work and learning, continuous skills development has become essential. AI, cloud computing, and digital platforms are creating more flexible and personalized learning opportunities through online courses and micro-credentials. However, a widening gap between digitally skilled and unskilled individuals threatens broad participation in the digital economy. Educational institutions, private sector actors, and public sector policymakers will need to collaborate and build inclusive learning experiences that are context-based, localized and able to adapt to technological change.

*Figure 5: DCO Digital Economy Trends Blueprint 2025*




**LEGEND**

**Dotted circles:**
Expected potential impact
*(average socio-economic impact)*
**Central circle:** Enablers

**Digital economy trends**
○ current
▲ emerging

*Source: DCO DET Survey 2025*

## Key enablers per digital economy trends

All enablers support the adoption of digital economy trends; however, some are considered more fundamental to the flourishing of these trends, as illustrated in Figure 6. Readers seeking to better understand their country's readiness to capitalize on the 2025 digital economy trends can refer to their country's maturity levels in the relevant DEN pillars.

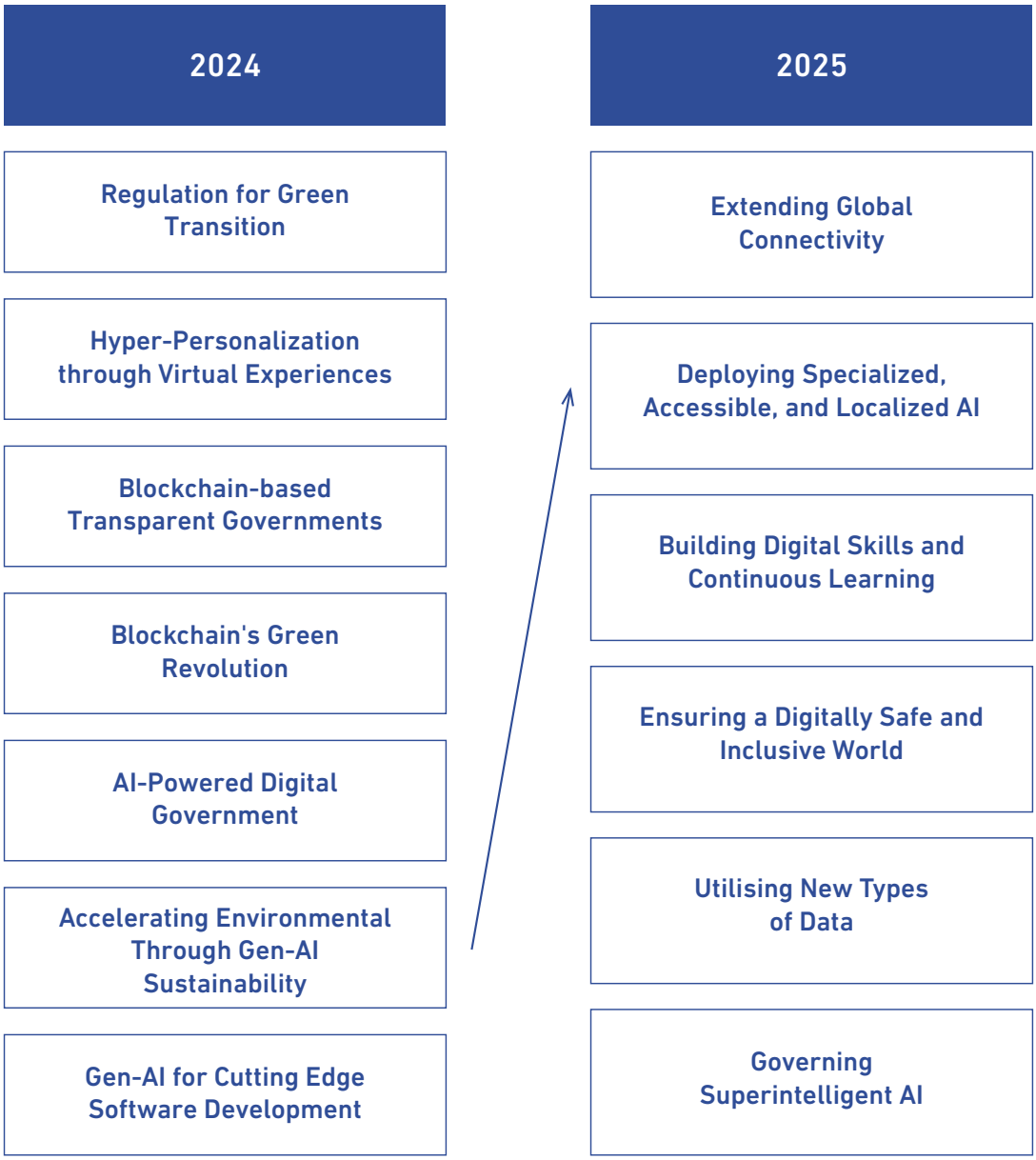
| | Digital infrastructure | Digital capabilities | ICT core business | Digital finance | Digital regulation and public administration | Digital innovation | Industry digital transformation |
|---|---|---|---|---|---|---|---|
| Deploying Specialized, Accessible, and Localized AI | ✓ | ✓ | | | | | ✓ |
| Extending Global Connectivity | ✓ | | | ✓ | ✓ | | |
| Powering a Sustainable Digital Economy | ✓ | | | ✓ | ✓ | | |
| Strengthening Collaborative Data Ecosystems | | | | ✓ | ✓ | | ✓ |
| Deploying Autonomous Systems at Scale | | | ✓ | ✓ | ✓ | | |
| Utilizing New Types of Data | | ✓ | | | ✓ | ✓ | |
| Delivering Hyper-Personalization | ✓ | ✓ | | | ✓ | | |
| Building Digital Skills and Continuous Learning | ✓ | | | ✓ | ✓ | | ✓ |
| Accelerating Scientific Discovery | ✓ | | | ✓ | ✓ | ✓ | |
| Strengthening Digitalization of Financial Services | | | | ✓ | ✓ | | |
| Evolving Digital Cultures, Social Connections, and Behaviors | ✓ | ✓ | | | ✓ | | |
| Embracing Immersive Hybrid Experiences | ✓ | | | | | ✓ | ✓ |
| Evolving Digital Governance | ✓ | ✓ | | | | | ✓ |
| Increasing Resources for Cybersecurity | ✓ | ✓ | | | | ✓ | |
| Advancing Industrial Policies for the Digital Economy | | ✓ | ✓ | | ✓ | | |
| Preparing for the Quantum Era | ✓ | | | | ✓ | ✓ | |
| Ensuring a Digitally Safe and Inclusive World | | ✓ | | | ✓ | ✓ | |
| Governing Superintelligent AI | ✓ | | | | ✓ | | ✓ |

**Figure 6: Essential enablers per current digital economy trend**
**Source:** *DCO DET project team*

### Comparison of top digital economy trends over time

All 15 trends identified in the DET 2024 can be mapped to the trends identified in this year's edition (available in the Appendix). Figure 7 shows how the top digital economy trends have changed between 2024 and 2025. Only one of the top trends in 2025 — Deploying Specialized, Accessible, and Localized AI — is related to one of the top trends identified in 2024 — (Accelerating Environmental Sustainability Through Gen-AI), confirming the rapid evolution of the digital economy.

*Figure 7: Comparison of top trends for 2024 and 2025*

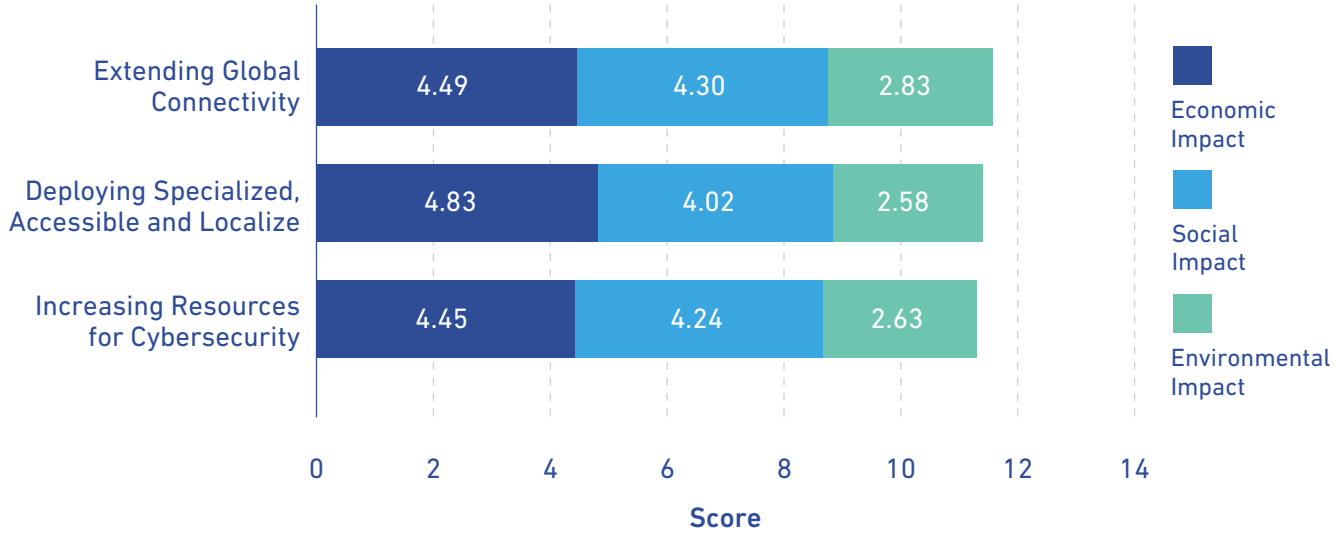



*Source: DCO DET project team based on DET 2024 and DET 2025 findings.*

### Top current trends by collective social, economic, and environmental impact

As stakeholders increasingly focus on the environmental impacts of the digital economy, survey respondents were asked to evaluate them in addition to economic and social impacts. Across all trends, respondents expected the positive environmental impacts to be significantly lower than social and economic impacts for the next 12 to 18 months. When these responses were aggregated to gauge which trends would have the most collective impact on the 2025 digital economy, the top three trends are: Extending Global Connectivity, Deploying Specialized, Accessible, and Localized AI, and Increasing Resources for Cybersecurity. Their scores per impact area are shown in Figure 8.[8]

***Figure 8: Top three current trends by combined economic, social, and environmental impact***




**Source:** *DCO 2024 Digital Economy Trends Survey*
**Q:** *How would you assess the economic/social/environmental impact of these current digital trends in the next 12-18 months at the global level? Each trend is evaluated on a scale of 0-5 with 5 representing the highest value.*
**Respondents:** *293 CTOs and senior technologists working in large companies (+250 employees), 59 policymakers, and 40 digital economy experts.*

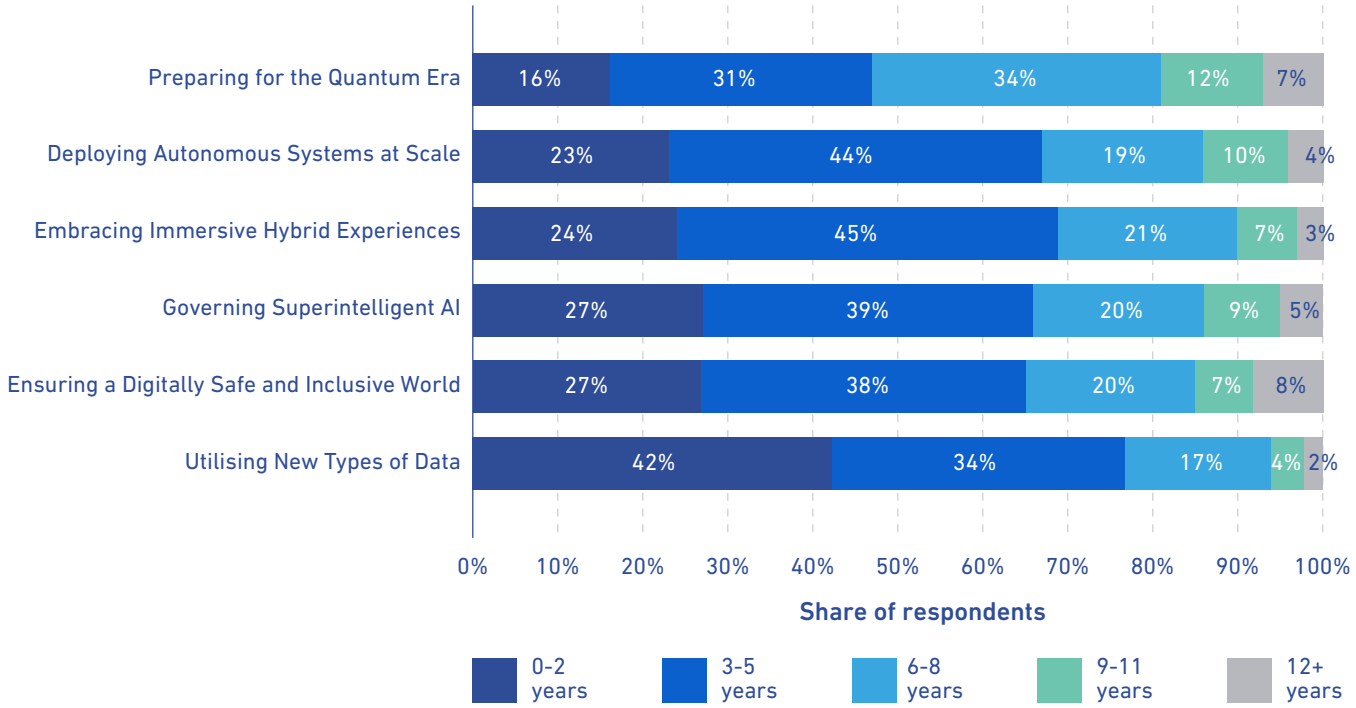
**Top trends shaping the digital economy in 2025**

**Economic impact**
1. Deploying Specialized, Accessible, and Localized AI
2. Building Digital Skills and Continuous Learning
3. Extending Global Connectivity

**Social impact**
1. Building Digital Skills and Continuous Learning
2. Extending Global Connectivity
3. Increasing Resources for Cybersecurity

**Environmental impact**
1. Powering a Sustainable Digital Economy
2. Accelerating Scientific Discovery
3. Strengthening Collaborative Data Ecosystems

*Figure 9: Expected years until the materialization of emerging trends*




**Source:** *DCO 2024 Digital Economy Trends Survey*
**Q:** *At a global level, when do you expect the following emerging Digital Economy trends to affect businesses and societies?*
**Respondents:** *240 CTOs and senior technologists working in large companies (+250 employees), 59 policymakers, and 38 digital economy experts*

### Risk and uncertainty to industry

Alongside their expected positive impact, however, these trends were ranked by industry respondents as posing the biggest risk and uncertainty to their company's operations.

Along with the increasing threat of AI-enabled cyberattacks and the resources required to manage the transition to post-quantum cryptography, a key challenge for organizations is the recruiting and retention of qualified AI and cybersecurity professionals. Particularly for small and medium-sized enterprises, the shortage of skilled personnel hinders effective AI and cybersecurity implementation and advancing larger digital transformation initiatives.

### Emerging trends

Survey responses on the six emerging trends reveal a complex interplay between opportunities and risks. At their core, these trends are considered unpredictable, given their complex and boundary-crossing nature.

There is a significant degree of uncertainty among survey respondents about when the emerging trends will materialize. Roughly 80% of respondents believe they will all mature at some point in the next ten years, although superintelligent AI and quantum computing are expected to have the longest maturity curves.

**Biggest risks and uncertainties to company operations**

1. Deploying Specialized, Accessible, and Localized AI
2. Increasing Resources for Cybersecurity
3. Extending Global Connectivity

There is a crucial window for collaborative action in 2025 — spanning public policy, industry investment, and civil society engagement — to proactively shape how these trends may evolve. Balancing innovation with responsibility can ensure that whenever the emerging trends materialize, they contribute positively to building a digital economy that is fair, resilient, and sustainable for all.

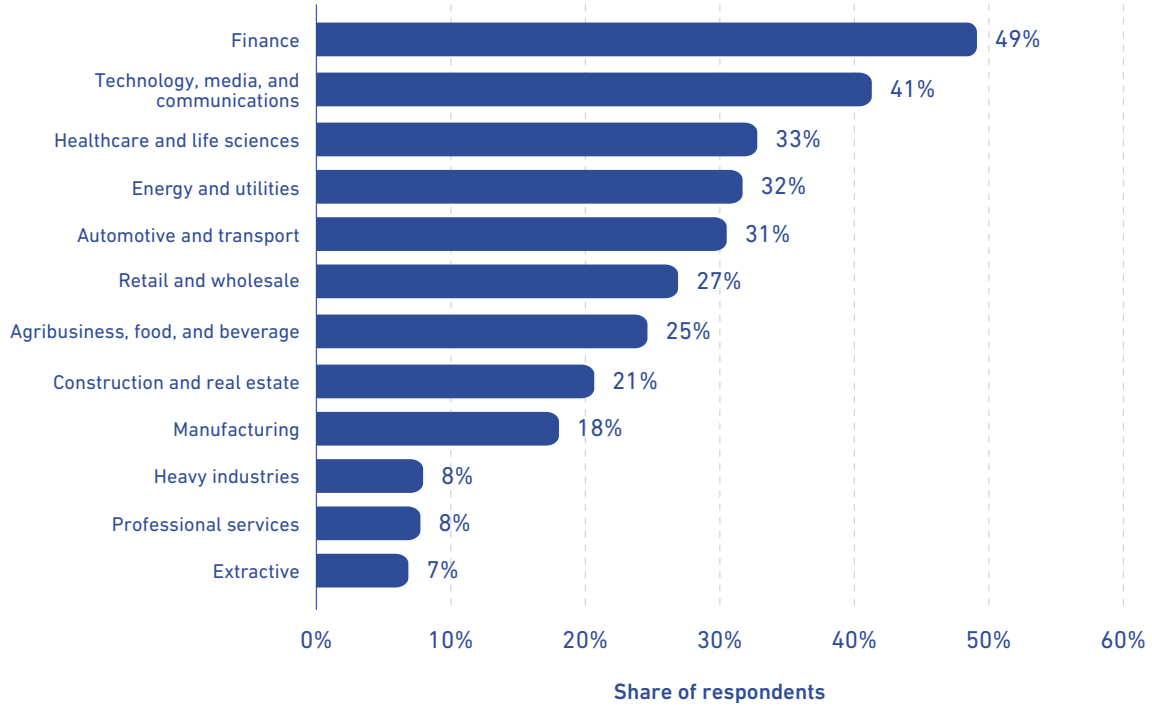
The survey responses suggest that readiness for the emerging trends requires proactive collaboration on priorities that differ by region. North American and Indo-Asia and Pacific survey respondents emphasized quantum readiness and autonomous systems; European respondents prioritized environmental sustainability and agile governance, particularly regarding data and AI; and stakeholders from emerging economies point to the need for equitable access to ensure that the benefits of frontier technologies are broadly distributed. The survey shows that industries need to better prepare for the emerging trends' impacts. This gap between awareness and preparedness is particularly pronounced in healthcare, financial services, and manufacturing, where the convergence of autonomous systems, quantum computing, and new data types could enable radical innovation while introducing novel risks and regulatory uncertainty.

According to DET survey respondents, preparedness levels among stakeholder groups vary significantly. The private sector is viewed as the most prepared, with 49.0% of all respondents believing that businesses are ready to leverage digital economy trends. This figure rises to 72.0% when considering only private sector respondents. In contrast, only 36.9% of respondents believe the public sector is prepared (37.3% if only public sector respondents are included). Meanwhile, the perception of preparedness drops to 30.1% for societies and individuals as a whole.

### Industry outlook on the digital economy

According to survey respondents, finance is the sector most likely to benefit overall from the evolution of the digital economy in the next 12-18 months. While the 12 current trends are delivering profound transformation, their impacts vary by sector.

*Figure 10: Industries most likely to benefit from the digital economy in the next 12-18 months*




**Source:** *DCO 2024 Digital Economy Trends Survey*
**Q:** *At a global level, select the three industries in order of importance you believe are most likely to significantly benefit from the digital economy in the next 12-18 months.*
**Respondents:** *302 CEOs, CTOs, and senior technologists working in large companies (+250 employees).*

As with the entire survey sample, industry respondents ranked Specialized, Accessible, and Localized AI as one of their top three priorities in 2025. They also ranked Increasing Resources for Cybersecurity as a top trend, particularly for respondents from data-heavy sectors such as technology, media, and communications, automotive and transport, and retail and wholesale. Meanwhile, Digital Skills and Learning is particularly important for finance, technology, media, and communications, energy and utilities, and heavy industries and extractive, which need to invest in developing human capital to keep pace with the changing demands of the digital economy.

Respondents from energy and utilities, construction and real estate, manufacturing, heavy industry, and agribusiness, food, and beverage were more likely to focus on sustainability and addressing the expanding energy requirements of frontier technologies. Connectivity ranks high for sectors that increasingly depend on real-time data analytics, such as automotive and transport and construction and real estate. Collaborative data ecosystems are a growing priority for finance and healthcare and life sciences.

## Key trends for growth opportunities by industry

### Finance
1. Strengthening Collaborative Data Ecosystems
2. Strengthening Digitalization of Financial Services
3. Building Digital Skills and Continuous Learning

### Technology, media, and communications
1. Increasing Resources for Cybersecurity
2. Building Digital Skills and Continuous Learning
3. Strengthening Digitalization of Financial Services

### Healthcare and life sciences
1. Accelerating Scientific Discovery
2. Deploying Specialized, Accessible, and Localized AI
3. Strengthening Collaborative Data Ecosystems

### Energy and utilities
1. Increasing Resources for Cybersecurity
2. Powering a Sustainable Digital Economy
3. Deploying Specialized, Accessible, and Localized AI

### Automotive and Transport
1. Deploying Specialized, Accessible, and Localized AI
2. Extending Global Connectivity
3. Increasing Resources for Cybersecurity

### Retail and wholesale
1. Evolving Digital Cultures, Social Connections, and Behaviors
2. Deploying Specialized, Accessible, and Localized AI
3. Increasing Resources for Cybersecurity

### Agribusiness, food, and beverage
1. Deploying Specialized, Accessible, and Localized AI
2. Powering a Sustainable Digital Economy
3. Advancing Industrial Policies for the Digital Economy

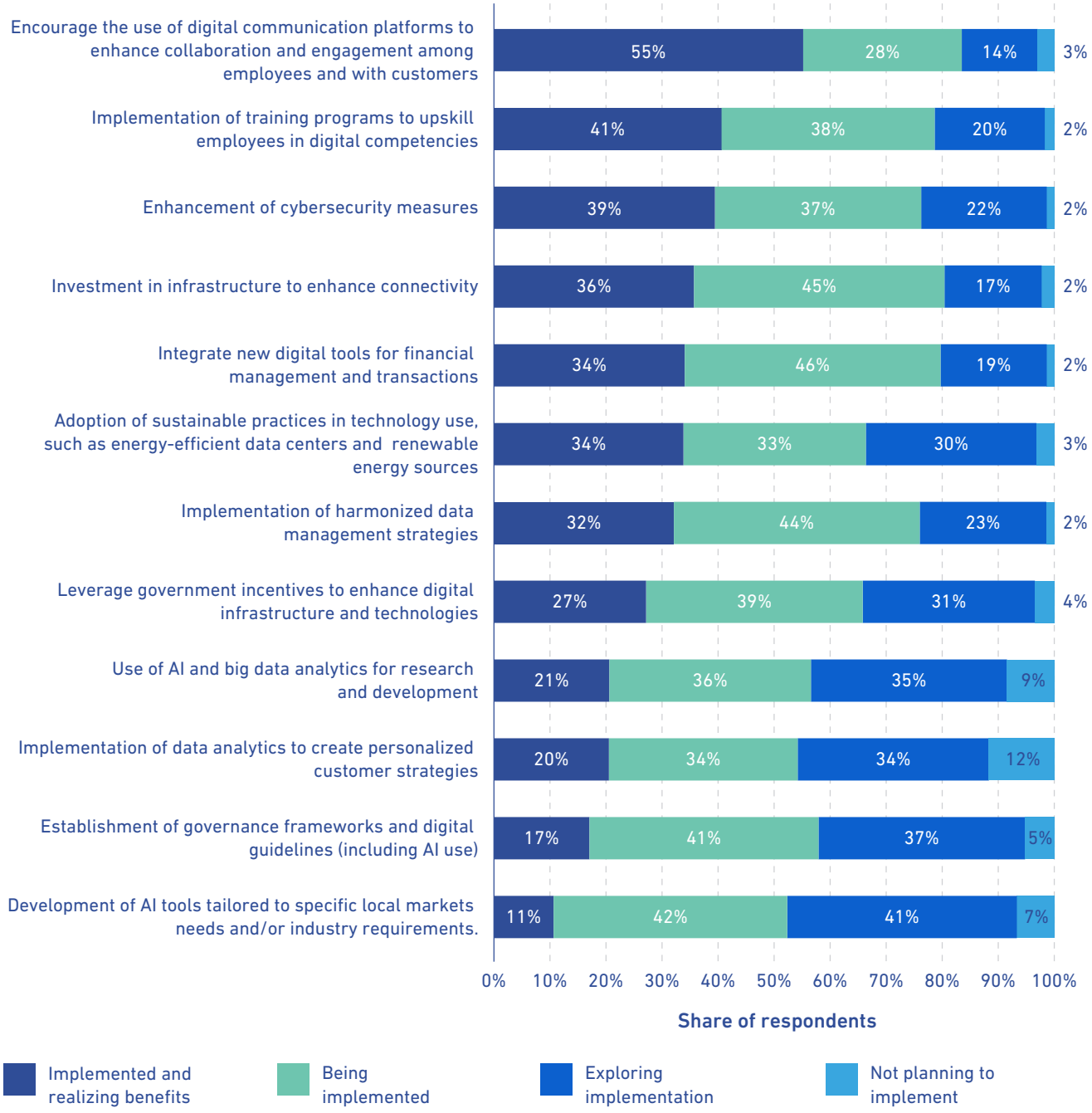
### Construction and real estate
1. Powering a Sustainable Digital Economy
2. Deploying Specialized, Accessible, and Localized AI
3. Increasing Resources for Cybersecurity

### Manufacturing
1. Advancing Industrial Policies for the Digital Economy
2. Powering a Sustainable Digital Economy
3. Increasing Resources for Cybersecurity

### Heavy industries and extractive
1. Deploying Specialized, Accessible, and Localized AI
2. Building Digital Skills and Continuous Learning
3. Powering a Sustainable Digital Economy

Survey results indicate that industry respondents identify the highest potential for returns on investment in improving communication platforms, upskilling employees, and strengthening cybersecurity. Companies appear to be taking a measured approach to implementing AI, as only 20% already report significant benefits. With many prioritizing the establishment of robust governance frameworks before widespread deployment, 2025 is poised to be a pivotal year to maximize the opportunities and address the challenges associated with commercial AI.

**Figure 11: What strategies and plans is your company planning to implement in the next 12-18 months?**




**Source:** *DCO 2024 Digital Economy Trends Survey*
**Q:** *To what extent is your company implementing or planning to implement (in the next 12 months) the following strategies/plans?*
**Respondents:** *302 CEOs, CTOs, and senior technologists working in large companies (+250 employees).*

## Top trends by region

Respondents generally agreed on priority trends across regions. Building Digital Skills and Continuous Learning ranked high across the world, with stakeholders from the private sector, public sector, and international organizations all recognizing it as essential for building an equitable and resilient global digital economy. Proactive collaboration among governments and businesses is needed to equip individuals with the skills to flourish in the digital economy, advancing societal well-being and economic opportunity.

Specialized, Accessible, and Localized AI was also a priority across regions. As the AI market evolves away from large language models toward smaller, localized AI applications tailored to the specific needs of sectors and communities, respondents from around the world see growing potential to design, develop, and deploy AI solutions that reflect their distinct national priorities, cultural values, and regulatory frameworks in 2025.

While some priorities are shared globally, Figure 12 shows that regions also exhibit distinct focal points based on their unique conditions, highlighting the need for tailored approaches to maximize the benefits of digital economy trends.

*Figure 12: Key trends by region*

# 1 Sustainable Intelligent Ecosystems

CURRENT TREND

## 1.1

Deploying Specialized, Accessible, and Localized AI

CURRENT TREND

## 1.2

Extending Global Connectivity

CURRENT TREND

## 1.3

Powering a Sustainable Digital Economy

CURRENT TREND

## 1.4

Strengthening Collaborative Data Ecosystems

EMERGING TREND

## 1.5

Deploying Autonomous Systems at Scale

EMERGING TREND

## 1.6

Utilizing New Types of Data

# Overview

The Sustainable Intelligent Ecosystems theme reflects how artificial intelligence (AI) and data are central to value creation in the digital economy and highlights the urgent need for sustainability and inclusion. Business, government, and civil society leaders need to collaborate on balancing the speed of innovation, resource consumption, and equitable access to ensure a more prosperous and inclusive digital economy.

Successfully doing so would entail:

Cross-sector partnerships enabling transformative and inclusive solutions.

Adaptive governance in place to protect individual rights while fostering innovation.

Addressing commercial sustainability and digital divides in tandem.

## Current trends

### 1.1: Deploying Specialized, Accessible, and Localized AI

Small and open-source models are expanding access to AI technology, enabling organization-specific deployments across sectors.

### 1.2: Extending Global Connectivity

5G networks and satellites are transforming access to connectivity, but there are concerns about the resulting digital divide, fair pricing, and regulatory oversight.

### 1.3: Powering a Sustainable Digital Economy

The growing demand for sustainable and clean power is driven by AI's increasing need for computing power, highlighting its dual role in improving energy efficiency while posing environmental challenges.

### 1.4: Strengthening Collaborative Data Ecosystems

New collaborative frameworks are bridging organizational data silos and jurisdictional boundaries to leverage large volumes of data via secure, distributed, privacy-enhancing technologies that ensure confidentiality and compliance.

## Emerging trends

### 1.5: Deploying Autonomous Systems at Scale

The rapid deployment of autonomous systems is reshaping industries with new efficiencies while also presenting significant workforce displacement and socio-economic disruption challenges.

### 1.6: Utilizing New Types of Data

New classes of granular and real-time data from an array of biological, chemical, material, social and physical systems are being leveraged for breakthrough discoveries, and innovations.

**AI Governance:** Recent United Nations (UN) reports highlight the need to improve the Global South's representation in developing tools for AI governance that align with the Sustainable Development Goals.[1]

"AI has the potential to boost productivity, create new opportunities, improve consumer welfare, and provide significant benefits to the global economy and society. However, it also poses risks, such as reinforcing the dominance of big tech, displacing workers, increasing inequality, enhancing state surveillance, eroding privacy, spreading misinformation, manipulating democratic processes, and increasing security vulnerabilities."

International Monetary Fund, 2024[2]

CURRENT TREND

# 1.1

# Deploying Specialized, Accessible, and Localized AI

## What does the trend encompass?

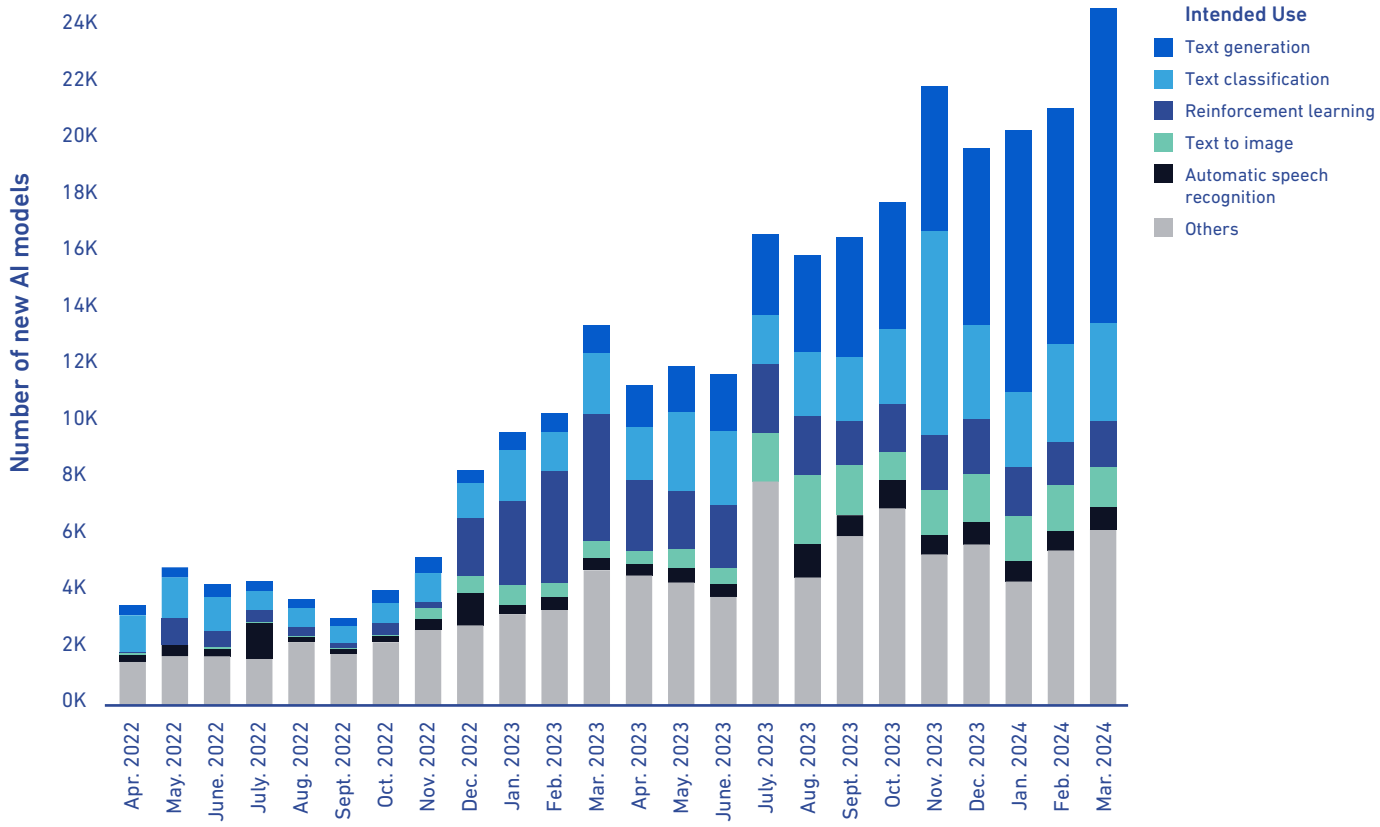
AI applications are becoming more specialized, localized, and democratized. Examples include disease-specific diagnostics, farmer-specific crop management, and language-adapted learning tools. The shift from Large Language Models (LLMs) to Small Language Models (SLMs) is driven by growing demand for open-source AI that addresses the needs of specific sectors, including adherence to regulatory requirements.[3]

## Why is it important?

Organizations are increasingly recognizing the limitations of generic AI models in addressing sector-specific challenges. Industries have their own regulatory frameworks, data privacy concerns, and operational demands that require customized solutions. Recent analysis indicates that half of reported generative AI use cases now involve specialized models — either customized with proprietary data or built from scratch to address specific business requirements.[4]

> "In terms of also how we empower communities, we need to make sure that the localized services are specifically tailored to reflect the local culture, customs, and the language."
>
> *Cristina Bueti, ITU, 2nd Expert Panel*

***Figure 13: Evolution of new AI models, per intended use***




*Source: OECD.AI (2024)*

OECD and Hugging Face data, as shown in Figure 13, highlights how AI models are growing both in number and diversity. While text-based models still dominate, other functions — such as audio, image, and feature-extraction — are rapidly gaining momentum. This indicates a shift toward multi-modal AI applications that are more specialized and localized solutions that are tailored to meet sector-specific compliance requirements.

The next key shift in the AI landscape is localization. Edge AI—which sees AI models deployed on local devices — is still in the early development stages, but the market is projected to grow to US$140 billion by 2032, from US$19 billion in 2023.[6] Driven by advances in the Internet of Things (IoT), semiconductor technology, and 5G, edge AI is set to be integrated in devices such as smartphones, PCs, and automobiles for tasks from image generation to language translation. This kind of on-device processing should enable services that are more personalized, with lower latency, and minimize risks to data privacy.[7]

Accessibility is the third factor shaping the AI landscape, with a proliferation of open-source models, publicly available training datasets, and software development tools expanding capabilities beyond large technology companies. Low-code/no-code platforms are enabling smaller organizations and communities to innovate and customize their own solutions to specific challenges. Meta's Llama is one example of an open-source AI model being adopted across industries.[9]

**Investment trends in AI:** The US is outpacing other regions in AI investment. Since 2013, it has invested US$335 billion, much more than China ($104 billion) and the UK (US$22.3 billion). The gap continues to widen, with US investments growing by 22% from 2022, compared with declines in China (44%), and the EU, and UK (14%).[5]

**Use case:** Edge AI is helping to make buildings smarter and more environmentally friendly.[8] It aggregates data from sensors to manage heating, cooling, and lighting systems more efficiently, and spot early signs of equipment problems to let building managers fix things before they break.

The DCO 2024 Digital Economy Trends Survey revealed that among Chief Technology Officers (CTO) specialized AI solutions are spreading rapidly: **59% of companies have already implemented or are currently implementing their own AI solutions**, and most of the others are considering it — only 6% say they are not.

## Impacts on the horizon

Regulated sectors (healthcare, finance, manufacturing) driving early adoption through defined use cases.

Urban edge computing expansion enabling the first wave of localized AI applications.

Automated machine learning and no-code platforms democratizing access for mid-sized enterprises.

Talent shortages and regional compliance creating friction between innovation and regulation.

According to the Stanford AI Index Report 2024, private investment in generative AI increased ninefold from 2022 to 2023, with a 40% increase in newly funded AI companies.[10]

**Sovereign AI initiatives:** The growing momentum behind sovereign AI initiatives reflects the increasing strategic focus nations place on technological autonomy and competitive differentiation. These programs enable countries to develop AI capabilities that honor cultural context and local innovation while maintaining oversight of critical systems within their sovereign borders. Although sovereign AI presents opportunities for enhanced security and economic growth, it also requires thoughtful investment in infrastructure, talent development, and governance frameworks to ensure its use is consistent with the principles of responsible and ethical AI development.

A recent report from Imperial College London and the Trusted AI Alliance explores the concept of 'Sovereign AI' and the drive for nations to develop independent AI capabilities, free from reliance on dominant big tech firms. The report highlights the importance of achieving strategic autonomy, fostering cultural relevance, driving economic growth, and tackling critical concerns such as cybersecurity, online misinformation, and market competitiveness.[11]

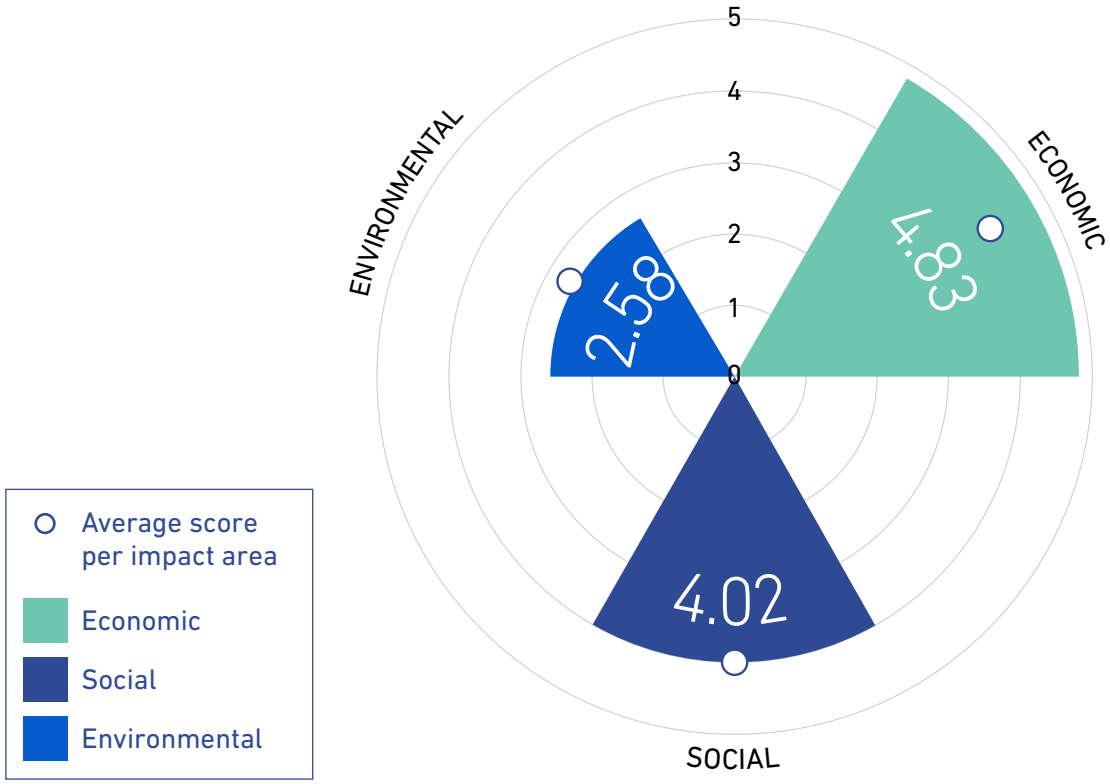
Listen to the AI-generated audio summary of the 'Sovereign AI' report by clicking this QR code.

# Survey findings

### Economic, social, and environmental impact

Respondents rank the Deployment of Specialized, Accessible, and Localized AI as having the highest potential for positive economic impact among all 12 trends (4.83). Its social impact is also rated positively (4.02), but the low environmental score (2.58) likely indicates concern about the need for greater energy consumption as more AI models are deployed.

*Figure 14: Trend 1.1 - Positive economic, social, and environmental impact*



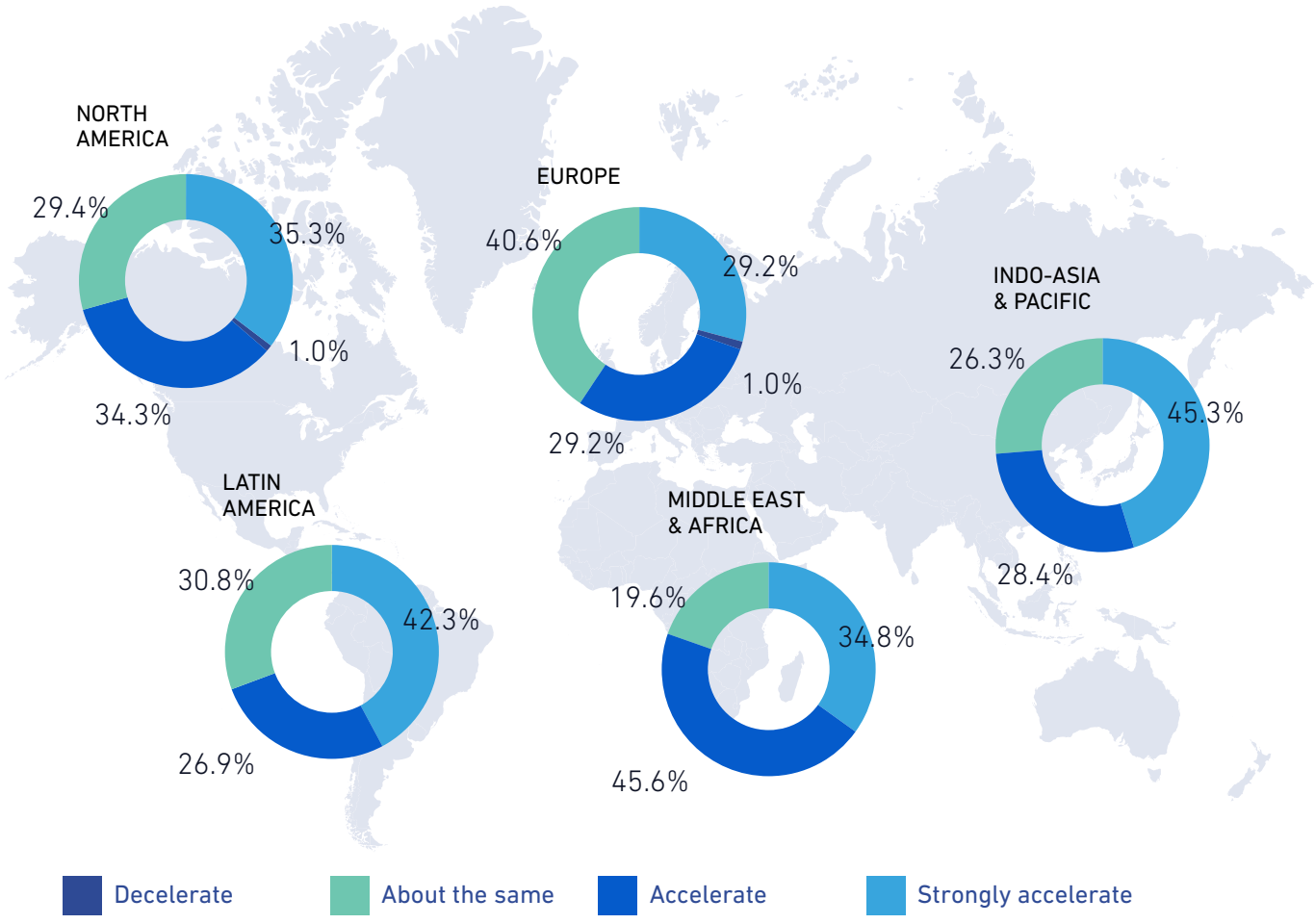

**Source:** *DCO 2024 Digital Economy Trends Survey.*
**Q:** *How would you assess the economic/social/environmental impact of these current digital trends in the next 12-18 months at the global level?*
**Respondents:** *293 CTOs and senior technologists working in large companies (+250 employees), 59 policymakers, and 40 digital economy experts.*

Respondents from Indo-Asia and Pacific and Latin America are the most optimistic about this trend's economic (5.57 and 5.71, respectively) and social (4.75 and 5.33, respectively) impacts, while those in North America are particularly skeptical about its environmental impact (2.43). Private sector respondents are more enthusiastic about economic (5.28) and social (4.48) impacts than policymakers (3.54 and 2.51 respectively) or experts (3.40 and 2.90 respectively), who are concerned about implementation challenges such as equitable access and governance. In terms of industry sectors, economic optimism is the highest in finance and professional services (6.17) while respondents from healthcare and life sciences are the most confident about positive social impacts (5.47).

### Pace of change

Most respondents believe the pace of the trend for localized and specialized AI will accelerate in the next 12-18 months. Confidence is highest in the Indo-Asia and Pacific region (where 45% expect strong acceleration) followed by Latin America (42%). Meanwhile, those in Europe were the most likely to say they expect no change (41%). Private sector respondents anticipate more accelerated progress than their public sector counterparts.

*Figure 15: Trend 1.1 - Pace of change per region*

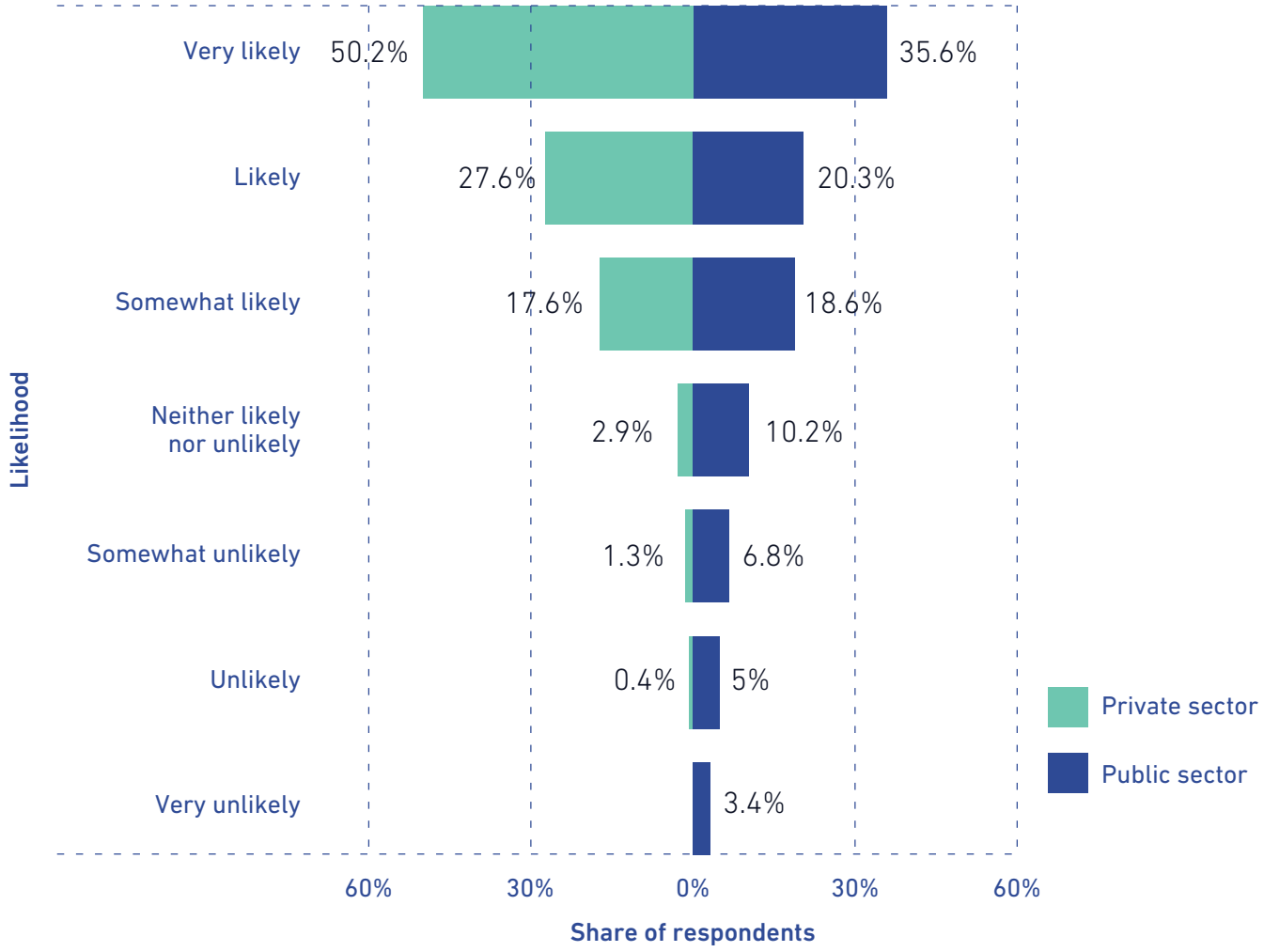



**Source:** *DCO 2024 Digital Economy Trends Survey.*
**Q:** *How do you expect the pace of change of these current digital trends to evolve in the next 12-18 months at the global level?*
**Respondents:** *293 CTOs and senior technologists working in large companies (+250 employees), 59 policymakers, and 40 digital economy experts.*

### Stakeholder impact

Survey respondents widely anticipate that Specialized, Accessible, and Localized AI will face new regulations within the next 12 to 18 months, although more private sector respondents (50%) than policymakers (35%) say new regulations are very likely. Expectations are highest in Latin America (61%) and lowest in Europe (28%), where a recent surge in EU policy momentum[12] may have left stakeholders believing that further regulations in the near term are less likely.

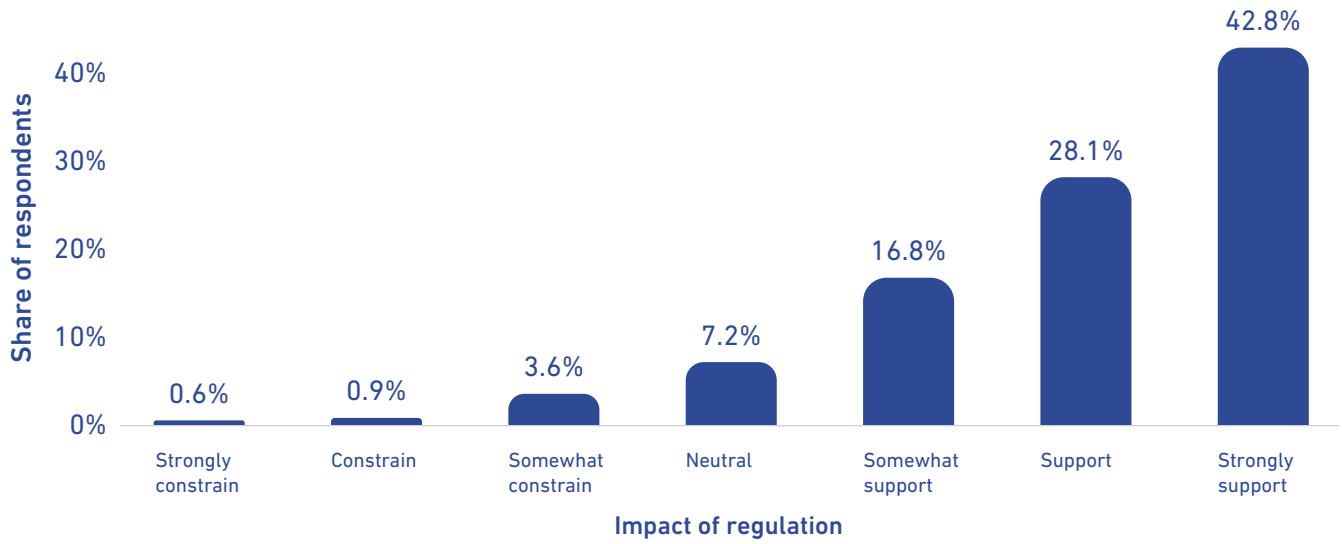
*Figure 16: Trend 1.1 - Perceptions of likelihood of legislation or regulation activity by stakeholder group*




**Source:** *DCO 2024 Digital Economy Trends Survey.*
**Q:** *At a global level, how likely do you think it is that we will see an increase in legislative and regulatory activities related to the following trends in the Digital Economy over the next 12 to 18 months?*
**Respondents:** *293 CTOs and senior technologists working in large companies (+250 employees), 59 policymakers, and 40 digital economy experts.*

There is widespread consensus that new regulations are likely to support rather than hinder the adoption of this trend, by promoting innovation while ensuring responsible use. Respondents in Indo-Asia and Pacific (53%) are most likely to support new regulations, and those in Europe least likely. Private sector respondents and experts in the technology, media, and communications sector also support new regulations, while policymakers themselves take a more cautious perspective, perhaps reflecting appreciation of the challenges of regulating such a rapidly moving field.

***Figure 17: Trend 1.1 - Expected impact of new legislation or regulation activity on trend adoption***




**Source:** *DCO 2024 Digital Economy Trends Survey.*
**Q:** *At a global level, how do you expect these legislative and regulatory activities to influence the adoption of digital economy trends in the next 12 to 18 months?*
**Respondents:** *293 CTOs and senior technologists working in large companies (+250 employees), 59 policymakers, and 40 digital economy experts.*

## Asking AI

**We asked three leading LLMs (ChatGPT-4o, Claude 3.5, and Llama 3.1) to assess the economic, social, and environmental impacts of this trend over the next 12-18 months. Here's what the models had to say:**

### Economic impact

All three LLM models noted the deployment of specialized AI as having a positive economic impact in the next 12-18 months. They argued that it is expected to enhance productivity and drive growth globally as specialized AI will drive efficiencies, cost savings, and new business opportunities.

### Social impact

The ChatGPT and Llama models agreed that specialized AI would have a somewhat positive social impact in the next 12-18 months, while Claude was more optimistic. The models agreed they would improve access, however, ChatGPT highlighted concerns about data privacy and equitable access.

### Environmental impact

The LLMs were also split between somewhat positive and positive impacts regarding the environment. They all noted that AI can save energy, but Claude and Llama rated the trend somewhat positive and noted that it may lead to increased consumption and e-waste.

*Note: These insights from LLMs are not data driven. They are provided as directional and sentimental and the LLMs have not had access to the survey data.*[13]

## Key enablers

**The widespread adoption of specialized and localized AI solutions depends on:**

**Digital Infrastructure**

Pervasive high-speed connectivity, with particular emphasis on 5G/6G deployment in underserved regions.

**Industry digital transformation**

Public-private funding mechanisms prioritizing sector-specific over general-purpose AI applications.

**Digital capabilities**

Digital literacy initiatives building skills in the community, including AI-specific certification pathways.

## Recommendations

### Private sector

**Prioritize localized AI applications** that process data at the source to provide immediate insights and ensure data privacy compliance.

**Build regional data hubs and cross-sectoral governance frameworks** to support distributed AI deployment.

**Engage local stakeholders** to develop culturally aware, open-source AI solutions and multilingual models.

**Create public-private partnerships** to establish local training datasets while protecting data sovereignty.

### Public sector

**Develop risk-based, local regulations** balancing innovation with public safety and equity.

**Prioritize the harmonization of data protection policies** that incentivize infrastructure investment in underserved areas and establish clear AI deployment guidelines.

**Build public-private partnerships** to focus on expanding digital infrastructure and AI skills development to serve broader societal interests.

### IGOs, IOs, and others

**Develop governance frameworks to ensure the proliferation of AI reduces** rather than amplifies digital divides. Focus areas include developing ethical frameworks, monitoring local societal impacts, and advocating for inclusive policies.

**Establish open global standards for promoting responsible AI adoption** across diverse cultural and economic contexts.

CURRENT TREND

# 1.2

# Extending Global Connectivity

## What does the trend encompass?

The rollout of advanced connectivity technologies, such as satellite and 5G, is bringing transformational new capabilities, especially in edge AI. However, the unevenness of the digital divide — driven by affordable pricing, effective regulatory oversight and commercial viability — is also raising tensions.[14]

## Why is it important?

> "We have seen that ever since the launch of ChatGPT in late 2022, high-income countries have surged ahead, and on average every internet user in high-income countries use ChatGPT three or four times on average per month. But in middle-income countries and the lower-income countries, the usage intensity has been very low."
>
> *Yan Liu, World Bank, 2nd Expert Panel*

As market dynamics favor deploying networks where populations are dense, urban areas and business districts are more likely to benefit from cutting-edge 5G and private wireless networks, while rural and remote communities face connectivity challenges.[16]

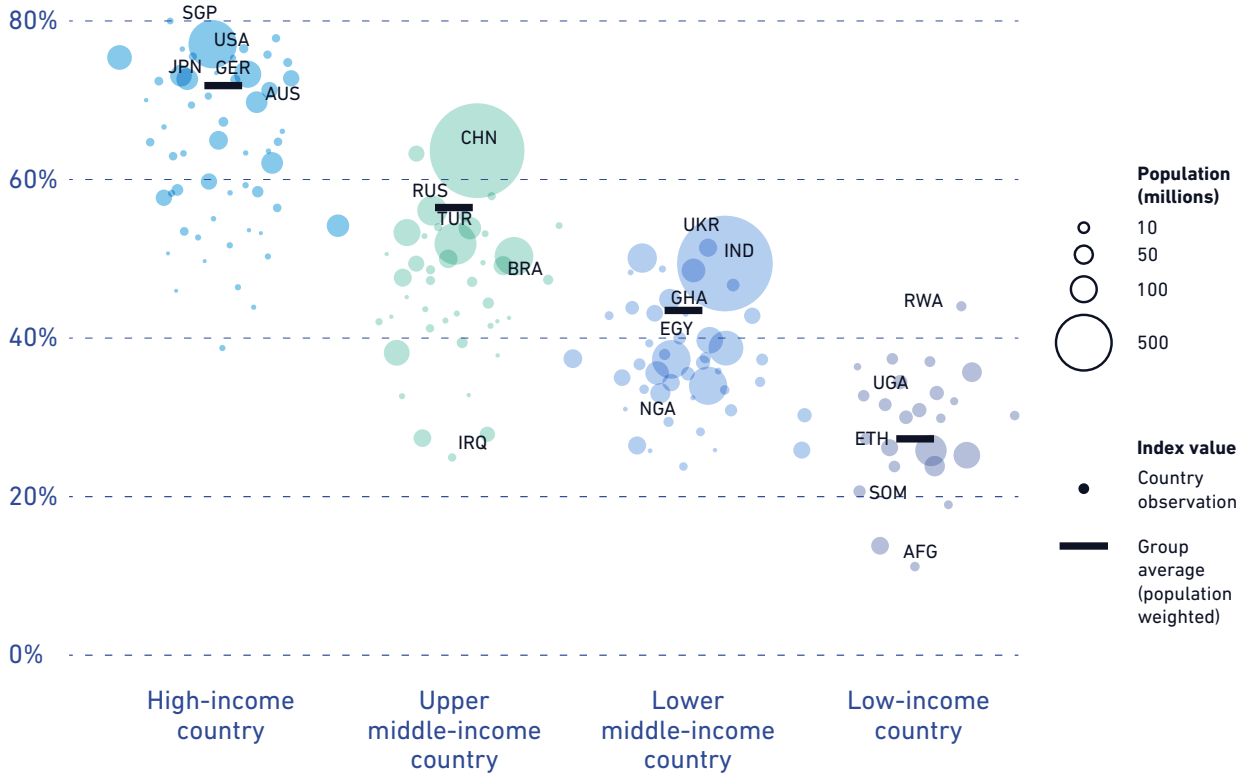
Although hybrid terrestrial-satellite solutions promise wider coverage, many low- and middle-income countries still do not meet the ITU's broadband affordability targets. In 2023 entry-level 1GB data plans cost more than 2% of average monthly income in 37% of low- and middle-income countries, while 20GB data can cost up to 15% of monthly income in Sub-Saharan Africa.

**5G growth:** By 2030 there are projected to be 5.5 billion 5G connections, up from 1.6 billion in 2024, accounting for US$930 billion of the US$6.4 trillion global mobile economic impact.[15]

**Cost of connectivity:** Connectivity costs are decreasing, but at a slowing rate. Between 2019 and 2022, 100 Gbps wavelength prices on major international routes decreased by 13%, compared with 23% for the previous three-year period. This reflects factors such as supply constraints and geopolitical challenges, which vary by region: some routes, such as US-Latin America, saw prices fall more than others, such as Marseille-Singapore and Hong Kong-Singapore.[17]

Figure 18 shows the digital divide in AI readiness across countries, with scores on an index measuring digital infrastructure, human capital, and institutional capacity decreasing markedly with each income group.

***Figure 18: IMF AI Preparedness Index by income group, 2024***




*Source: Schellekens and Skilling.*[18]

Governments increasingly recognize connectivity as being in the same category of essential utilities as electricity and water. This shift in mindset is driving new models of public-private collaboration to build digital public infrastructure that expands beyond connectivity to also include digital ID systems, payment networks, cloud services, and data exchange platforms.

Building local expertise in network deployment, management, and maintenance is crucial to make expansions in connectivity sustainable, particularly in underserved areas. Communities need specialists who understand both technical requirements and local context, including expertise in regulatory compliance, security protocols, and business model innovation. Investment in continuous learning programs must keep pace with evolving technologies while ensuring knowledge transfer to build local capacity.

**Digital infrastructure disparities:** Among the 50 countries featured in the Digital Cooperation Organization's (DCO) 2024 Digital Economy Navigator (DEN), progress in digital infrastructure is evident across the board, yet regional disparities persist, highlighting uneven advancement. While 52% are classified as frontier or advanced in digital infrastructure, a substantial segment remains in the emerging (22%) and nascent (12%) categories. North America and Europe/Central Asia lead, especially in affordability, with smartphone costs at 1.7 and 4.6 times the average monthly income, compared with South Asia (40.2) and Sub-Saharan Africa (27.1). These geographical disparities highlight significant gaps that need addressing, particularly in these latter two regions.

## Impacts on the horizon

Expanded use of 5G and satellite services address rural connectivity challenges.

Traditional spectrum and infrastructure regulations expand to support the achievement of measurable socio-economic impact.[25]

Increase in public-private funding mechanisms drive digital inclusion.[26]

Commercial incentives for digital innovations may deliver increased socio-economic impact.

**5G use cases:**

**Industrial and manufacturing:** 5G networks improve the reliability of automated guided vehicles and enable real-time machinery monitoring, with Bosch's Bengaluru factory reducing time spent on repairs by 40%.[19]

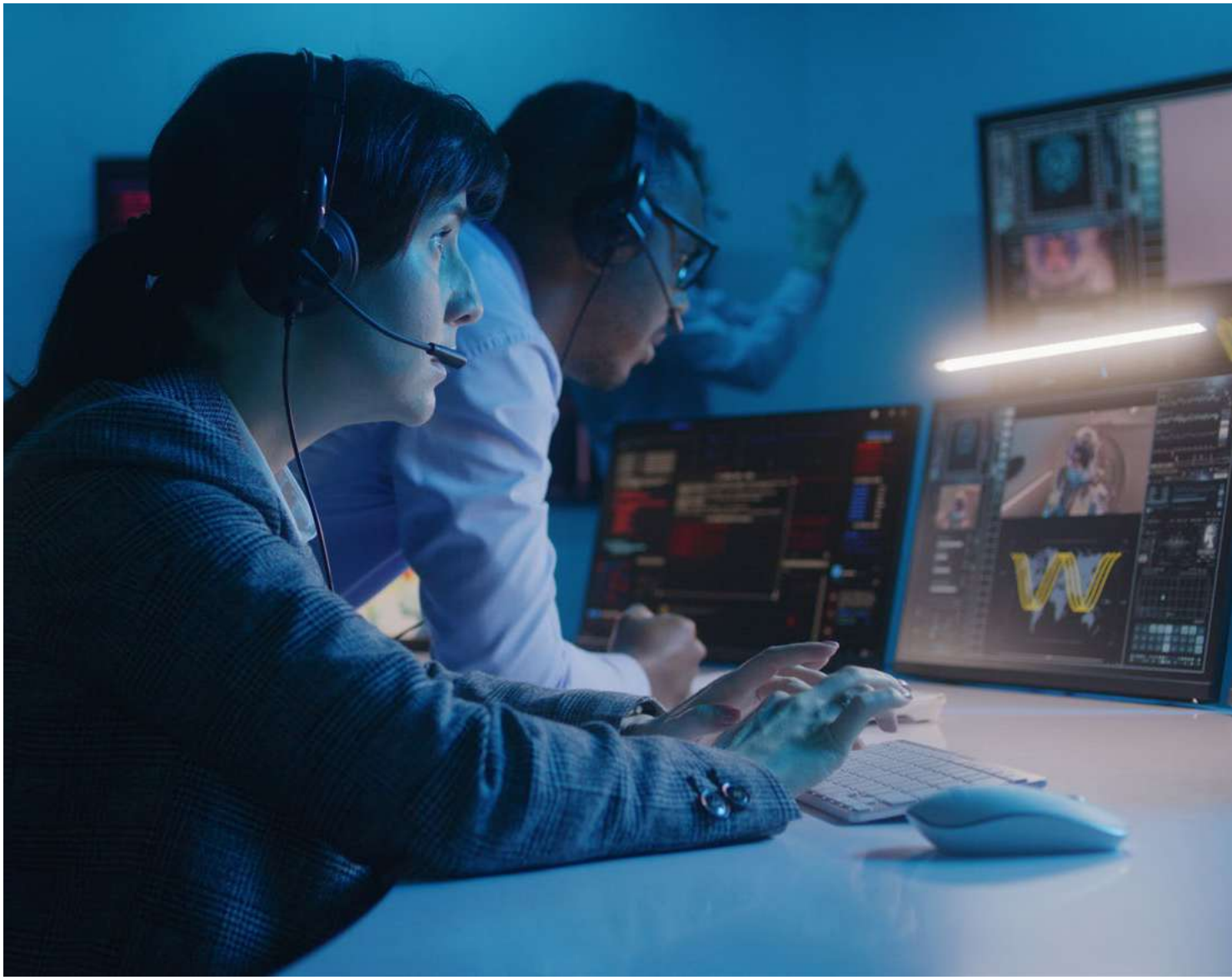
**Agriculture:** Precision farming systems in Australia leverage 5G for real-time machinery monitoring and resource optimization.[20]

**Transport:** Volvo's European 5G-connected truck trials and Singapore's automated port operations showcase logistics automation.[21]

**Healthcare access:** 5G-enabled telemedicine expands specialist care to remote areas. India's rural clinics are deploying this technology to enable remote diagnostics and monitoring.[22]

**Connectivity as digital public infrastructure**

The G20 measures the effectiveness of digital public infrastructure, defined as "shared digital systems that are secure and interoperable"[23], through metrics including equitable access, user adoption, efficiency gains, and adequacy of safeguards. This helps to identify where digital public infrastructure might be failing to deliver expected benefits or giving rise to unintended consequences such as data centralization or system monopolization.[24]



**Digital public infrastructure use case:** Estonia's X-Road platform[27] and India's IndiaStack[28] exemplify how public sector organizations can establish effective governance frameworks for digital public infrastructure, empowering public and private entities to build innovative solutions. IndiaStack's[29] interoperable digital building blocks include a biometric system that enables access to essential services and a payment interface that facilitates over 8 billion monthly transactions. Individuals can control how their data is shared for purposes such as building their credit score.

# Survey findings

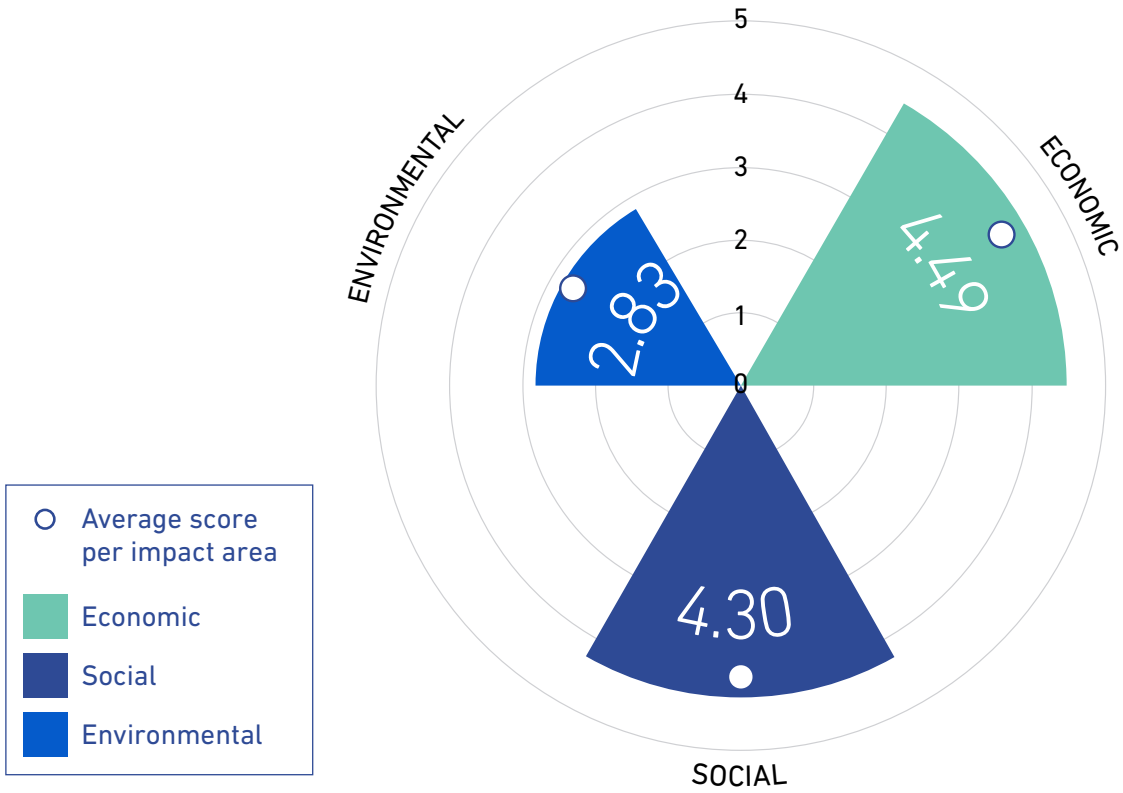
### Economic, social, and environmental impact

Respondents identify Extending Global Connectivity as a leading force for social equity (4.3), placing it second among the 12 trends. It also scores relatively well for economic (4.5) and environmental (2.8) impacts, ranking third and fourth respectively.

Respondents in Indo-Asia and Pacific and Latin America exhibit the strongest optimism for the economic (5.79 and 5.21, respectively) and social (4.77 and 4.94, respectively) impacts of extending connectivity. Scores are more muted in Europe and North America for economic (3.54 and 4.28) and social (3.34 and 4.14) impacts, reflecting relatively saturated connectivity markets. Respondents in Europe were especially concerned with the environmental impact (2.0) of actions to expand connectivity, such as satellite launches and 5G rollouts.

Private sector respondents are more confident about economic (4.74) and social (4.56) impacts than policymakers (3.34 and 3.54, respectively). In terms of sectors, enthusiasm is highest in technology, media, and communications and finance and professional services.

*Figure 19: Trend 1.2 - Positive economic, social and environmental impact*



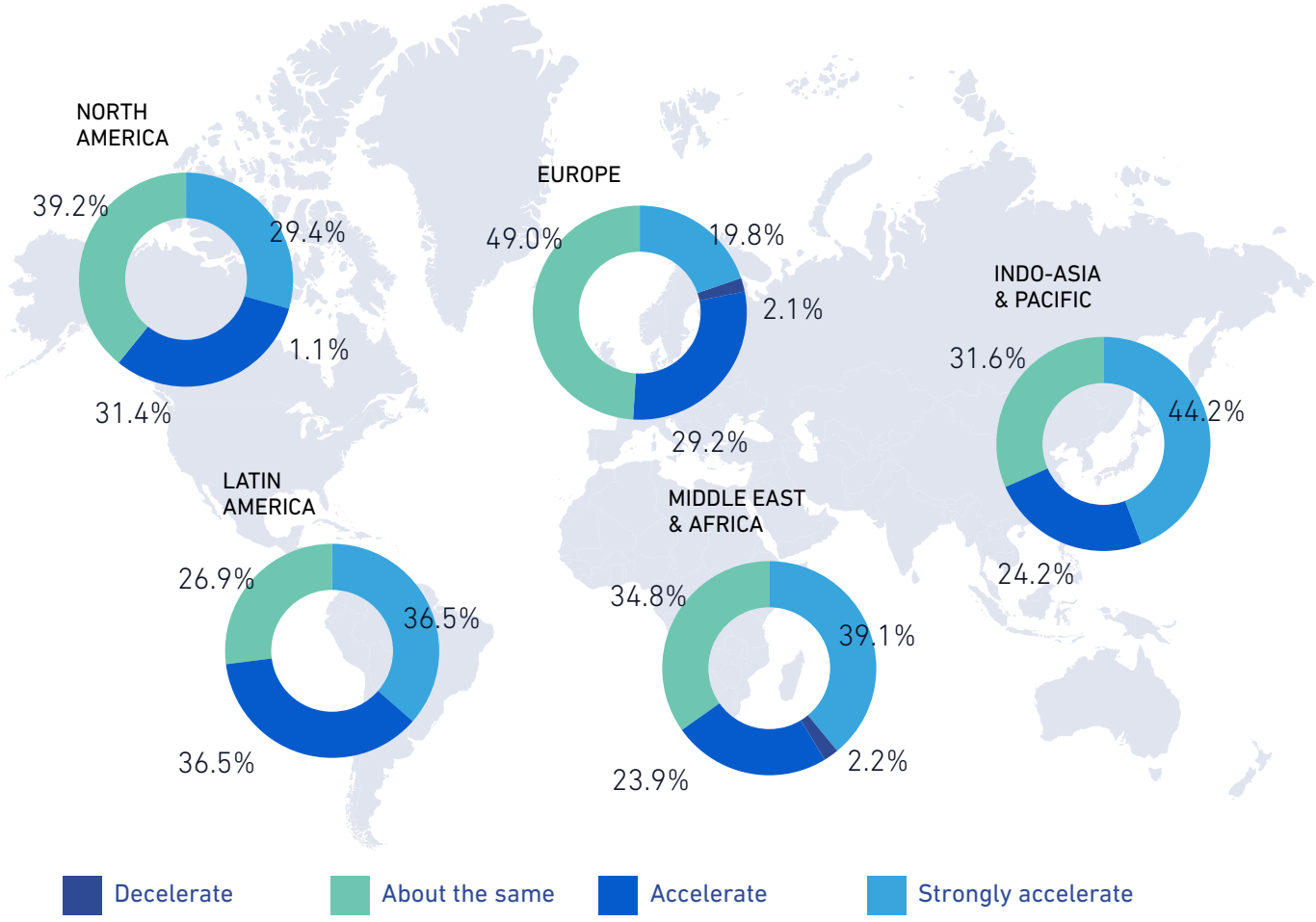

**Source:** *DCO 2024 Digital Economy Trends Survey.*
**Q:** *How would you assess the economic/social/environmental impact of these current digital trends in the next 12-18 months at the global level?*
**Respondents:** *293 CTOs and senior technologists working in large companies (+250 employees), 59 policymakers, and 40 digital economy experts.*

### Pace of change

Extending Global Connectivity is expected to accelerate over the next 12 to 18 months, though at a slower pace than most other trends, ranking ninth overall. Respondents from technology, media and communications are more likely to anticipate strong acceleration than those in other sectors.

Indo-Asia and Pacific is the most optimistic region, with 44.2% expecting strong acceleration, followed by the Middle East and Africa (39.1%) and Latin America (36.5%). In Europe, however, more than half the respondents expect the pace to remain unchanged (49%) or decelerate (2%), likely reflecting the region's already high levels of digital connectivity.

*Figure 20: Trend 1.2 - Pace of change per region*

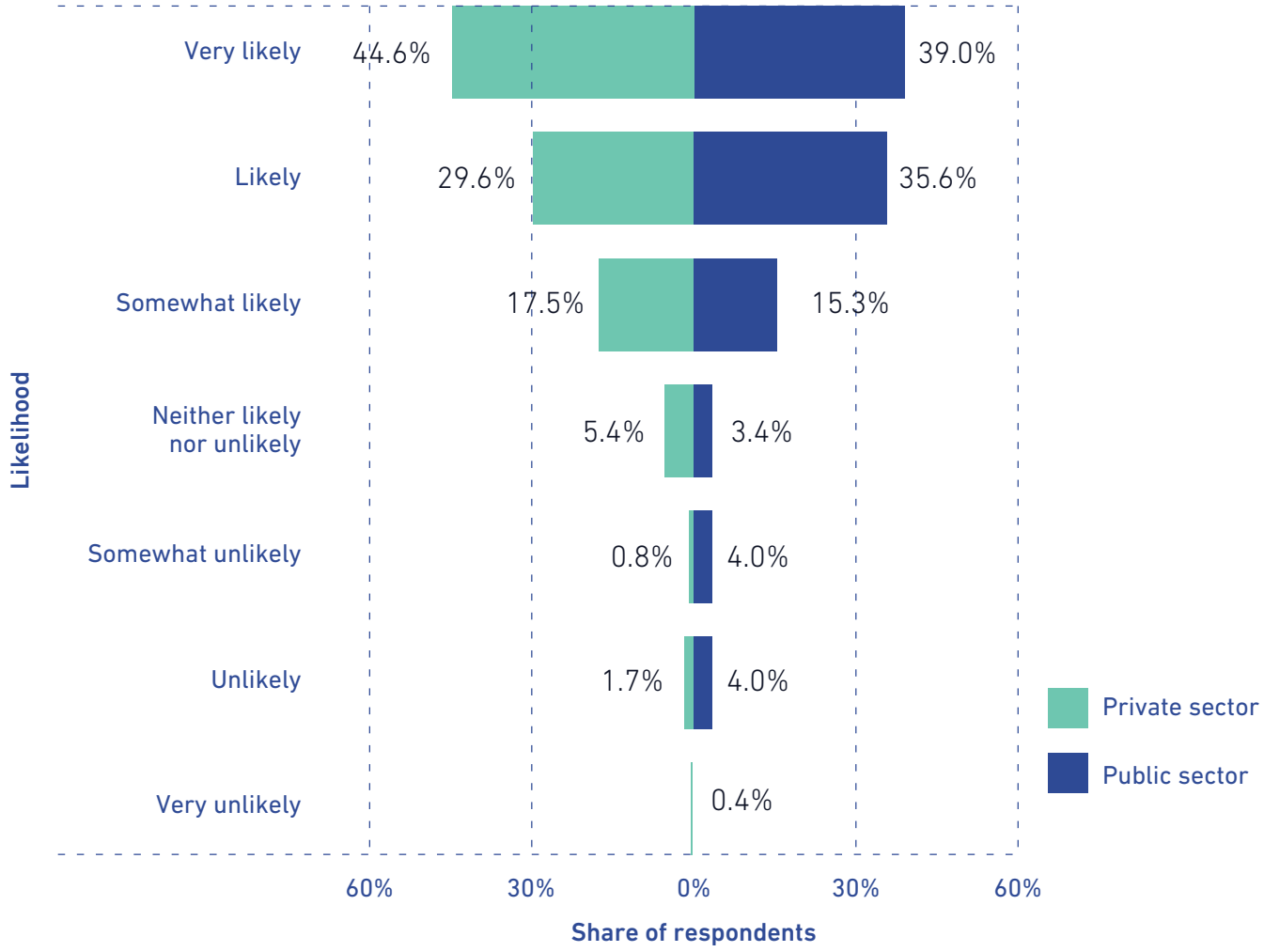



**Source:** *DCO 2024 Digital Economy Trends Survey.*
**Q:** *How do you expect the pace of change of these current digital trends to evolve in the next 12-18 months at the global level?*
**Respondents:** *293 CTOs and senior technologists working in large companies (+250 employees), 59 policymakers, and 40 digital economy experts.*

### Stakeholder impact

Approximately 40% of respondents expect new legislation and regulations on extending global connectivity within the next 12 to 18 months, with private sector respondents rating it as slightly more likely than policymakers. Respondents in the Middle East and Africa (52%) are the most likely to see new regulations as imminent, with those in Europe (20%) the least likely.

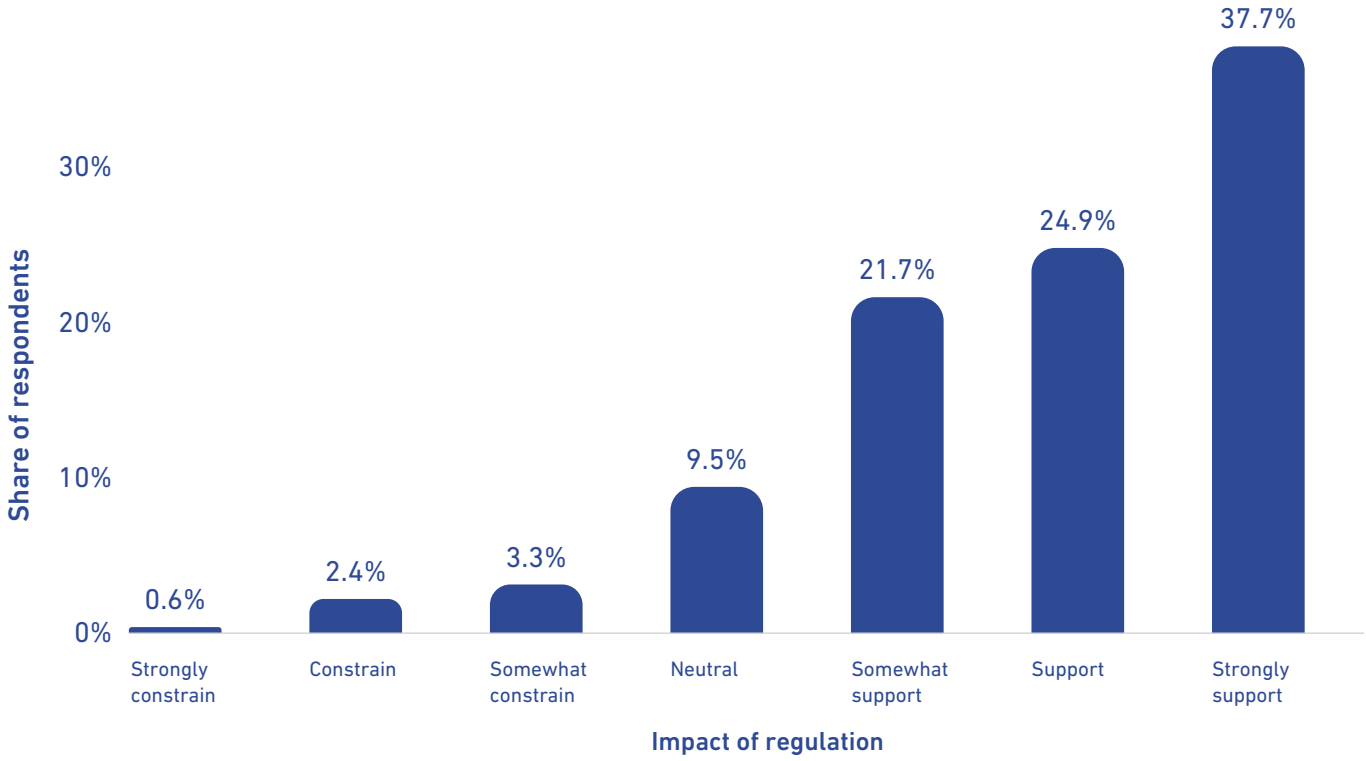
*Figure 21: Trend 1.2 - Perception of likelihood of legislation or regulation activity by stakeholder group*




**Source:** *DCO 2024 Digital Economy Trends Survey.*
**Q:** *At a global level, how likely do you think it is that we will see an increase in legislative and regulatory activities related to the following trends in the Digital Economy over the next 12 to 18 months?*
**Respondents:** *293 CTOs and senior technologists working in large companies (+250 employees), 59 policymakers, and 40 digital economy experts.*

Less than 40% of technology experts and policymakers believe that regulation will strongly support the development of global connectivity. Policymakers (36%) are even less likely than technology experts (42%) to believe that regulation will have a positive impact, the lowest score of all the trends. This suggests concerns about potential issues such as regulatory overreach, compliance costs, or creating unintended barriers to innovation.

***Figure 22: Trend 1.2 - Expected impact of new legislation or regulation activity on trend adoption***




**Source:** *DCO 2024 Digital Economy Trends Survey.*
**Q:** *At a global level, how do you expect these legislative and regulatory activities to influence the adoption of digital economy trends in the next 12 to 18 months?*
**Respondents:** *293 CTOs and senior technologists working in large companies (+250 employees), 59 policymakers, and 40 digital economy experts.*

## Asking AI

**We asked three leading LLMs (ChatGPT-4o, Claude 3.5, and Llama 3.1) to assess the economic, social, and environmental impacts of this trend over the next 12-18 months. Here's what these models had to say:**

### Economic impact

All three LLMs assessed the expansion of global connectivity as having a positive economic impact in the next 12-18 months. They all noted how the deployment of 5G networks and low Earth orbit satellites are projected to drive significant economic growth.

### Social impact

All the models expect the expansion of global connectivity to have a somewhat positive social impact. They note the potential to drive improved social outcomes but are concerned that the digital divide and unequal access to connectivity might exacerbate existing social inequalities.

### Environmental impact

ChatGPT and Claude anticipate the expansion of global connectivity to have a somewhat positive impact on the environment. Llama believes that any potential gains will be offset by increased energy demands and expects a neutral impact on the environment.

*Note: These insights from LLMs are not data driven. They are provided as directional and sentimental and the LLMs have not had access to the survey data.*[30]

## Key enablers

**Next-generation connectivity deployment requires:**

**Digital infrastructure**

Standardized and interoperable digital public infrastructure optimized for both urban and rural requirements.

**Digital finance**

Innovative financing such as blended finance mechanisms linking commercial returns to measurable digital inclusion metrics.

**Digital regulation and public administration**

Harmonized cross-jurisdictional regulations that balance innovation with equitable access.

## Recommendations

### Private sector

**Consider developing targeted deployment strategies** that combine commercial returns with measurable social impact metrics, particularly in underserved areas.

**Explore innovative infrastructure** sharing models and public-private partnerships that could reduce deployment costs, ensure affordability and expand coverage.

**Participate in digital public infrastructure** initiatives through standardized, interoperable, and accessible platforms.

### Public sector

**Explore performance-based incentive structures** that reward providers for achieving specific connectivity, adoption, and social-impact outcome metrics.

**Harmonize regulations** across local, national, and regional jurisdictions to facilitate efficient network deployment, operation, and impact.

**Equip regulators with the tools and enforcement capacity** to ensure affordable and equitable pricing for digital services.

### IGOs, IOs, and others

**Establish standardized metrics and evaluation frameworks** to assess the impact of connectivity on community development and digital inclusion.

**Facilitate knowledge sharing** between regions and stakeholders to accelerate the adoption of successful deployment models.

**Support capacity building in local communities** focusing on technical skills and digital literacy. Inclusively balancing the growing demand for computing power with the impact on the environment.

CURRENT TREND

# 1.3

# Powering a Sustainable Digital Economy

## What does the trend encompass?

AI's rapid growth presents a dual challenge for society. First, its soaring computational needs are straining global energy systems. Data centers powering AI systems are projected to consume 160% more power by 2030, challenging carbon reduction targets.[31]

Second, AI's intense energy demand is creating barriers to access. Given that many emerging economies lack reliable electricity infrastructure, it restricts their ability to develop and deploy AI systems at scale, thereby widening the digital divide between nations.

These challenges intersect in concerning ways. As AI becomes more essential for economic competitiveness, countries without robust energy infrastructure risk falling further behind. The result could be a dual digital economy where some countries directly benefit from AI and others do not.

However, AI simultaneously offers breakthrough capabilities for addressing global environmental challenges. AI enables unprecedented advances in energy efficiency, smart grid optimization, and renewable energy integration, it demonstrates its potential to transform environmental protection even as its own footprint grows.

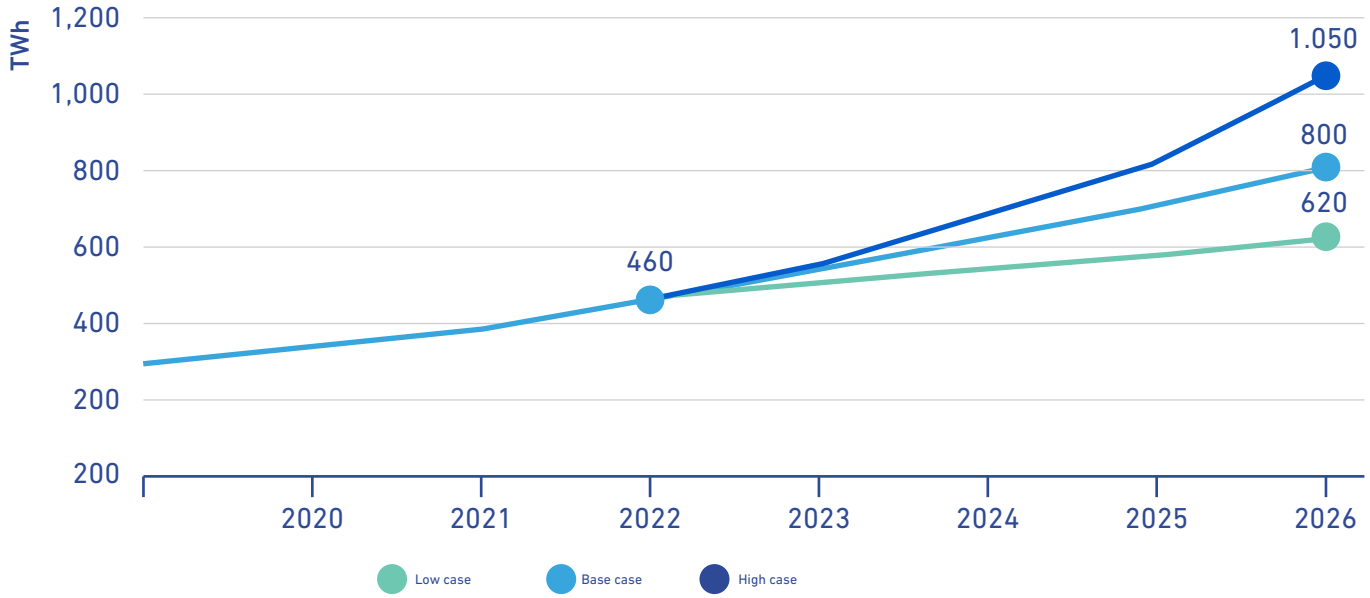
This duality presents a complex challenge for stakeholders across sectors. The private sector, public sector, and international organizations must balance AI's transformative benefits against its environmental impact.

> "Do we have the clean energy to power what is a very power-hungry set of technologies?"
>
> *Bruce Armstrong Taylor, The Digital Economist, 2nd Expert Panel*

**AI's energy consumption:** AI currently accounts for roughly 2-3% of global technology energy consumption,[32] but the computational power it demands is doubling roughly every 100 days.[33] The additional electricity it will require by 2026 could be as high as 590 TWh, equivalent to the annual electricity consumption of Germany.[34]

The combined electricity use of data centers, cryptocurrencies, and artificial intelligence is projected to fall between 620 and 1,050 TWh (Figure 23). The most likely scenario places demand at just over 800 TWh, a significant increase from 460 TWh in 2022.

***Figure 23: Global electricity demand from data centers, AI, and cryptocurrencies, 2019-2026***




*Source: International Energy Agency*

## Why is it important?

AI's energy consumption creates a financial and ethical challenge.[35] While it has the potential to improve efficiencies and support sustainability in areas like energy grid management,[36] its own energy demands threaten to counteract these benefits.[37] Training just one large AI model can generate more carbon than the lifetime emissions of five cars.[38]

Organizations including the UN and International Energy Agency have raised concerns about AI's environmental impact.[39] They suggest a mix of policies and incentives to encourage sustainable practices in technology development.[40]

The energy demands of AI infrastructure also challenge digital inclusion. Population growth is already outpacing improvements in electricity access: in 2022, the number of people without electricity increased by 10 million to 685 million, the first increase in over a decade.[42] Over 80% of these are in Sub-Saharan Africa. Under current policies, 660 million people will still lack electricity access by 2030. Accommodating the energy demands of AI compounds existing challenges for countries already struggling to connect everyone to the grid.[43]

In many countries, meeting AI's energy requirements may impose significant financial burdens: in Sub-Saharan Africa, for instance, energy imports can account for up to 5% of GDP — and energy is only one cost associated with AI infrastructure.[45] In a world where access to AI capabilities increasingly determines economic competitiveness, the ability to afford basic AI infrastructure risks creating a new kind of digital divide.[46]

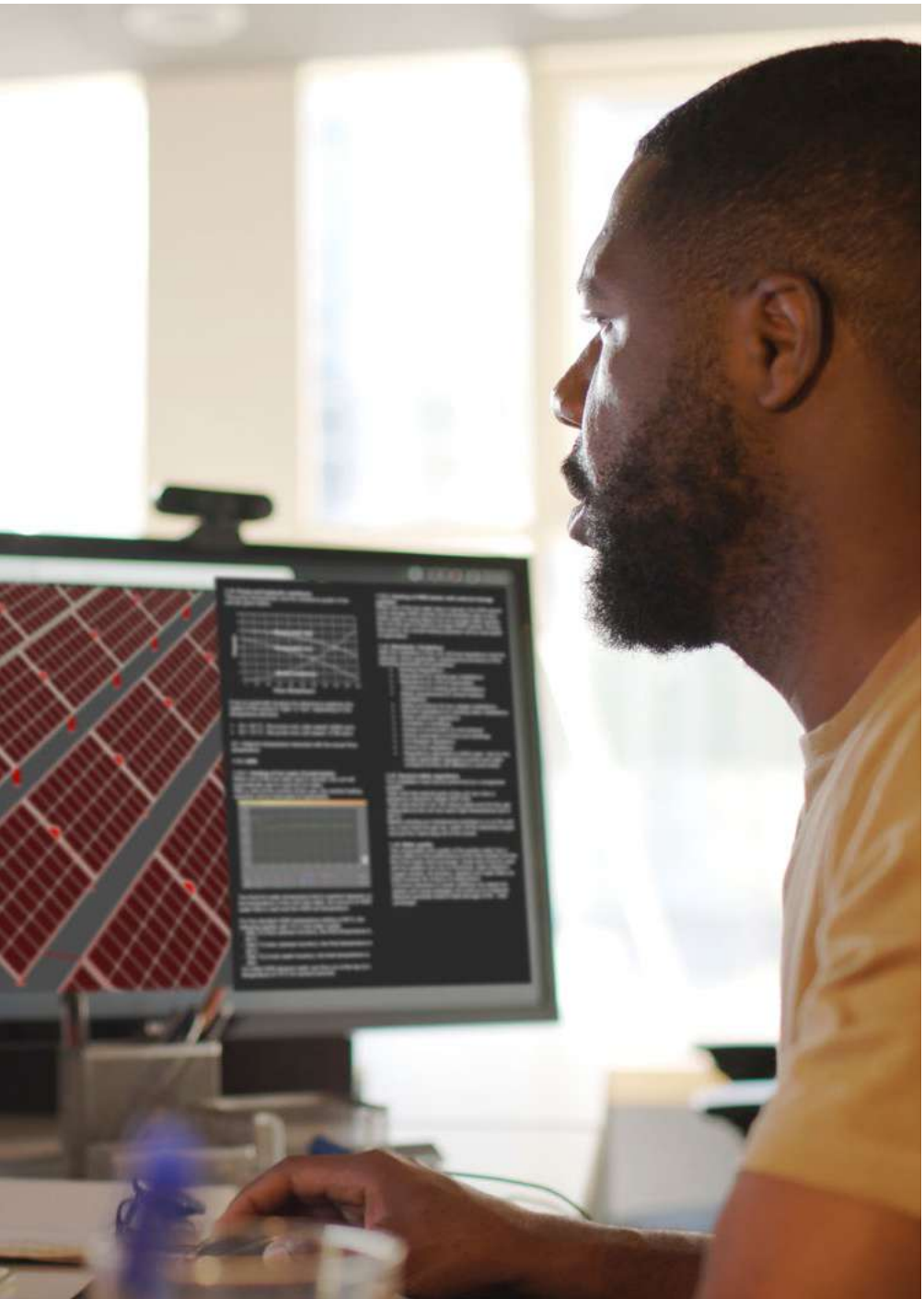
**COP29 and AI:** The COP29 Declaration on Green Digital Action calls for measures to leverage AI's potential to tackle climate change and mitigate the environmental challenges posed by its own energy consumption.[41]

## Impacts on the horizon

Energy resource limitations in developing nations restrict AI advances, deepening inequalities in health and education compared with affluent regions.

Increased multi-stakeholder collaboration to reduce AI energy consumption given COP29 resolutions.

Current AI investment patterns favor capital-rich nations which can invest to meet local energy demands.



"As the global economy increasingly shifts towards AI-driven production and innovation, less developed countries risk being left further behind, exacerbating economic and social divides. Without targeted and concerted efforts to bridge this digital divide, AI's potential to foster sustainable development and alleviate poverty will remain unrealized, leaving significant portions of the global population disadvantaged in the rapidly evolving technological landscape."

*Amandeep Singh Gill, UN Secretary-General's Envoy on Technology*[44]

**Digital-enabled sustainability:** Preliminary evidence from the DCO DEN report also shows that low- and lower-middle-income economies excel in using digital tools to reduce ecological footprints — like carpooling apps, public transport ticketing, and energy monitoring.

# Survey findings

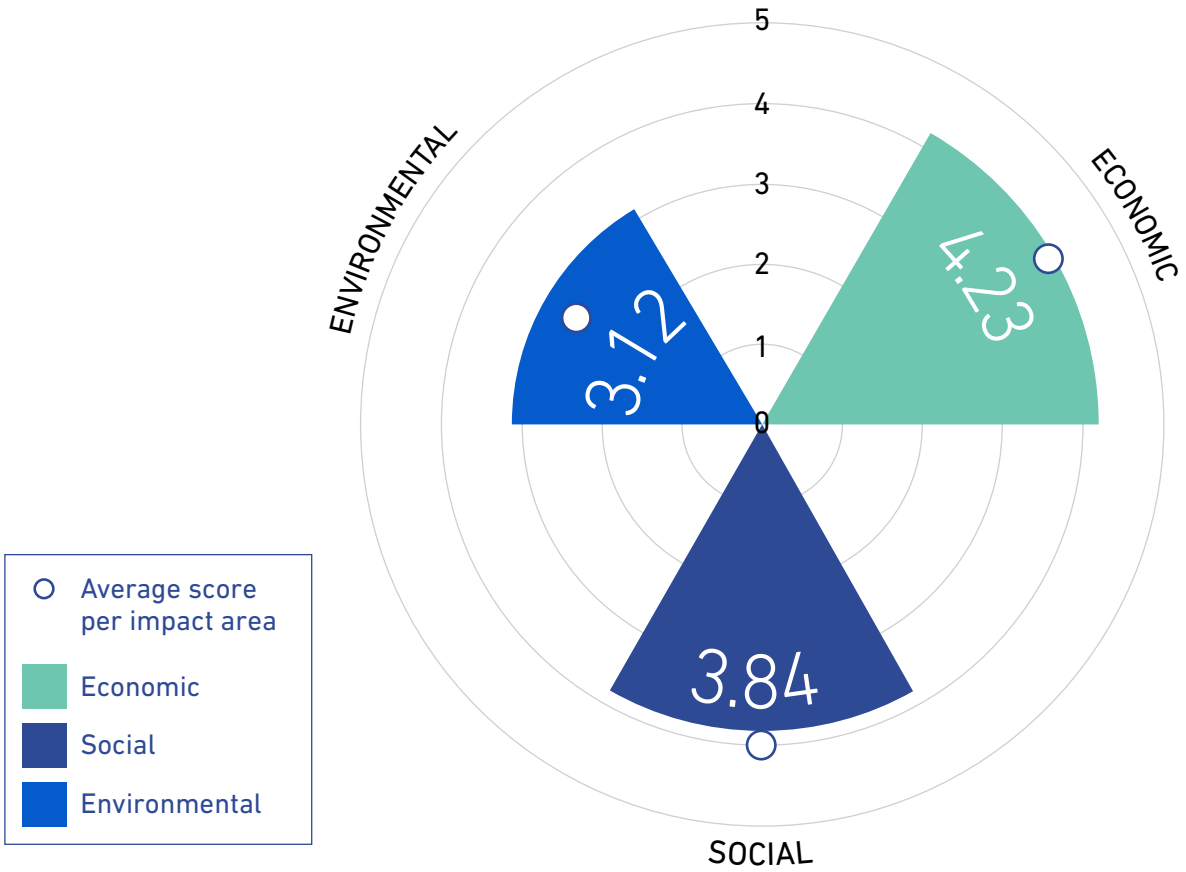
### Economic, social and environmental impact

Powering a Sustainable Digital Economy is the foremost trend in terms of its environmental impact in 2025 (scoring 3.12), reflecting its strong potential to drive ecological sustainability. Lower scores in Europe (2.91) and Indo-Asia and Pacific (2.86) suggest that respondents in these regions are especially concerned about curtailing the ecological footprint of digital expansion.

This trend ranks fifth out of 12 for its positive economic impact (4.23), but only tenth for social impact (3.84), suggesting room for improvement in addressing societal challenges and fostering inclusivity. Indo-Asia and Pacific and Latin America are the most optimistic about economic and social impacts, while Europe and North America are the most cautious.

In terms of sectors, economic confidence is strongest in agribusiness, food, and beverage, and energy and utilities. Expectations of positive environmental impacts are the highest in technology, media, and communications (3.77), and heavy industries and extractive (3.73), and the lowest in automotive and transport (2.41), and construction and real estate (2.20).

*Figure 24: Trend 1.3 - Positive economic, social and environmental impact*

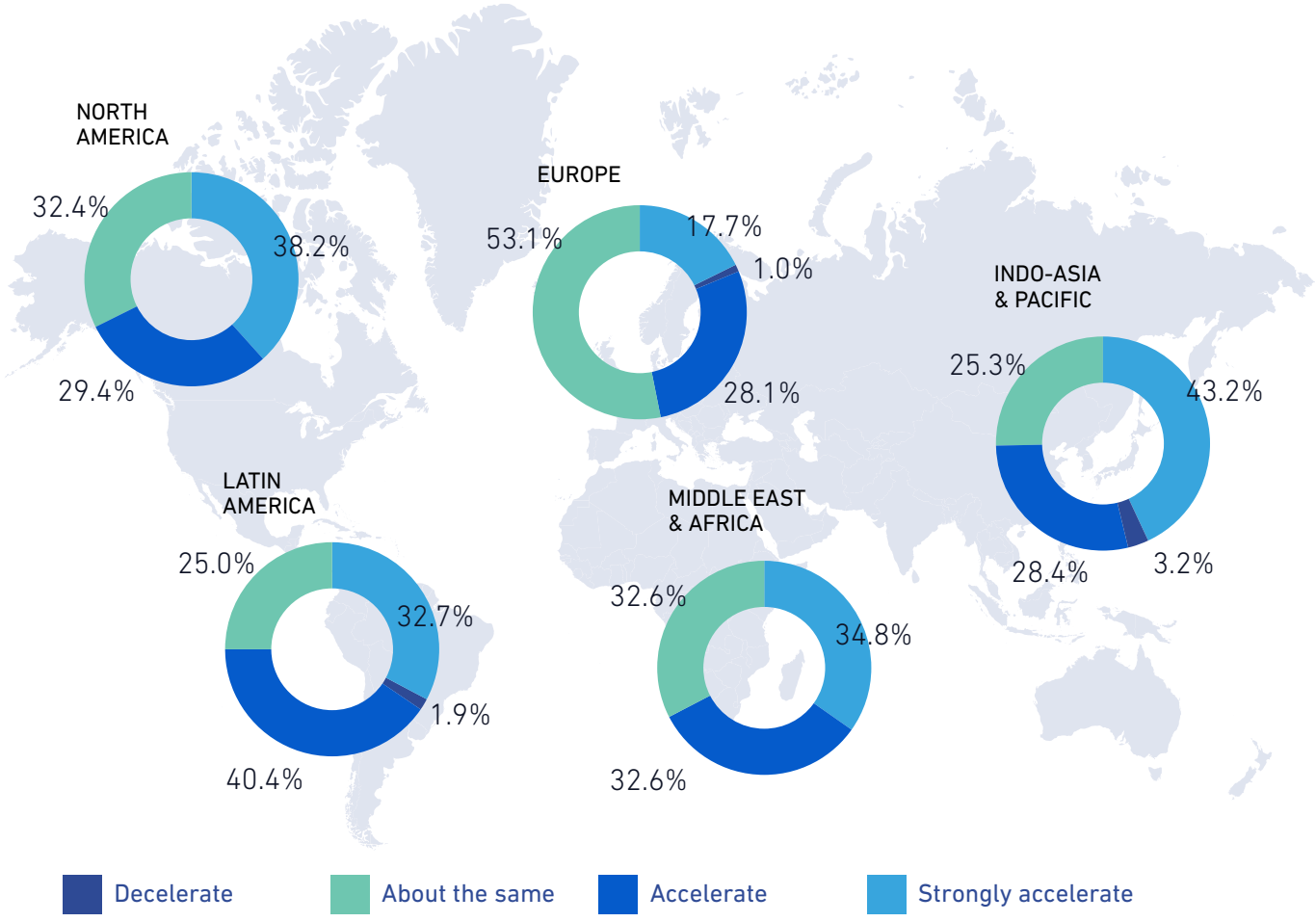



**Source:** *DCO 2024 Digital Economy Trends Survey.*
**Q:** *How would you assess the economic/social/environmental impact of these current digital trends in the next 12-18 months at the global level?*
**Respondents:** *293 CTOs and senior technologists working in large companies (+250 employees), 59 policymakers, and 40 digital economy experts.*

### Pace of change

Over two-thirds of respondents worldwide expect acceleration in the Powering a Sustainable Digital Economy trend, with 35% predicting a strong acceleration. Optimism is the highest in Indo-Asia and Pacific and the Middle East and Africa. Expectations are the lowest in Europe, where 53% of respondents anticipate no change in the pace of this trend.

*Figure 25: Trend 1.3 - Pace of change per region*

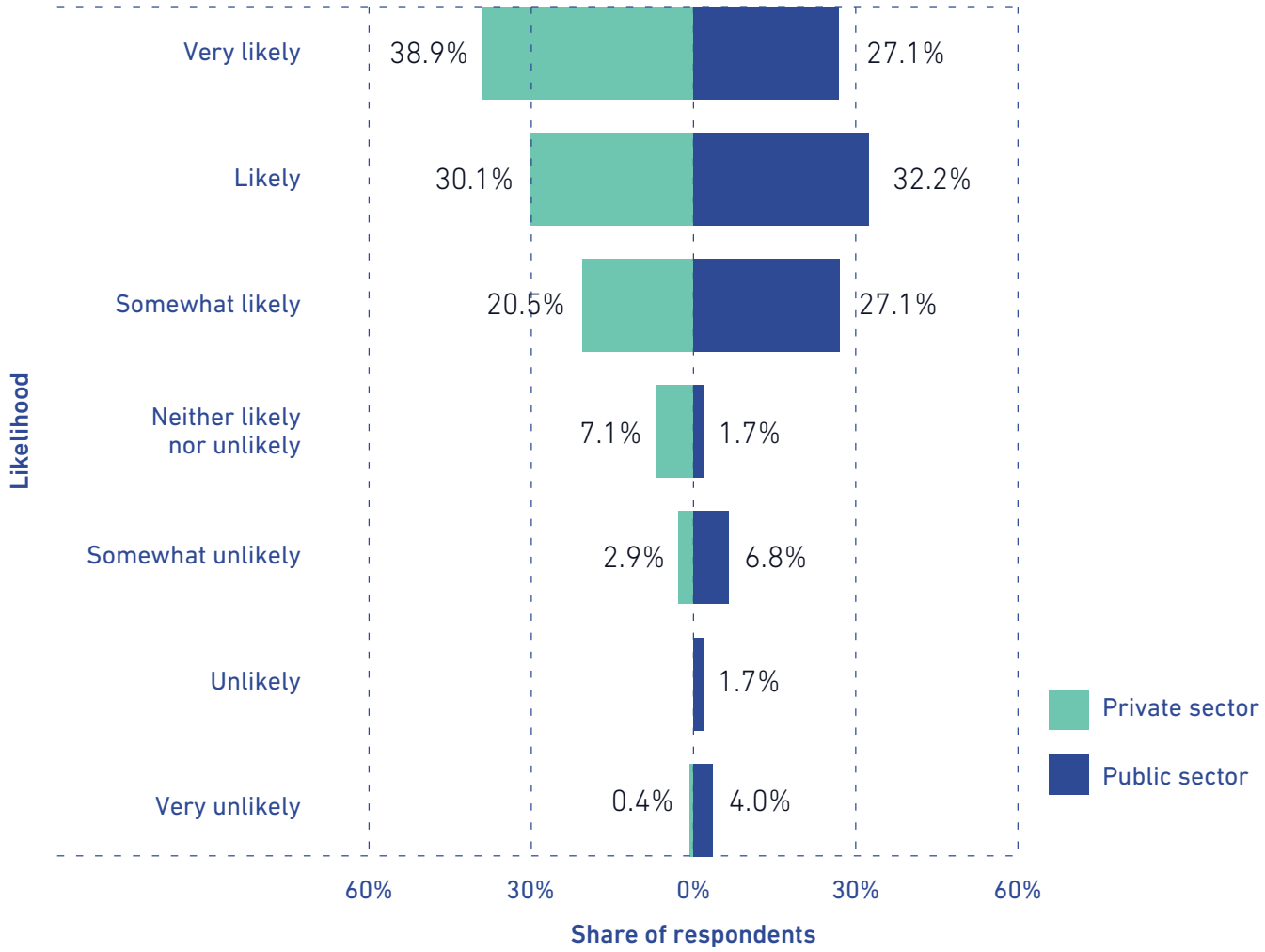



**Source:** *DCO 2024 Digital Economy Trends Survey.*
**Q:** *How do you expect the pace of change of these current digital trends to evolve in the next 12-18 months at the global level?*
**Respondents:** *293 CTOs and senior technologists working in large companies (+250 employees), 59 policymakers, and 40 digital economy experts.*

### Stakeholder impact

Most survey respondents expect new regulatory activity related to Powering a Sustainable Digital Economy in the coming 12 to 18 months, with 69% of private sector and 59% of public sector stakeholders rating it as very likely or likely. Respondents in Indo-Asia and Pacific and the Middle East and Africa are more likely to expect new legislative action than in Europe and North America.

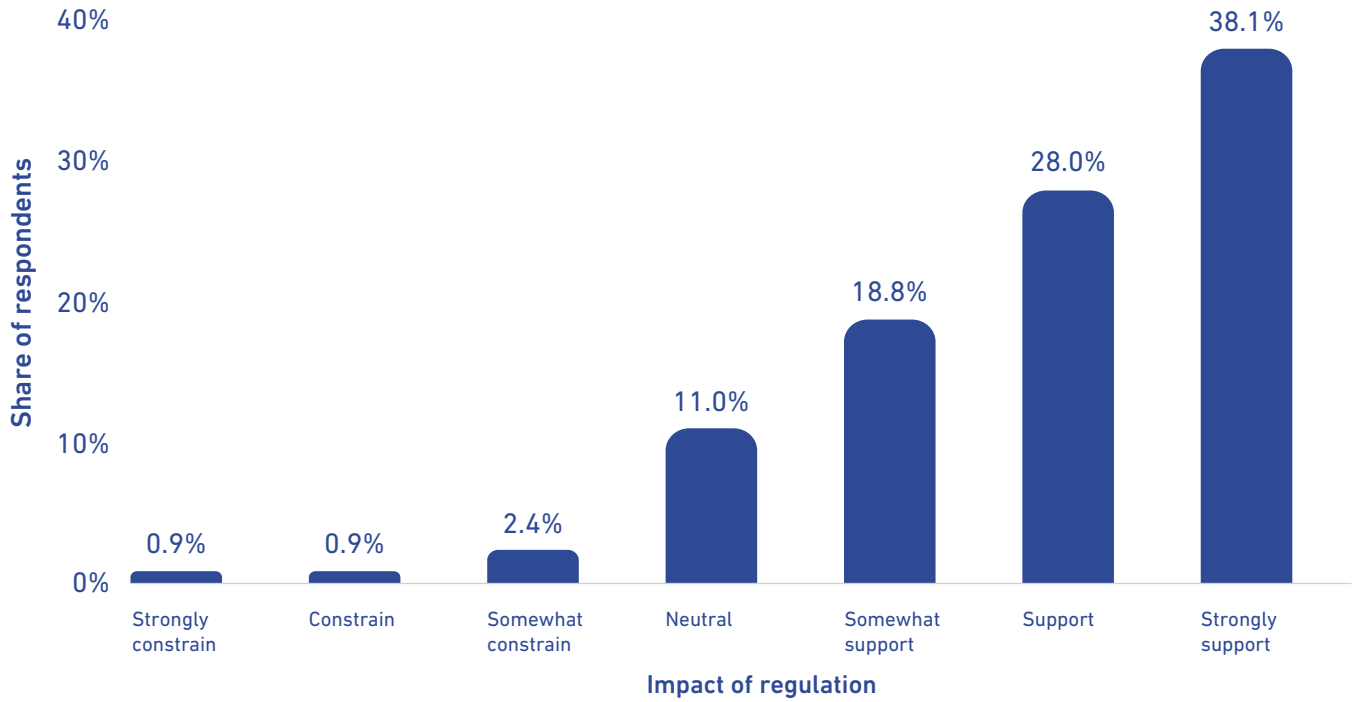
*Figure 26: Trend 1.3 - Perception of likelihood of legislation or regulation activity by stakeholder group*




**Source:** *DCO 2024 Digital Economy Trends Survey.*
**Q:** *At a global level, how likely do you think it is that we will see an increase in legislative and regulatory activities related to the following trends in the Digital Economy over the next 12 to 18 months?*
**Respondents:** *293 CTOs and senior technologists working in large companies (+250 employees), 59 policymakers, and 40 digital economy experts.*

Private sector respondents are about ten percentage points more likely than policymakers to believe that new regulations will strongly support sustainable digital economy initiatives. Expert respondents are significantly less optimistic: only 8% view regulation as highly supportive, potentially due to concerns about the efficacy or unintended consequences of legislative measures. Respondents in Indo-Asia and Pacific are most likely to be optimistic, and those in Europe least likely.

***Figure 27: Trend 1.3 - Expected impact of new legislation or regulation activity on trend adoption***




**Source:** *DCO 2024 Digital Economy Trends Survey.*
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**Respondents:** *293 CTOs and senior technologists working in large companies (+250 employees), 59 policymakers, and 40 digital economy experts.*

## Asking AI

**We asked three leading LLMs (ChatGPT-4o, Claude 3.5, and Llama 3.1) to assess the economic, social, and environmental impacts of this trend over the next 12-18 months. Here's what these models had to say:**

### Economic impact

The LLMs' answers range from a neutral to positive impact on the economy. They all reference the potential for the growing adoption of AI to drive economic benefits. But Claude in particular highlights that these gains are likely to be offset by the substantial costs of energy infrastructure upgrades and the deepening digital divide.

### Social impact

The LLMs were split between a somewhat positive and negative social impact. ChatGPT is more optimistic and notes that AI holds promise for advancing social benefits. Claude and Llama again flag concerns that, given the high resource and infrastructure costs associated with these technologies, these benefits may not reach many people in developing countries.

### Environmental impact

The models are less positive with regard to the environmental impact, with their answers ranging from neutral to negative. They all point to the fact that AI energy and data center power consumption are projected to increase dramatically in the coming years, which will lead to increased carbon emissions.

*Note: These insights from LLMs are not data driven. They are provided as directional and sentimental and the LLMs have not had access to the survey data.*[47]

## Key enablers

**Leveraging technology to enhance rather than undermine sustainability will require:**

**Digital infrastructure**

AI-enhanced smart electrical grids and distributed generation systems using edge computing can help reduce energy consumption while maintaining AI performance.

**Digital finance**

The high costs of AI systems, particularly for developing regions, necessitate creative approaches including public-private partnerships and blended finance solutions.

**Digital regulation and public administration**

Effective governance frameworks must balance technology innovation with sustainability targets.

## Recommendations

### Private sector

**Develop energy-efficient AI architectures** integrating edge computing and renewable solutions.

**Create specialized solutions** optimized for resource-constrained environments.

**Build partnerships** for shared digital and energy infrastructure development in underserved regions.

**Engage with stakeholders**, including the government, about renewable energy investment.

### Public sector

**Establish incentive structures and standardized global metrics** for energy-efficient AI deployment.

**Develop support mechanisms and policies** for regions with limited energy resources.

**Foster local renewable energy development.**

**Increase resources for renewable energy projects** by leveraging public-private partnership models to attract private capital and expertise.

### IGOs, IOs, and others

**Facilitate knowledge sharing** and unified standards for sustainable AI deployment.

**Create funding mechanisms** supporting AI adoption in energy-deficient regions.

**Monitor global disparities** and inform policymakers when the lack of energy availability is constraining the adoption of AI in energy-deficient regions.

CURRENT TREND

# 1.4

# Strengthening Collaborative Data Ecosystems

## What does the trend encompass?

Innovation in the digital economy depends on the collaborative use and leveraging of data in ways that address privacy, security, data sovereignty, and intellectual property (IP) concerns.[48] Carefully balancing the benefits of expanding access to data for AI innovation with the need to do so in a responsible and trustworthy manner will be a pillar of a resilient digital economy.

## Why is it important?

The amount of data generated globally is set to increase by a factor of around 10,000 between 2020 and 2025.[49] The voracious appetite AI has for data is driving innovation in new data management tools and platforms to provide access to this data in a cost effective and scalable manner. Standardized frameworks are emerging to ensure sector-specific regulations, data protection measures, and protect IP, facilitating partnerships across sectors and borders.

New technologies are transforming how organizations can share and analyze sensitive data without compromising people's privacy. For example, homomorphic encryption allows computations to be performed on data while keeping it encrypted. Innovations in data fabric architectures and mesh networks represent new ways of securely managing data. In some cases, organizations can create synthetic datasets that enable them to train AI models, bypassing the need to collect data about actual people.

**Data ecosystems market value:** The global enterprise data management market is expected to grow from US$101 billion in 2024 to US$225 billion by 2032.[50]

**Data ecosystem market dynamics:** Europe's national data ecosystems are projected to be worth over €550 billion by 2025, representing about 4% of the region's GDP.[51]
Financially, enterprise data sharing within ecosystems has demonstrated a 39% higher net income margin compared with the average net income margin of the 500 organizations surveyed by Capgemini, underscoring the value of leveraging data collaboratively to drive economic and business performance.[52]

## Impacts on the horizon

Technologies such as homomorphic encryption, synthetic data, and federated learning gain market traction and accelerate the development of AI models that address current data security, IP, and privacy concerns.

Cross-border data collaboration accelerates with emerging metadata standards, interoperable ID management for cross-border consent, and encrypted computation, enabling seamless cross-border data flow.

The proliferation of secure regulatory sandboxes as organizations collaboratively innovate in the use of diverse data sets and new AI models within a secure and compliant operating environment.

Sector-specific best practice risk assessments emerge for data sharing that serve to streamline commercial, legal, social, and operational risks in the collaborative use of data and AI.

**Use case:** The Humanitarian Data Exchange helped to save lives during Cyclone Biparjoy in Gujarat, India, in 2023. By integrating data from international organizations, local governments, and NGOs, it enabled humanitarian responders to co-ordinate with each other, optimizing resource allocation and minimizing response times.[53]

**Data regulatory sandboxes:** Data regulatory sandboxes are controlled environments in which businesses, regulators, and local communities can collaborate to develop new solutions — exploring stakeholder readiness, the potential for public benefit, and risk mitigation strategies.[54]

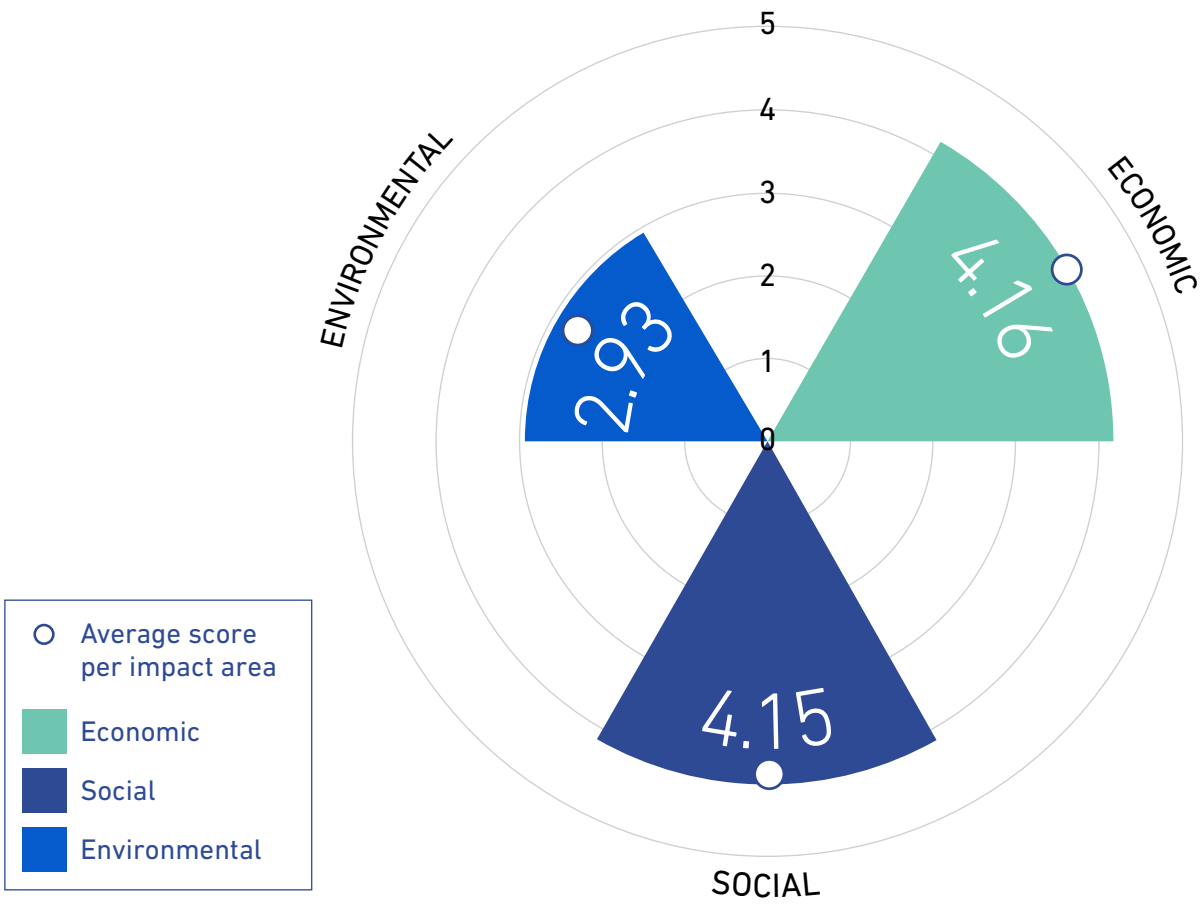
# Survey findings

### Economic, social, and environmental impact

Strengthening Collaborative Data Ecosystems ranks seventh out of 12 trends for its potential positive economic impact (4.16), fourth for social impact (4.15), and third for environmental impact (2.93). Given the regional precedent of experimentation and innovation in the reuse of data for the common good, respondents from Indo-Asia and Pacific (4.47) and Latin America (4.31) are the most optimistic about its economic impact. Policymakers are less optimistic than technology experts about the trend's economic and social impacts, but more confident about its environmental benefits.

Among industries, respondents from finance and professional services are optimistic about economic impact, those from healthcare and life sciences foresee potential for social impact, and those from the extractive industries lead in optimism about environmental impact.

*Figure 28: Trend 1.4 - Positive economic, social and environmental impact*

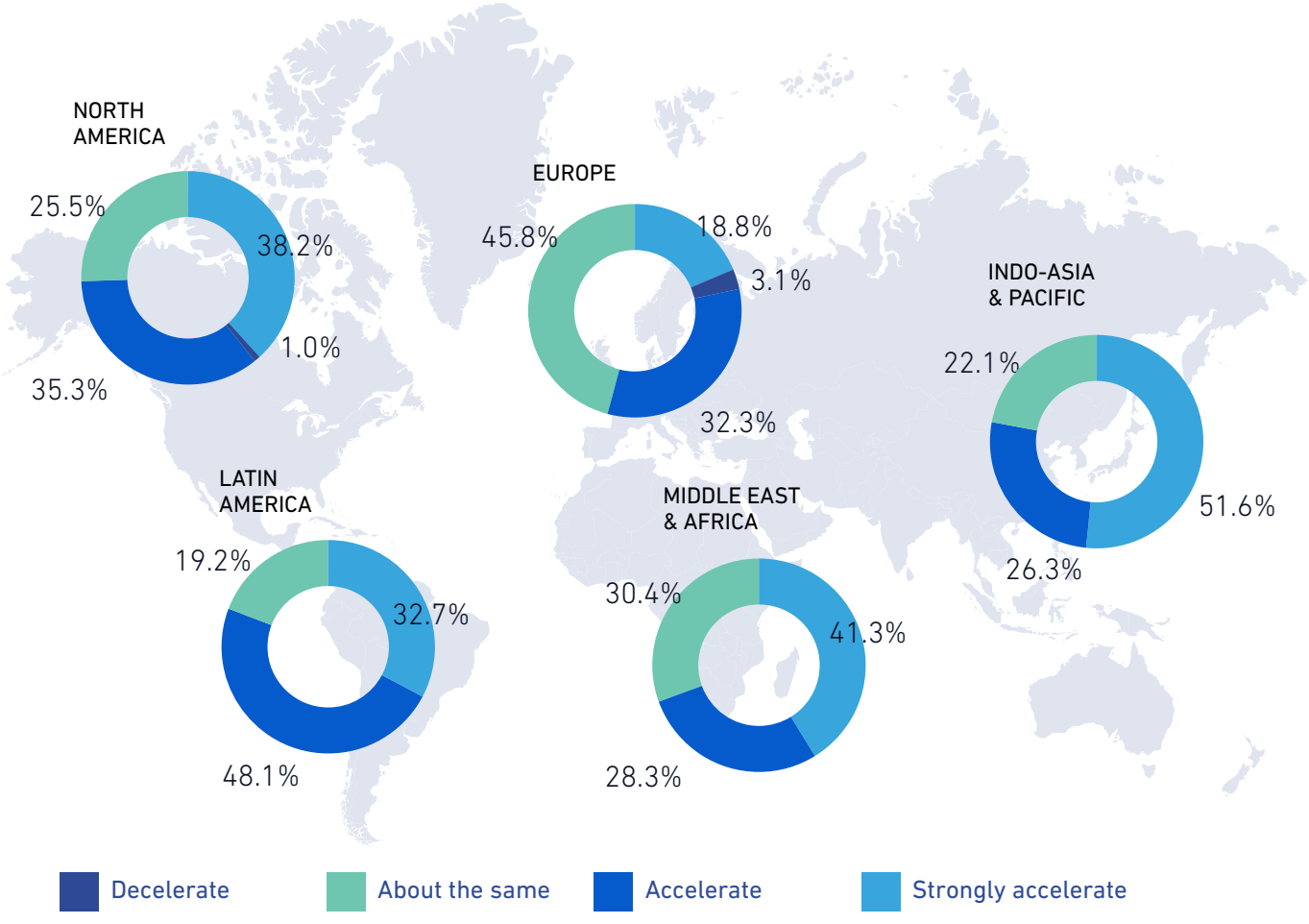



**Source:** *DCO 2024 Digital Economy Trends Survey.*
**Q:** *How would you assess the economic/social/environmental impact of these current digital trends in the next 12-18 months at the global level?*
**Respondents:** *293 CTOs and senior technologists working in large companies (+250 employees), 59 policymakers, and 40 digital economy experts.*

### Pace of change

Given the advent of an array of privacy-enhancing technologies focused on strengthening the trustworthiness of collaboratively using data, this trend ranks fourth in how the impact is poised to accelerate. Around two-thirds of respondents expect its pace to speed up, with 30% predicting a strong acceleration. Unsurprisingly, private sector respondents are more likely than those from the public sector to believe it will accelerate. Industry sectors generally recognized as leaders in collaborative data practices (technology, media, and communications, and healthcare and life sciences) expected the fastest acceleration of this trend. Given the recent enactment of several regional AI and data regulations focused on ensuring human rights and a competitive marketplace, respondents from Europe exhibited the highest level of skepticism.

*Figure 29: Trend 1.4 - Pace of change per region*

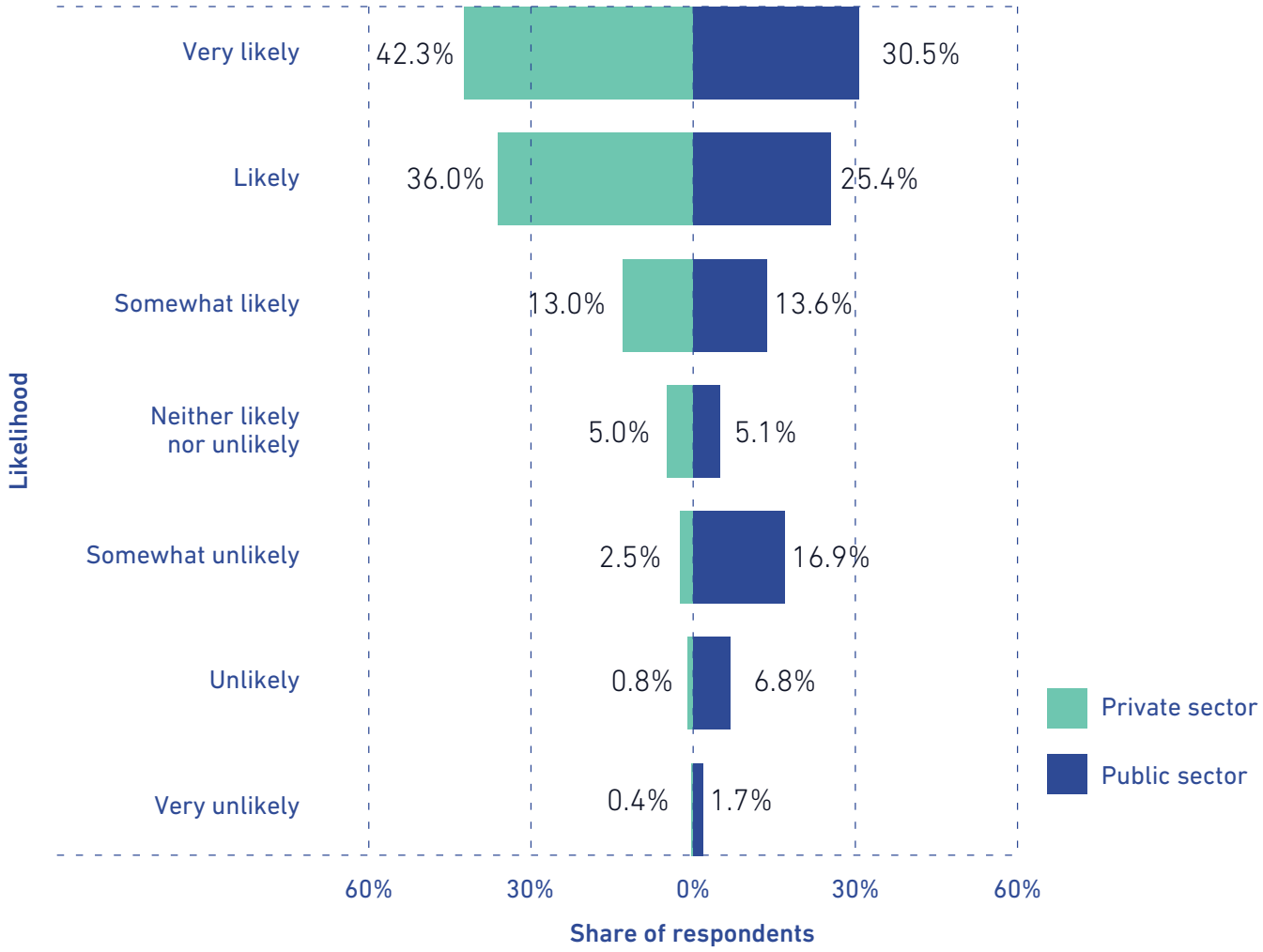



**Source:** *DCO 2024 Digital Economy Trends Survey.*
**Q:** *How do you expect the pace of change of these current digital trends to evolve in the next 12-18 months at the global level?*
**Respondents:** *293 CTOs and senior technologists working in large companies (+250 employees), 59 policymakers, and 40 digital economy experts.*

### Stakeholder impact

Technology professionals see a higher likelihood of new regulations for Strengthening Collaborative Data Ecosystems, with 43% predicting it to be very likely, compared with 30% in the public sector. Respondents from the healthcare and life sciences and agribusiness, food, and beverage sectors are the most likely to expect new regulations, and those from the extractive industries and manufacturing are the least likely. Regionally, more than twice as many respondents in Indo-Asia and Pacific think that new regulatory activity is very likely compared with those in Europe.

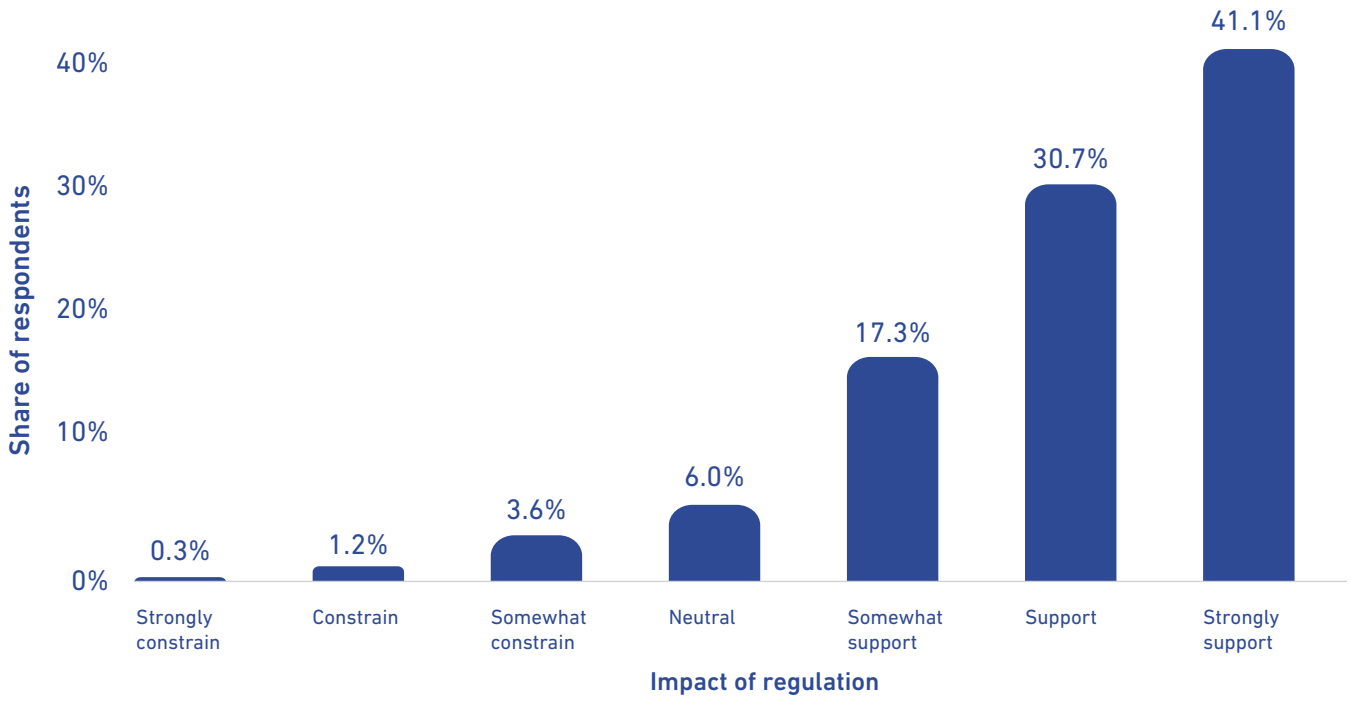
***Figure 30: Trend 1.4 - Perception of likelihood of legislation or regulation activity by stakeholder group***




**Source:** *DCO 2024 Digital Economy Trends Survey.*
**Q:** *At a global level, how likely do you think it is that we will see an increase in legislative and regulatory activities related to the following trends in the Digital Economy over the next 12 to 18 months?*
**Respondents:** *293 CTOs and senior technologists working in large companies (+250 employees), 59 policymakers, and 40 digital economy experts.*

Technology experts and policymakers broadly expect regulation to support the development of collaborative data ecosystems, with 78% anticipating it will support or strongly support this trend. This puts it fourth among the 12 trends. Automotive and transport professionals are the most optimistic, while those from the extractive industries are most negative about the prospect of future regulation. Regionally, respondents from Indo-Asia and Pacific and the Middle East and Africa are the most optimistic, and those from Europe the most neutral.

***Figure 31: Trend 1.4 - Expected impact of new legislation or regulation activity on trend adoption***




**Source:** *DCO 2024 Digital Economy Trends Survey.*
**Q:** *At a global level, how do you expect these legislative and regulatory activities to influence the adoption of digital economy trends in the next 12 to 18 months?*
**Respondents:** *293 CTOs and senior technologists working in large companies (+250 employees), 59 policymakers, and 40 digital economy experts.*

## Asking AI

**We asked three leading LLMs (ChatGPT-4o, Claude 3.5, and Llama 3.1) to assess the economic, social, and environmental impacts of this trend over the next 12-18 months. Here's what these models had to say:**

### Economic impact

All three LLMs expect the strengthening of collaborative data ecosystems to have a positive economic impact in the next 12-18 months. The development of trusted frameworks and privacy-enhancing technologies facilitates cross-border data sharing, fostering competitive advantages. The models expect this to drive value creation in the digital economy.

### Social impact

The models' answers range from a somewhat to very positive social impact. ChatGPT raises some concerns about how data sovereignty, misuse, and unequal system access may limit broader social benefits. However, Claude and Llama are much more positive and reference the fact that secure and trusted data collaboration can lead to improved outcomes in diverse sectors such as healthcare, education, and disaster response.

### Environmental impact

All three models anticipate a somewhat positive impact on the environment. They note that data ecosystems have the potential to contribute to environmental sustainability by enabling better resource management and predictive modelling. However, they also flag that the increased use of digital technologies may lead to increased energy consumption, which could counteract some of the environmental benefits.

*Note: These insights from LLMs are not data driven. They are provided as directional and sentimental and the LLMs have not had access to the survey data.*[55]

## Key enablers

**Collaborative data ecosystems depend on:**

**Industry digital transformation**

Harmonizing privacy-preserving infrastructure through distributed architectures incorporating edge computing and secure enclaves for compliant data processing.

**Digital finance**

Consortium-based funding mechanisms balancing shared costs with collective value creation and socio-economic impact.

**Digital regulation and public administration**

With a focus on trust-building, ethics and consent, collectively enabling value creation while protecting stakeholder interests.

## Recommendations

### Private sector

**Consider implementing privacy-enhancing technologies** like synthetic data and homomorphic encryption.

**Develop standardized approaches** to data rights management and value sharing.

**Build collaborative platforms** that enable secure, controlled data sharing.

### Public sector

**Establish low-cost and compliant data regulatory sandboxes** to support innovation while protecting privacy and IP rights.

**Create incentives** for the development of secure cross-border architecture for data.

**Foster international cooperation** on risk assessments, metadata standards, data interoperability, data sharing agreements and outcome metrics.

### IGOs, IOs, and others

**Facilitate dialogue** on the unique risks and harms that emerging technology and cross-border data sharing can have on vulnerable populations and communities.

**Support capacity building** for local expertise on privacy harms alongside business, legal, and technical interventions to lower those risks.

**Engage in local and regional data regulatory sandboxes** to ensure the rights, consent and aspirations of local communities and individuals are being met.

EMERGING TREND

# 1.5

# Deploying Autonomous Systems at Scale

## What does the trend encompass?

AI, connectivity, and automation are coming together to create autonomous systems that can sense, decide, and act with minimal human intervention. These systems could transform how institutions and enterprises operate and deliver services. They promise efficiency gains, but may also affect human flourishing, community well-being, and environmental sustainability.

## Why is it important?

Recent innovations in sectors such as transport and manufacturing represent the early stages of a move toward totally automated systems, powered by AI, robots, and real-time data analysis. If designed with human-centered principles in mind, autonomous systems can augment human capabilities, handling routine operations and allowing workers to focus on more creative, strategic, and interpersonal activities.

Additionally, this trend has at its core the imperative to ensure elements of the digital divide are not exacerbated. While well-resourced economies can focus on optimization and innovation, many regions — particularly in the Global South — lack the connectivity, resources, and expertise needed for basic autonomous operations. Targeted investment in infrastructure and skills development will be needed in these areas and to avoid further marginalizing underserved communities throughout the digital economy.

The transition to autonomous systems will reshape work, interactions, and daily life. It will both displace certain jobs, particularly in transport and logistics, while creating new opportunities in system design, maintenance, and human-machine collaboration. Leveraging this trend to shape a healthy digital economy will require meaningful community engagement, transparent communication about the risks and opportunities, proactive workforce development programs, and attention to responsible design and equitable access.

Regulatory frameworks will need to balance innovation with human values and planetary stewardship — for example, cross-border standards for data collection and transfer that protect individual privacy rights, clear liability frameworks for autonomous decision-making, and ethical guidelines to ensure systems serve the broader public good.

**Global autonomous systems' market:** The uptake of global industrial autonomous systems rose by 10% in 2023.[56]

The global market is predicted to grow from US$47 billion in 2025 to US$170 billion by 2032.[57]

**Use case:** Container ports are deploying autonomous systems equipped with AI, thermal cameras, and real-time navigation capabilities.[58]
Caofeidian in China has achieved a 70% reduction in labor costs and a 30% increase in efficiency through automation.

## Impacts on the horizon

Robust security frameworks emerge that include explainability, algorithmic integrity, and privacy frameworks to address new market segments requiring complex decision-making.

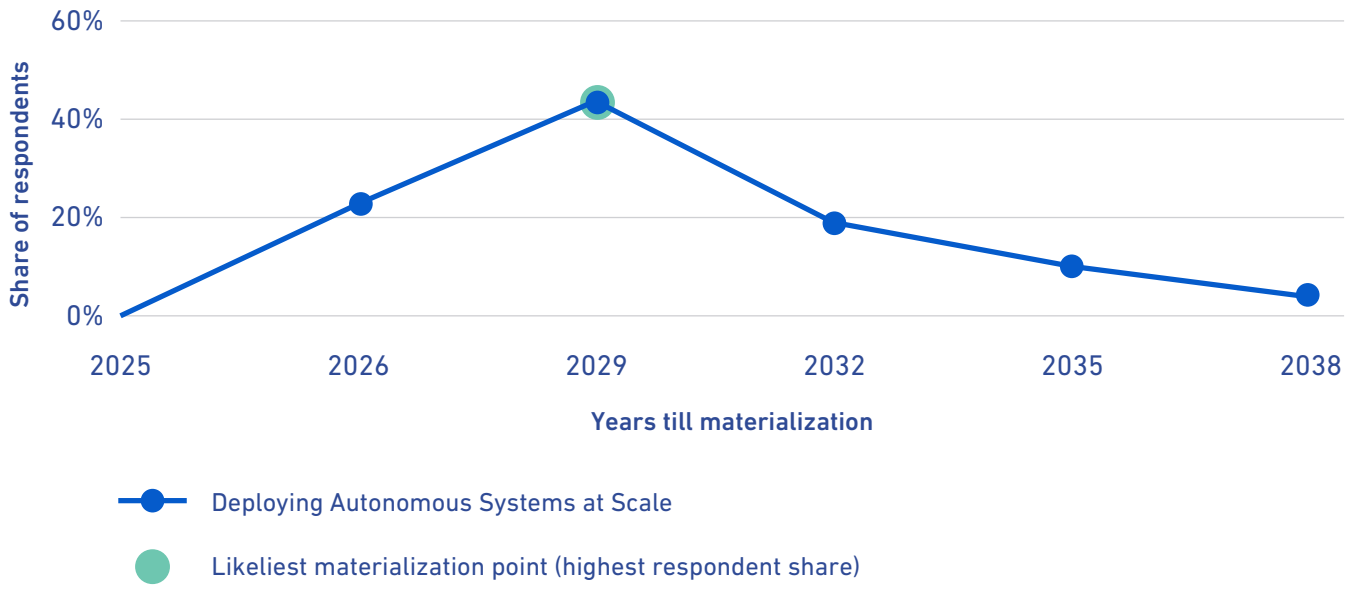
The integration of technical security measures, social impact assessments, and local community engagement protocols create a more open and trustworthy way for autonomous systems to be deployed in ways that reflect local norms, values, and societal implications, particularly job displacement, discrimination, and local resource consumption.

# Survey findings

### When will these trends materialize?

About two-thirds of survey respondents expect Deploying Autonomous Systems at Scale to have a material impact within the next five years, although most of them expect it will take 3 to 5 years rather than up to 2 years given the complexities .

*Figure 32: Trend 1.5 - Likely materialization*



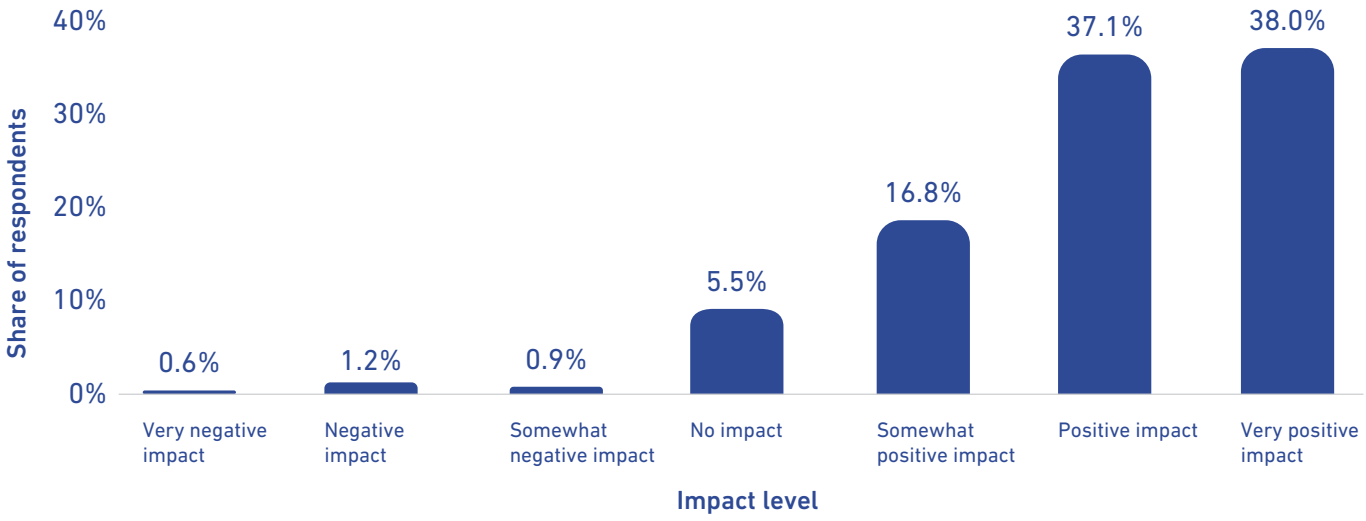

**Source:** *DCO 2024 Digital Economy Trends Survey.*
**Q:** *At a global level, when do you expect the following emerging Digital Economy trends to affect businesses and societies?*
**Respondents:** *240 CTOs and senior technologists working in large companies (+250 employees), 59 policymakers and 38 digital economy experts.*

### Socio-economic impact

Respondents generally expect positive outcomes from the deployment of autonomous systems — more so than the average for emerging trends. Optimism is the highest in Indo-Pacific and Asia and Midde East and Africa, with greater caution in Europe and North America.

Private-sector technology professionals were especially likely to foresee very positive impacts in the technology, media, and communications (70%) sector and extractive industries (68%), where automation can improve safety as well as productivity, although only 9% in professional services agree. In the public sector, 34% of respondents anticipate very positive impacts.

*Figure 33: Trend 1.5 - Expected socio-economic impact in 3-5 years*




**Source:** *DCO 2024 Digital Economy Trends Survey.*
**Q:** *At a global level, to what extent do you believe the following emerging trends will have a net positive or negative socio-economic impact in the next 3-5 years?*
**Respondents:** *240 CTOs and senior technologists working in large companies (+250 employees), 59 policymakers, and 38 digital economy experts.*

## Asking AI

**Prompt:**
**"Act as a global expert on the digital economy. What are the potential near-term benefits, challenges, and considerations for the trend of Deploying Autonomous Systems at Scale?"**

### Claude 3.5 response:

**Benefits**

2-3x efficiency gains through 24/7 operations and 70% error reduction. Successful examples in warehousing and manufacturing with immediate cost savings.

**Challenges**

Complex integration with human workflows and infrastructure. Cybersecurity vulnerabilities at scale pose significant risks.

**Considerations**

Requires holistic planning across technology readiness, workforce adaptation, ethical implications, and regulatory compliance. Success depends on the balance between automation speed and stakeholder acceptance.

*Note: These insights from LLMs are not data driven. They are provided as directional and sentimental and the LLMs have not had access to the survey data.*

## Key enablers

**The sustainable deployment of autonomous systems hinges on:**

**ICT core business**

Real-time data processing architectures combining 5G, satellite networks, and edge computing capabilities.

**Digital finance**

Targeted investment strategies such as strategic partnerships prioritizing transport, mobility, and healthcare innovation solutions.

**Digital regulation and public administration**

Cross-border protocols addressing liability, privacy rights, community engagement, and ethical deployment standards.

## Recommendations

### Private sector

**Consider prioritizing investments in autonomous systems** that not only enhance efficiency and productivity but also demonstrably improve human well-being based upon standardized outcome measures.

**Actively engage with communities and policymakers** to ensure transparency and address concerns regarding the impact of autonomous systems on employment, environmental impact and social equity.

**Collaborate with educational institutions** to support workforce development programs that equip individuals with the requisite skills to thrive in an increasingly autonomous world.

### Public sector

**Foster an enabling environment** for the development and deployment of autonomous systems by establishing clear and adaptive regulatory frameworks that balance innovation with ethical considerations, safety, job displacement, and societal well-being.

**Address the heightened cyber-risk** to critical physical infrastructure given the increasing reliance on automated systems.

**Proactively address potential socio-economic impacts**, such as job displacement, through enhanced digital skills and vocational training in formal education systems and robust workforce development programs to ensure that autonomous systems do not exacerbate the digital divide.

**Promote international cooperation and cross-border collaboration** to establish consistent standards and guidelines for the responsible development and deployment of autonomous systems.

### IGOs, IOs and others

**Facilitate dialogue and collaboration among diverse stakeholders** — including private sector actors, policymakers, and community representatives — to ensure that the development and deployment of autonomous systems align with shared human values and societal goals.

**Advocate for responsible and ethical development** in the use of autonomous systems, emphasizing the importance of human oversight, explainability, transparency, and accountability.

**Support initiatives that promote digital literacy and skills development**, particularly in underserved communities.

EMERGING TREND

# 1.6 Utilizing New Types of Data

## What does the trend encompass?

Access to new and diverse classes of real-time, granular data is transforming our ability to understand and make decisions about biological, chemical, social and physical systems. The ability to collect, manage, and share these new kinds of data securely, efficiently, and in a way that addresses concerns about privacy, fairness, and IP, is fundamental to the healthy evolution of the digital economy.

## Why is it important?

The Internet of Things (IoT), comprising smart sensors and connected systems, is expanding by nearly 20% a year.[59] Integrated sensing and communications technologies, in which a single system can collect and transmit data while incorporating privacy and security features, are making networks more efficient and sustainable.[60] Together these advances are behind everything from smart city infrastructure to precision agriculture and monitoring patients' health.

Data fabric architectures are enabling the use of more types of data. These intelligent networks can seamlessly connect and organize data from different sources with diverse formatting. By breaking down data silos while maintaining strict governance and compliance standards, they are particularly valuable for complex challenges that require collaboration across organizations, sectors, or borders.

Innovation in privacy-protecting technologies, such as homomorphic encryption (see trend 1.4), is opening further possibilities for secure data sharing.[62] This is especially relevant in fields such as healthcare,[63] where overcoming concerns about patient privacy will be critical for using new kinds of data to improve AI-assisted diagnostics.[64] This could particularly benefit resource-constrained regions with physician shortages.

Unlocking the potential of data will require aligning diverse stakeholders behind agile, risk-based regulatory frameworks across local, regional, and global jurisdictions that balance innovation with protecting individuals and communities in different cultures.[65]

**Data fabrics market:** the global data fabric market is expected to grow from $US1.8 billion in 2022 to $8.5 billion in 2030.[61]

**Use case:** Stefaan Verhulst of NYU's GovLab notes how Generative AI could transform how organizations extract insights from new and diverse sources of data, provided they can establish new frameworks for ensuring its quality, provenance and permissioned use.[66]

## Impacts on the horizon

The use of synthetic data, Application Programming Interface (APIs), and federated learning will drive innovation in the use of real-time granular IoT data, especially in heavily regulated industries such as healthcare and finance, where compliance typically places constraints on data innovation.

IoT sensors combined with privacy tech and analytics will unlock new privacy-conscious and equitable data applications.

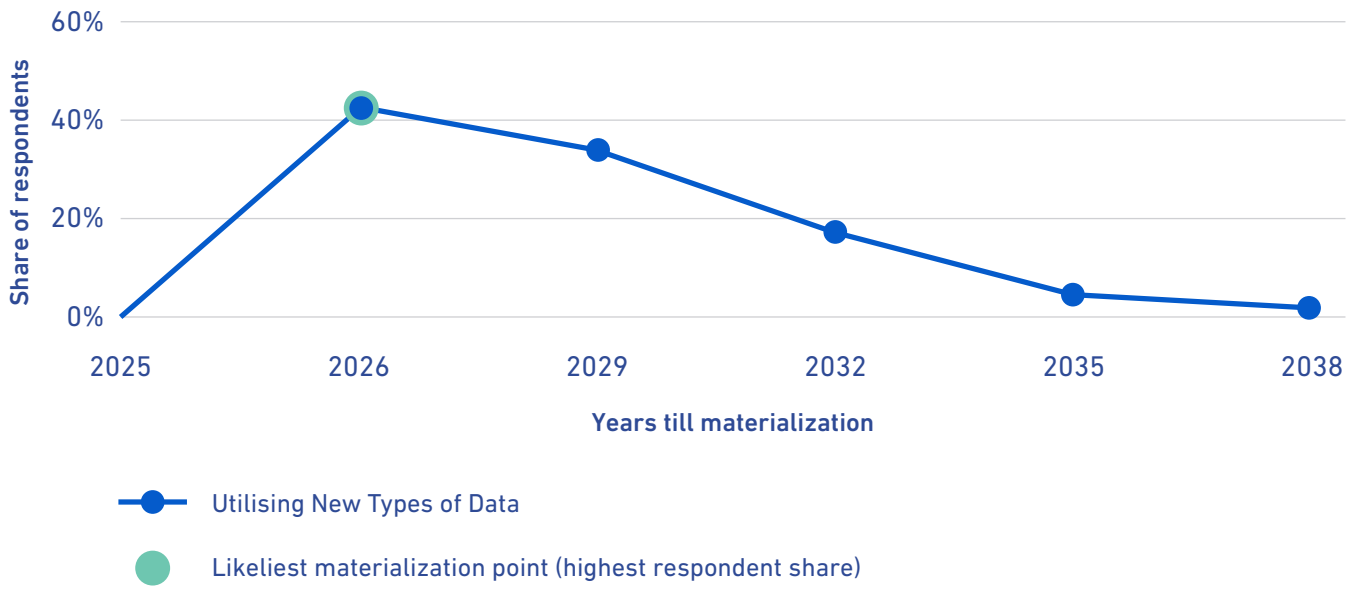
Organizations using comprehensive risk frameworks that address business, legal, technical, and social factors will be the most successful in creating value from new types of granular and highly sensitive data.

# Survey findings

### When will these trends materialize?

Survey respondents rank Utilizing New Types of Data as the emerging trend that is closest to having a significant material impact on the digital economy, with 42% expecting that it will take hold in the next two years.

*Figure 34: Trend 1.6 - Likely materialization*



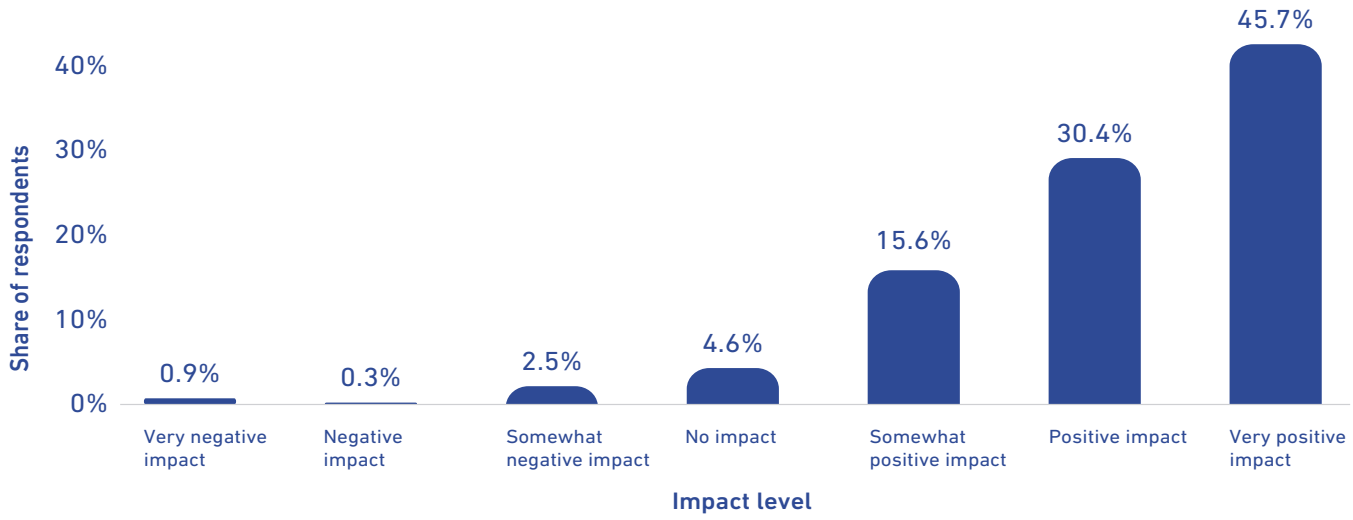

**Source:** *DCO 2024 Digital Economy Trends Survey.*
**Q:** *At a global level, when do you expect the following emerging Digital Economy trends to affect businesses and societies?*

**Respondents:** *240 CTOs and senior technologists working in large companies (+250 employees), 59 policymakers and 38 digital economy experts.*

### Socio-economic impact

Respondents rate this trend as being more likely than average for emerging trends to stimulate economic growth and contribute to social advancement. Enthusiasm is particularly high in the Indo-Asia and Pacific and North America regions, where 55% and 47% of respondents, respectively, predict a very positive impact.

*Figure 35: Trend 1.6 - Expected socio-economic impact in 3-5 years*




**Source:** *DCO 2024 Digital Economy Trends Survey.*
**Q:** *At a global level, to what extent do you believe the following emerging trends will have a net positive or negative socio-economic impact in the next 3-5 years?*
**Respondents:** *240 CTOs and senior technologists working in large companies (+250 employees), 59 policymakers, and 38 digital economy experts.*

Private sector professionals across all industries anticipate positive outcomes. Those in the technology, media, and communications sector are the most optimistic, with 63% predicting very positive impacts, followed by agribusiness, food, and beverage, and automotive and transport. A lower proportion of public sector respondents (39%) anticipate very positive impacts, however, perhaps reflecting concerns about the readiness of infrastructure to process new data securely and effectively at scale.

## Asking AI

**Prompt: "Act as a global expert on the digital economy. What are the potential near-term benefits, challenges, and considerations for the trend of Utilizing New Types of Data?"**

### ChatGPT-4o Response:

**Benefits**

Enhanced decision-making and personalization from real-time insights using diverse data sources, driving innovation and efficiency.

**Challenges**

Risks of privacy violations, integration hurdles with legacy systems, and potential biases in unstructured or unconventional data.

**Considerations**

Prioritize data governance, regulatory compliance, and investment in advanced analytics and workforce skills to maximize value responsibly.

*Note: These insights from LLMs are not data driven. They are provided as directional and sentimental and the LLMs have not had access to the survey data.*[67]

## Key enablers

**Novel data types demand:**

**Digital innovation**

Edge-based architectures supporting real-time processing and cross-boundary collaboration.

**Digital capabilities**

For security protocols and compliance requirements.

**Digital regulation and public administration**

In business models that balance value creation with regulatory adherence.

## Recommendations

### Private sector

**Foster inclusive data partnerships** that support resource-constrained organizations and communities.

**Invest in scalable, interoperable data architectures** that enable broader data collaboration and participation.

**Develop responsible data practices** that balance innovation with ethical considerations and community needs.

### Public sector

**Create interoperable regulatory frameworks** that protect privacy while enabling innovation and data sharing.

**Establish incentive programs for private sector investment** in underserved communities' data infrastructure.

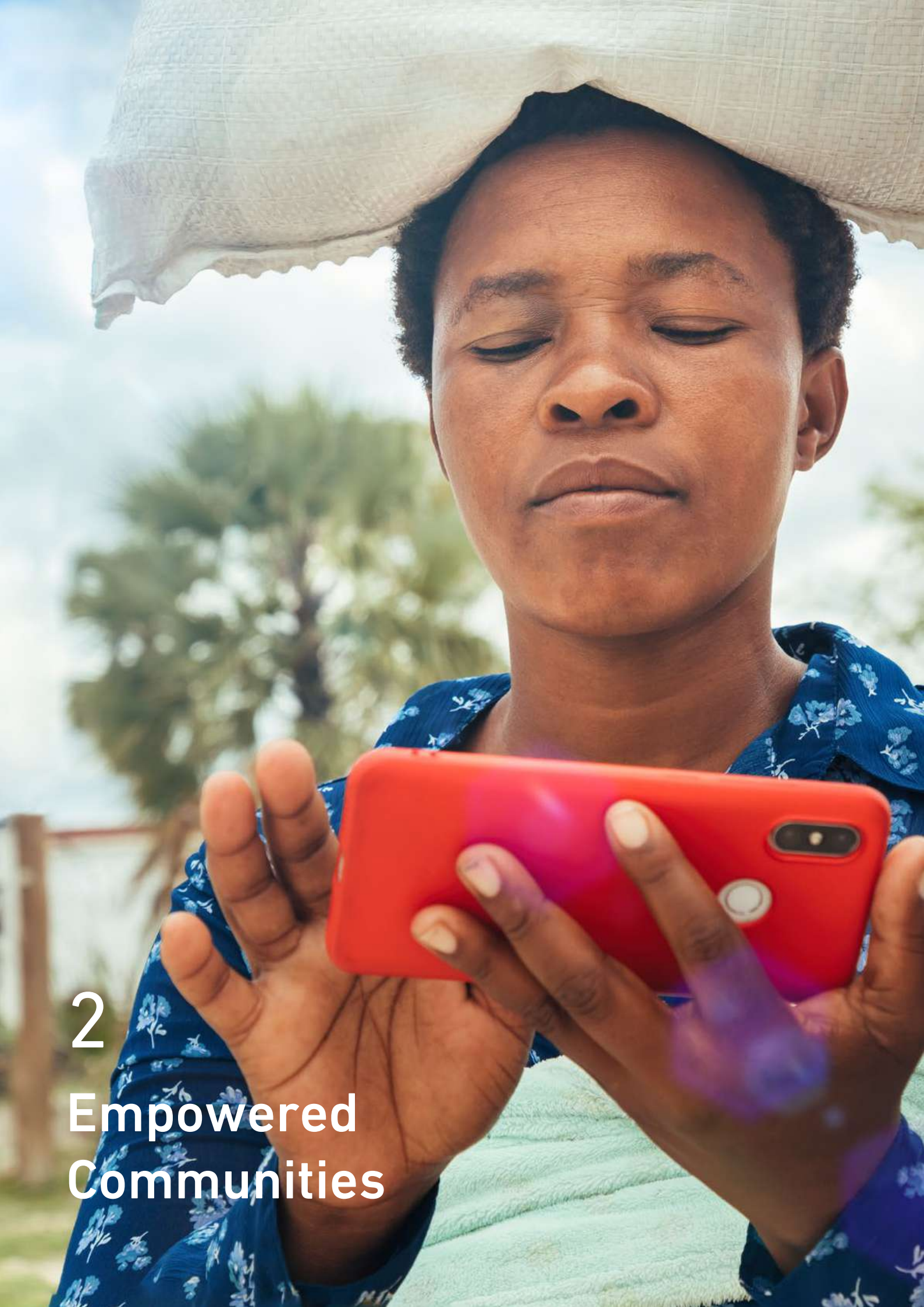
**Support international standards development** for ethical, interoperable data systems.

### IGOs, IOs and others

**Facilitate knowledge transfer and capacity building** for data-driven innovation.

**Create platforms** for sharing best practices and coordinating multi-stakeholder initiatives.

**Advocate for equitable access** to data resources and infrastructure development.



# 2 Empowered Communities

CURRENT TREND

## 2.1

Delivering Hyper-Personalization

CURRENT TREND

## 2.2

Building Digital Skills and Continuous Learning

CURRENT TREND

## 2.3

Accelerating Breakthrough Scientific Discoveries

CURRENT TREND

## 2.4

Strengthening Digitalization of Financial Services

EMERGING TREND

## 2.5

Evolving Digital Cultures, Social Connections, and Behaviors

EMERGING TREND

## 2.6

Embracing Immersive Hybrid Experiences

# Overview

The Empowered Communities theme explores how the digital economy can transform the lives of individuals, communities, and societies. It highlights the role of economic growth driven by technological innovation in addressing societal requirements, with a focus on boosting equitable, inclusive, and sustainable development. By tackling critical challenges such as skill gaps, financial inclusion, and cultural adaptation , this theme serves as a guide for stakeholders, including policymakers, to shape a digital economy that can benefit everyone.

Successfully doing so would entail:

Promoting financial inclusion, developing digital skills, and ensuring equitable access to address socio-economic and regional disparities, fostering a more inclusive digital future.

Leveraging advances in artificial intelligence (AI), digital financial systems, and extended reality (XR) to revolutionize industries and unlock breakthroughs in healthcare, education, and industrial efficiency.

Cultivating secure, inclusive, and meaningful online environments as digital technologies transform how people interact and engage globally.

## Current trends

### 2.1: Delivering Hyper-Personalization

Advances in AI, data analytics, and personalized devices are empowering people through hyper-personalized experiences across platforms and industries, which is also raising concerns about data privacy, algorithmic bias, and the potential exclusion of individuals from the digital economy.

### 2.2: Building Digital Skills and Continuous Learning

The rapid pace of technological change is creating demand for new skills. Relevant education and training programs, when applied alongside digital policy frameworks, are equipping individuals with the digital skills to thrive in the all-inclusive digital economy.

### 2.3: Accelerating Scientific Breakthrough Discoveries

The rapid advancement of AI is revolutionizing scientific research, enabling faster literature reviews, innovative hypothesis generation, and complex data analysis, and promises significant breakthroughs in fields such as biology, healthcare, and climate and materials sciences.

### 2.4: Strengthening Digitalization of Financial Services

Technologies such as blockchain, mobile money platforms, and central bank digital currencies are empowering underserved populations through inclusion in the financial system and easier access to essential services. This fosters inclusion and economic resilience while bridging gaps for underserved populations in the digital economy.

### 2.5: Evolving Digital Cultures, Social Connections, and Behaviors

The rapid expansion of digital technologies is transforming social interactions and communication patterns. Virtual communities (e.g. social media and digital platforms, gaming, and study groups) are facilitating real-time engagement and collaboration, reshaping personal and professional relationships.

## Emerging trend

### 2.6: Embracing Immersive Hybrid Experiences

Advances in XR devices and models will empower communities by democratizing access to immersive experiences across the digital economy, from education and training to entertainment, industrial applications, and digital twin technology.

CURRENT TREND

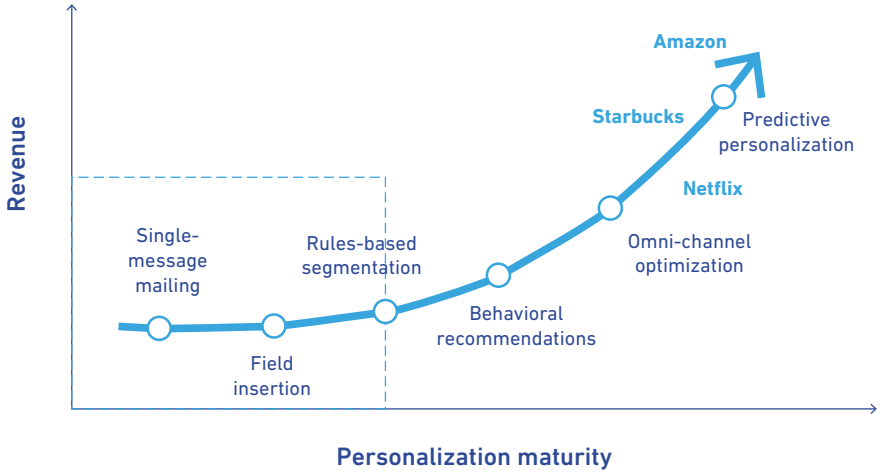
# 2.1

# Delivering Hyper-Personalization

## What does the trend encompass?

The convergence of AI, advanced analytics, and real-time processing capabilities is enabling a fundamental shift from mass to hyper-personalization, where digital experiences are dynamically tailored to individual contexts, preferences, and intentions. For example, a streaming service can analyze someone's viewing habits and create a personalized homepage of recommendations and promotions, denoted in Figure 36 as predictive personalization and corresponding to the highest level of the personalization behavioral curve.

*Figure 36: Personalization behavioral curve*




*Source: Deloitte*[2]

This trend is reshaping how organizations understand and engage with customers, moving beyond traditional demographic segmentation toward truly individualized experiences. AI and advanced analytics now enable unprecedented insights into consumer behavior and preferences, while real-time processing allows for experiences to be dynamically adapted across channels.

## Why is it important?

The rise of hyper-personalization enables organizations to understand their customers more deeply and leverage data to improve customer experiences. It is also empowering individuals from being passive consumers into active producers, providing people with more opportunities to monetize their talents, expertise, and assets.

However, robust privacy protections are needed for hyper-personalization to enhance rather than erode user trust. Further challenges involve ethical

**Personalization strategies in business:** According to Twilio Segment's survey of 500+ business leaders, 89% view personalization as critical for business success in today's digital economy while 73% believe AI adoption will fundamentally alter personalization strategies.[1]

concerns such as algorithmic bias, transparency, and digital inclusion. Overcoming these challenges will demand collaboration between stakeholders and within organizations — ranging from data scientists and privacy experts to customer experience designers and business strategists.

Ultimately, the success of hyper-personalization will depend on striking a balance between maintaining trust and affordable access to customized experiences for all customer segments. Organizations must ensure transparency by explaining how decisions and user experiences are developed. They must also comply with sector-specific regulations in areas such as healthcare, finance, identity verification, and consent. Ensuring equal, affordable, and fair access to personalization across all regions and socio-economic groups will be a pillar of a balanced digital economy.

## Impacts on the horizon

New models for data sharing, model explainability, and fair value exchange could empower individuals to meaningfully engage in trustworthy, hyper-personalized experiences while maintaining control of the data made about them.

AI-powered systems could anticipate needs and preferences before individuals explicitly express them, transforming how consent is managed and how likely future outcomes are communicated, while reshaping the design and delivery of services.

Social friction may emerge between hybrid physical-digital experiences as personalized, real-time pricing gains traction, raising concerns about fairness, privilege, and potential discrimination in retail environments.

**AI and personalization:** Gartner estimates that AI-powered micro-engagements, such as personalized in-app suggestions, can improve cross-selling rates by 20%.[3]

**Use case - Health:** Life Time Fitness integrates digital and physical experiences for its members, personalizing fitness, nutrition, and wellness programs across its country clubs and online platforms.[4] This has led to improved health outcomes, strengthened perceived customer value, and increased member retention.[5]

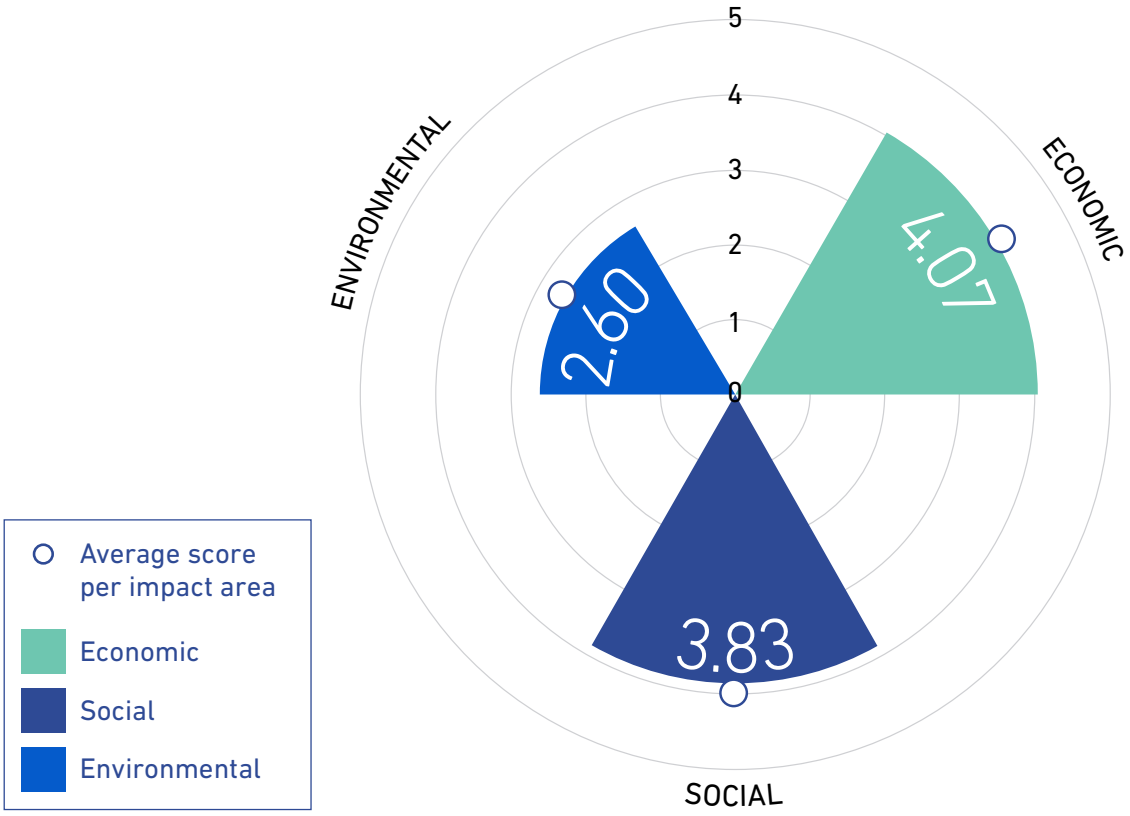
**Use case - Education:** Online education provider Khan Academy shows how hyper-personalization can blur the boundaries between learner and educator, empowering students to create and peer-review educational content.[6]

# Survey findings

### Economic, social, and environmental impact

Survey respondents are skeptical about the potential social benefits of Delivering Hyper-Personalization, ranking it second to last among the other trends with a score of 3.83. For the economic and environmental dimensions, the scores (4.07 and 2.60 respectively) place this trend in the middle of the pack. The relatively low expectation of social benefits could reflect concerns about how managing sensitive personal data will be handled.

*Figure 37: Trend 2.1 - Positive economic, social, and environmental impact*




**Source:** *DCO 2024 Digital Economy Trends Survey.*
**Q:** *How would you assess the economic/social/environmental impact of these current digital trends in the next 12-18 months at the global level?*
**Respondents:** *293 CTOs and senior technologists working in large companies (+250 employees), 59 policymakers, and 40 digital economy experts.*

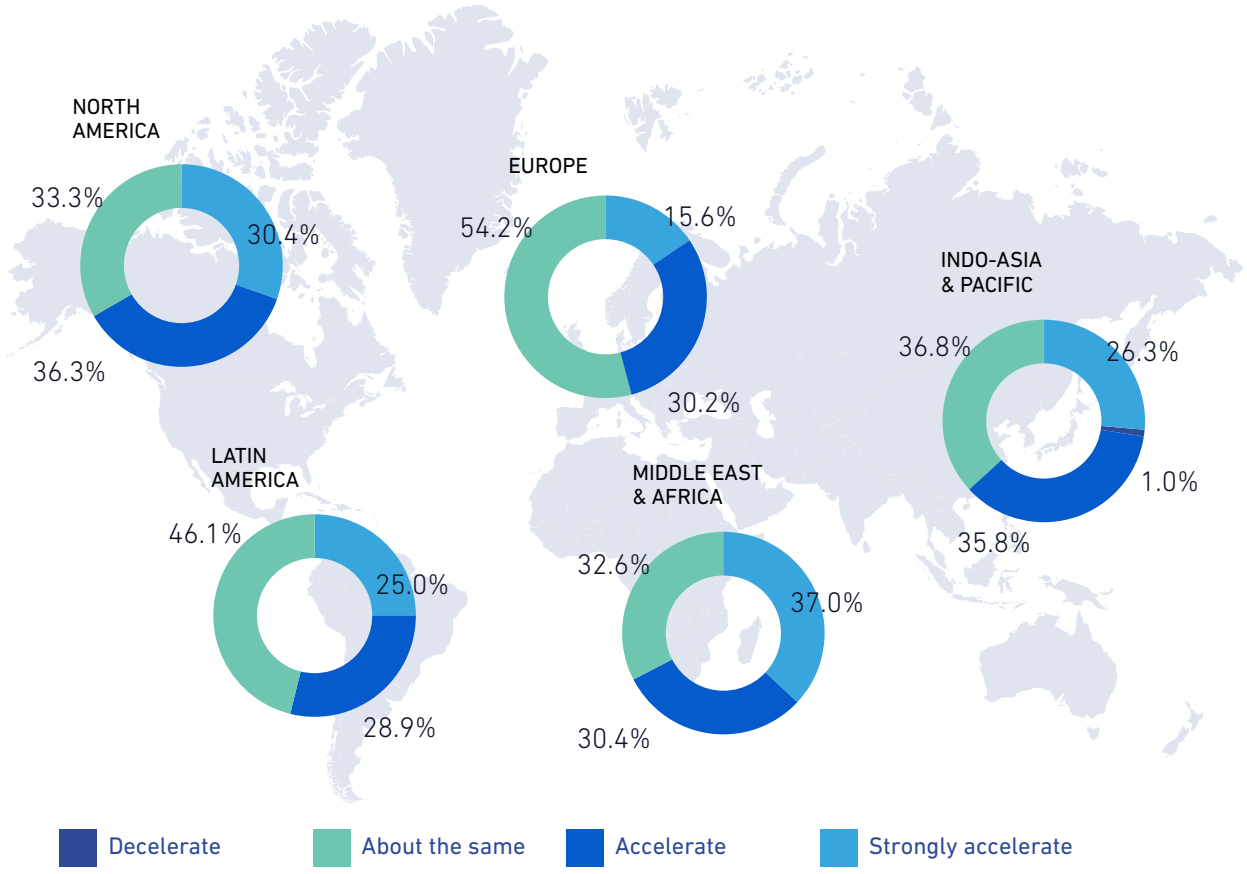
Only 15% of policymakers anticipate very positive social impacts, compared with 31% of private sector respondents. The divergence is even greater for economic impacts, with 34% of private sector respondents feeling very positive compared to with just 13% of policymakers.

Respondents from the technology, media, and communications sector are the most optimistic about socio-economic impacts, while those in manufacturing exhibit the highest confidence in its environmental benefits. Policymakers are more optimistic about environmental than social or economic benefits, with 22% anticipating a very positive impact from the potential of hyper-personalization to optimize energy use, for example.

### Pace of change

Most respondents anticipate that Delivering Hyper-Personalization will accelerate in the next 12-18 months, although the numbers are lower than for most other trends. Those in the Middle East and Africa are most likely to expect strong acceleration, while the majority in Europe expect the pace of change to remain about the same.

*Figure 38: Trend 2.1 - Pace of change per region*

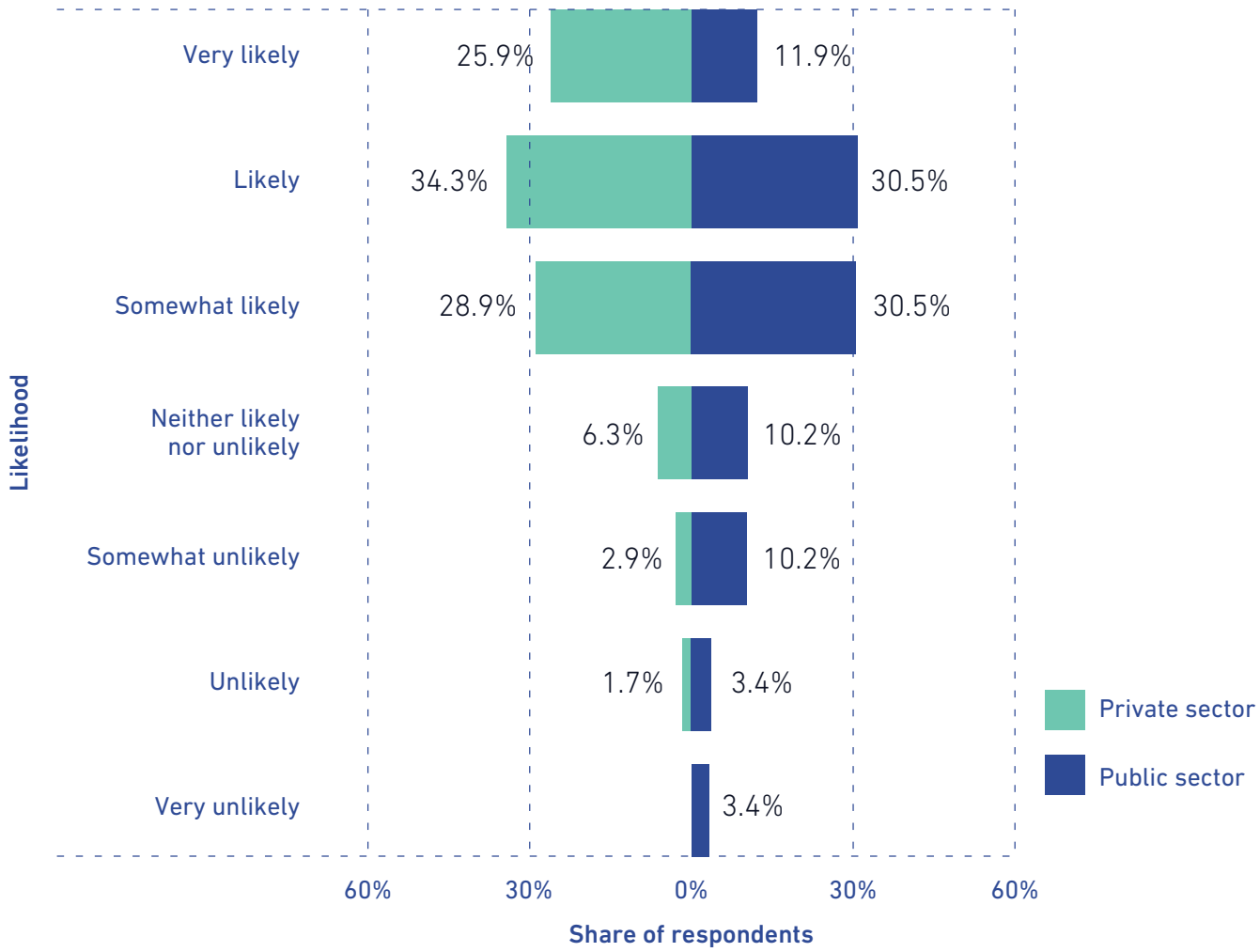



**Source:** *DCO 2024 Digital Economy Trends Survey.*
**Q:** *How do you expect the pace of change of these current digital trends to evolve in the next 12-18 months at the global level?*
**Respondents:** *293 CTOs and senior technologists working in large companies (+250 employees), 59 policymakers, and 40 digital economy experts.*

### Stakeholder impact

Just over 60% of private sector respondents consider new regulations on hyper-personalization to be likely or very likely within the next 12-18 months. However, the public sector outlook is more mixed, with 17% considering regulations unlikely to some degree.

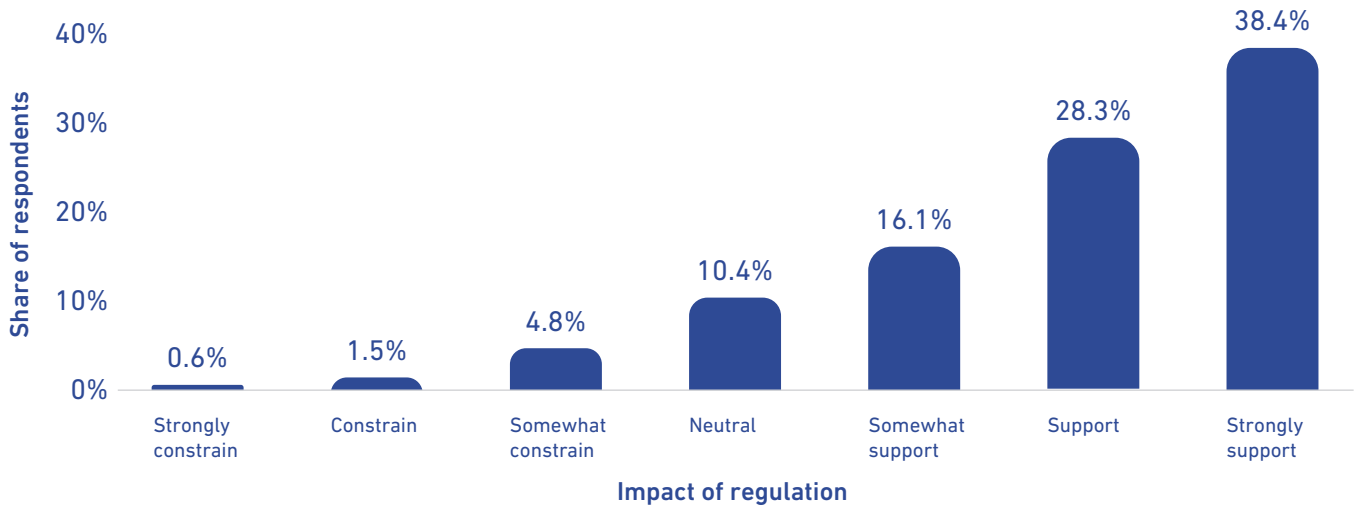
*Figure 39: Trend 2.1 - Perception of likelihood of legislation or regulation activity by stakeholder group*




**Source:** *DCO 2024 Digital Economy Trends Survey.*
**Q:** *At a global level, how likely do you think it is that we will see an increase in legislative and regulatory activities related to the following trends in the Digital Economy over the next 12 to 18 months?*
**Respondents:** *293 CTOs and senior technologists working in large companies (+250 employees), 59 policymakers, and 40 digital economy experts.*

About two-thirds of respondents anticipate that regulations will support or strongly support the trend toward hyper-personalization, with only a single-digit percentage believing they could pose constraints.

***Figure 40: Trend 2.1 - Expected impact of new legislation or regulation activity on trend adoption***




**Source:** *DCO 2024 Digital Economy Trends Survey.*
**Q:** *At a global level, how do you expect these legislative and regulatory activities to influence the adoption of digital economy trends in the next 12 to 18 months?*
**Respondents:** *293 CTOs and senior technologists working in large companies (+250 employees), 59 policymakers, and 40 digital economy experts.*

## Asking AI

**We asked three leading large language models (LLMs) — ChatGPT-4o, Claude 3.5, and Llama 3.1— to assess the economic, social, and environmental impacts of this trend over the next 12-18 months. Here's what these models had to say:**

### Economic impact

All three LLMs expect a positive economic impact as hyper-personalization enhances customer engagement, driving higher conversion rates and better customer retention.

### Social impact

The models anticipate a somewhat positive social impact, with the potential to empower individuals, but have concerns around data privacy, algorithmic bias, and digital exclusion.

### Environmental impact

None of the LLMs expect a significant environmental impact from this trend.

*Note: These insights from LLMs are not data driven. They are provided as directional and sentimental and the LLMs have not had access to the survey data.*[7]

## Key enablers

**For hyper-personalization to reshape digital experiences, society and industries will require:**

**Digital infrastructure**

High-quality, reliable digital infrastructure is needed to support the large-scale data collection, processing, and real-time analytics required.

**Digital capabilities**

Individuals will need digital skills to navigate hyper-personalized environments, with public-private collaboration frameworks supporting data rights.

**Digital regulation and public administration**

Balanced governance will be needed to protect individual rights and privacy while fostering innovation.

## Recommendations

### Private sector

**Design personalization systems** that are transparent and explainable, enabling users to have meaningful control over their data and experiences.

**Invest in advanced AI and data analytics** to create tailored user experiences that anticipate and meet individual customer needs.

**Prioritize data privacy and transparency** by implementing clear policies that empower users to understand and control how their data is collected, used, and protected by goods and service providers offering personalized experiences.

**Build trust through clear communication** about how AI and data inform personalized experiences for both individuals and the communities to which they belong.

### Public sector

**Establish balanced regulatory frameworks** that reflect the needs and aspirations of local communities, protect individual rights, including personal data privacy, and foster innovation and competition in the delivery of hyper-personalized experiences.

**Support digital literacy initiatives** to help all individuals effectively engage with hyper-personalized digital experiences by equipping them with the skills to understand, manage, and benefit from AI-driven, real-time tailored content and services.

**Create incentives** for developing inclusive personalization solutions that serve diverse communities.

### IGOs, IOs, and others

**Facilitate knowledge sharing and standard-setting** for ethical personalization practices.

**Monitor and address potential disparities** in access to personalization benefits, ensuring that underserved populations, marginalized communities, and individuals with limited digital literacy are not excluded from equitable opportunities to experience the advantages of tailored services and solutions.

**Promote international collaboration** to share best practices and innovative solutions for implementing hyper-personalized experiences in diverse cultural contexts.

CURRENT TREND

# 2.2

# Building Digital Skills and Continuous Learning

## What does the trend encompass?

As digital technologies reshape industries and jobs, the need to equip people with relevant skills has become critical for economic growth, social mobility, and sustained innovation.[9] Enabling individuals to learn continuously and participate meaningfully in the digital economy will require proactive and collaborative efforts across stakeholders, from governments and businesses to educational institutions and individuals themselves.

## Why is it important ?

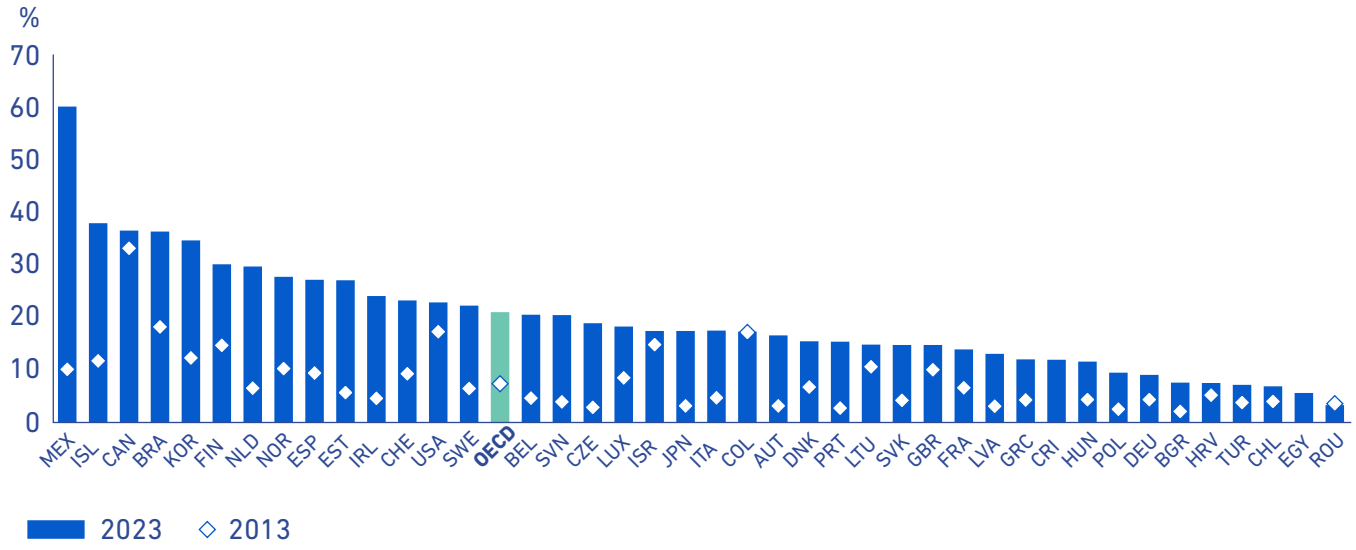
Without urgent action to improve access to digital skills development, existing socio-economic gaps risk becoming permanently entrenched resulting in a two-tier workforce. As the World Bank notes, the digital skills gap between developed and developing economies continues to widen. While some nations can invest heavily in digital infrastructure and training programs, others struggle with basic digital literacy and access to learning resources.[10] This disparity threatens to exacerbate existing economic inequalities and limit participation in the global digital economy. Furthermore, as AI transforms the workplace, workers will need to continuously adapt and upgrade their skills, moving beyond traditional one-time training models to embrace lifelong learning. Failing to improve access to digital skills development could entrench existing socioeconomic gaps and lead to the loss of opportunities for economic growth.[12]

**Top skills in the digital economy:** The fastest-growing job skills for 2024, according to Coursera, reflect the growing dominance of digital technology in the economy: e-commerce tops the list, followed by media strategy and planning, system security, and search engine optimization.[8]

"Digital technologies are having a profound impact on economies, labor markets, and societies, and the demand for digital skills is rapidly increasing"[11]

**DCO DEN 2024 findings:** The DCO DEN 2024 reveals narrowing gaps in basic digital literacy, with 98.6% of respondents proficient in tasks like email and word processing, yet significant disparities persist in advanced skills such as software installation and programming.[13]

*Figure 41: Individuals using the internet for an online course as a percentage of all individuals, 2023*




*Source: OECD*

Digital technologies are transforming learning methods. By enhancing access, quality, and cost efficiency in education systems, they are equipping communities with the skills to innovate and thrive in the digital economy. AI enables personalized, accessible, and flexible learning anytime, anywhere: as Figure 41 shows, the percentage of internet users following an online course has more than doubled across OECD countries over the past decade.

## Impacts on the horizon

Education and training systems are evolving toward blended and hybrid approaches, enhanced by AI-powered personalization, to prepare individuals for the digital economy.

Organizations are shifting from periodic training to continuous learning models, leveraging digital platforms and micro-credentials for professional development.

Digital literacy is becoming as fundamental as traditional literacy for empowering communities, requiring universal access to frameworks for developing digital competencies.

**Criticality of digital skills:** Organizations view digital skills as critical for creating a competitive advantage: nine out of ten executives plan to maintain or increase their investment in learning and development over the next six months.[14]

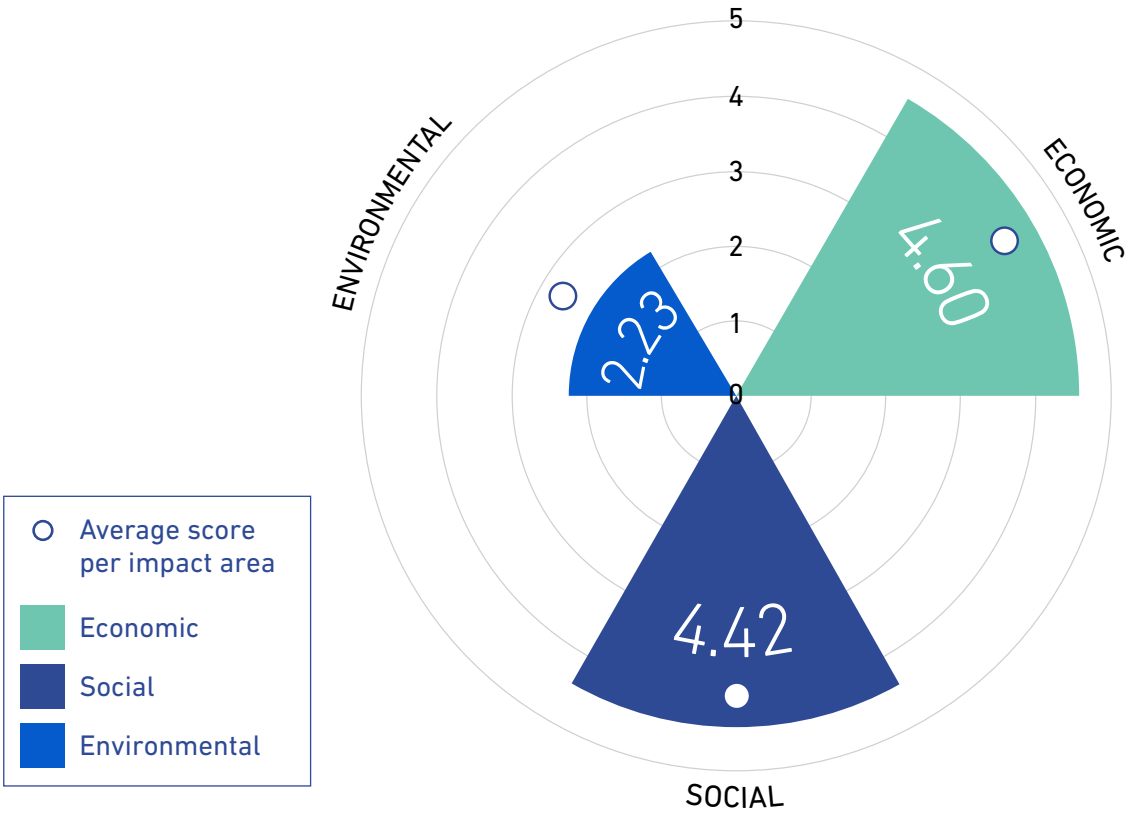
**Digital certifications:** With 60% of workers projected to need retraining by 2027, new forms of certification such as micro-credentials and digital badges are becoming more prominent as agile and granular ways to recognize capabilities.[15]

# Survey findings

### Economic, social, and environmental impact

Building Digital Skills and Continuous Learning is recognized as among the most transformative trends in this report. A score of 4.42 indicates that respondents believe it has more potential for social benefits than any other trend. It also ranks second for its potential economic impact, scoring 4.50. However, respondents do not expect this trend to have significant environmental benefits, with a score of 2.23 placing it behind every other trend in the report.

*Figure 42: Trend 2.2 - Positive economic, social, and environmental impact*



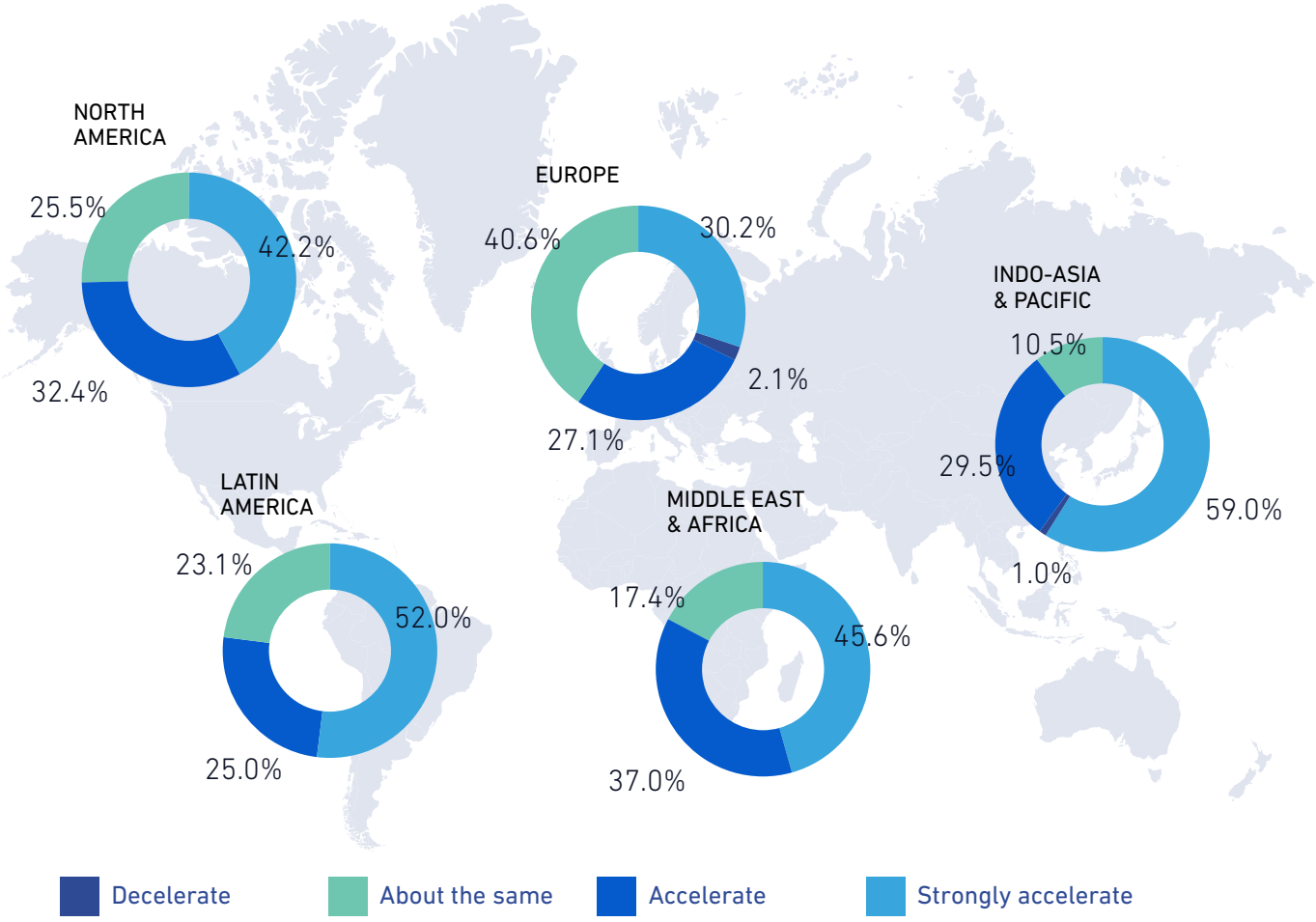

**Source:** *DCO 2024 Digital Economy Trends Survey.*
**Q:** *How would you assess the economic/social/environmental impact of these current digital trends in the next 12-18 months at the global level?*
**Respondents:** *293 CTOs and senior technologists working in large companies (+250 employees), 59 policymakers, and 40 digital economy experts.*

Public and private sector stakeholders are comparably optimistic about the potential positive economic and social impacts. However, their confidence does not extend to its environmental benefits, reflecting the limited focus on sustainability in digital skills initiatives. Respondents from the manufacturing and technology, media and communications sectors were most optimistic about economic benefits, with 53% and 50% respectively expecting a very positive impact. Those in healthcare and life sciences were the most likely to foresee strong social impacts.

### Pace of change

Nearly 80% of respondents predict that the pace of this trend will accelerate over the next 12-18 months, positioning it among the faster-moving trends. Respondents in Indo-Asia and Pacific (59%) and Latin America (50%) were the most likely to forecast a strong acceleration, and those in Europe (30%) the least likely.

*Figure 43: Trend 2.2 - Pace of change per region*

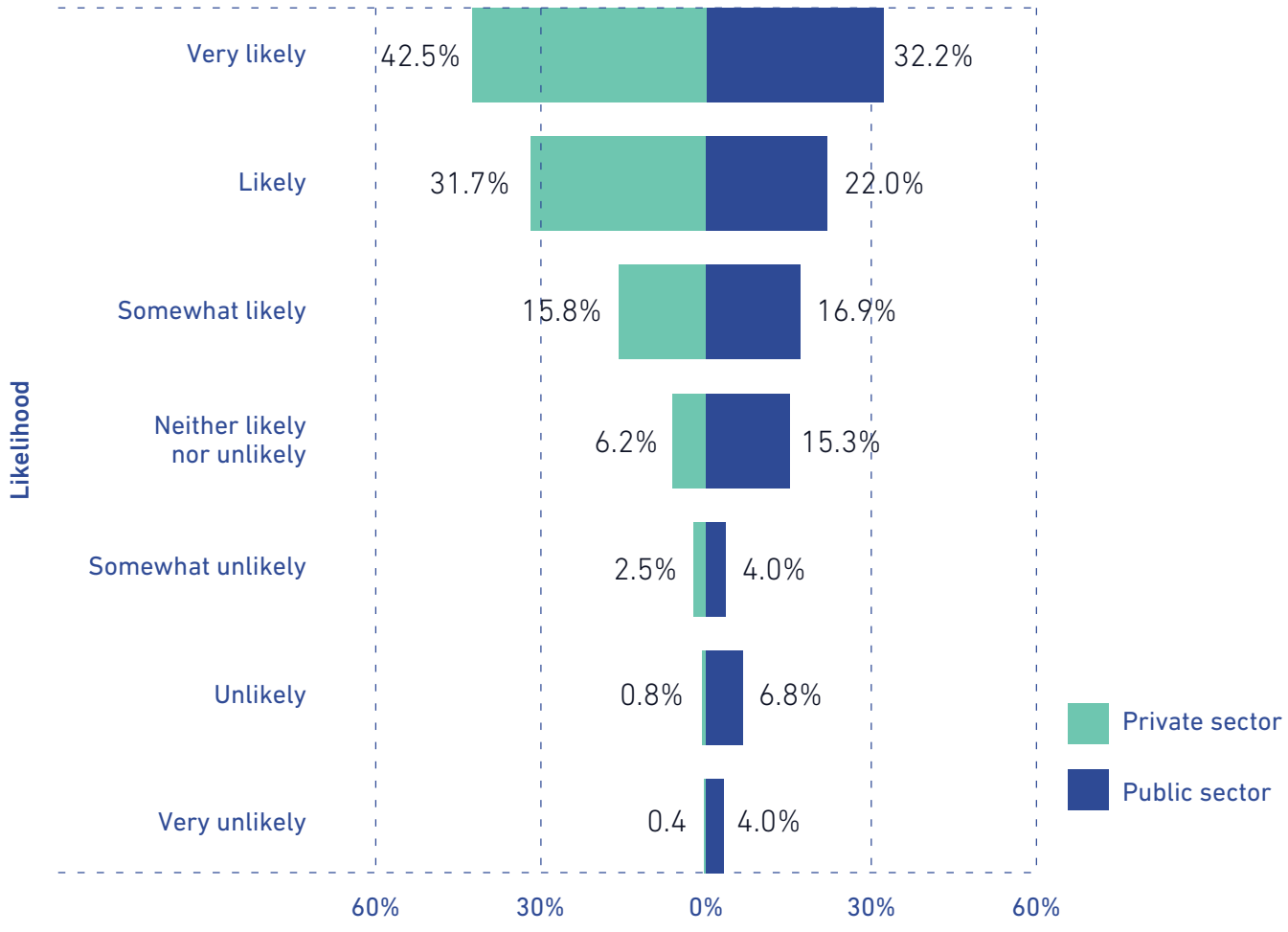



**Source:** *DCO 2024 Digital Economy Trends Survey.*
**Q:** *At a global level, how do you expect these legislative and regulatory activities to influence the adoption of digital economy trends in the next 12 to 18 months?*
**Respondents:** *293 CTOs and senior technologists working in large companies (+250 employees), 59 policymakers, and 40 digital economy experts.*

### Stakeholder impact

Ninety percent of private sector respondents believe it is at least somewhat likely that regulatory changes will impact Building Digital Skills and Continuous Learning within the next 12-18 months, with 42% considering it very likely. Public sector respondents are less confident, with just 32% believing it very likely and 15% remaining neutral.

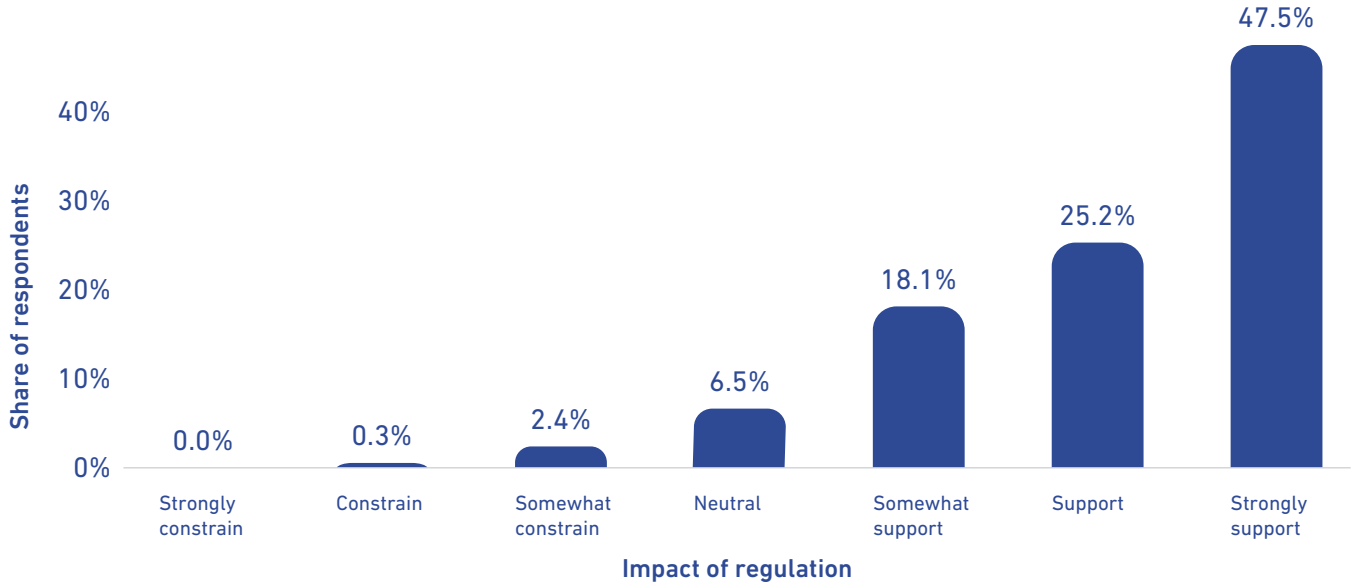
***Figure 44: Trend 2.2: Perception of likelihood of legislation or regulation activity by stakeholder group***




**Source:** *DCO 2024 Digital Economy Trends Survey.*
**Q:** *At a global level, how likely do you think it is that we will see an increase in legislative and regulatory activities related to the following trends in the Digital Economy over the next 12 to 18 months?*
**Respondents:** *293 CTOs and senior technologists working in large companies (+250 employees), 59 policymakers, and 40 digital economy experts.*

Respondents overwhelmingly believe that regulations will be supportive, with 47% expecting they will be strongly supportive and less than 3% viewing regulation as potentially constraining.

***Figure 45: Trend 2.2: Expected impact of new legislation or regulation activity on trend adoption***




**Source:** *DCO 2024 Digital Economy Trends Survey.*
**Q:** *At a global level, how do you expect these legislative and regulatory activities to influence the adoption of digital economy trends in the next 12 to 18 months?*
**Respondents:** *293 CTOs and senior technologists working in large companies (+250 employees), 59 policymakers, and 40 digital economy experts.*

## Asking AI

**We asked three leading LLMs (ChatGPT-4o, Claude 3.5, and Llama 3.1) to assess the economic, social, and environmental impacts of this trend over the next 12-18 months. Here's what these models had to say:**

### Economic impact

The models all agree that building digital skills and continuous learning is expected to drive economic growth and productivity.

### Social impact

Llama notes that digital skills development has the potential to promote social mobility, while ChatGPT and Claude share concerns that unequal access could exacerbate existing socio-economic divides.

### Environmental impact

None of the LLMs foresee a direct environmental impact.

*Note: These insights from LLMs are not data driven. They are provided as directional and sentimental and the LLMs have not had access to the survey data.*[16]

## Key enablers

**Four critical enablers are accelerating workforce transformation:**

**Digital infrastructure**

High-speed internet connectivity, affordable access, and widespread coverage, including rural areas, are essential to ensure individuals and businesses can engage with digital platforms, access learning resources, and develop the competencies required for building digital skills and fostering continuous learning.

**Digital finance**

Public-private partnerships enabling sustainable funding for skills development, including accessible and affordable financial solutions for individuals and businesses — such as digital payment systems for education fees, microloans for purchasing devices — and financial incentives for investing in upskilling and training programs.

**Digital regulation and public administration**

Quality standards and incentives supporting lifelong learning recognition.

**Industry digital transformation**

Fostering partnerships among educational institutions, businesses, and tech innovators to build ecosystems that support skill development, lifelong learning, and knowledge sharing.

## Recommendations

### Private sector

**Deploy AI-enabled learning platforms** that combine technical training with practical applications.

**Create inclusive skills development programs** with flexible learning pathways and recognized credentials.

**Partner with educational institutions to align training** with industry needs and provide work-based learning opportunities.

### Public sector

**Establish national digital skills frameworks and standards** that recognize both formal and informal learning.

**Support policies and funding that promote lifelong learning and skills development** through grants, subsidies, and public-private partnerships.

**Ensure digital infrastructure and training** resources reach underserved communities.

### IGOs, IOs, and others

**Facilitate knowledge sharing** and best practices for digital skills development across regions.

**Support capacity building in developing nations** through targeted resource allocation.

**Promote global standards** for digital skills assessment and credential recognition.

CURRENT TREND

# 2.3

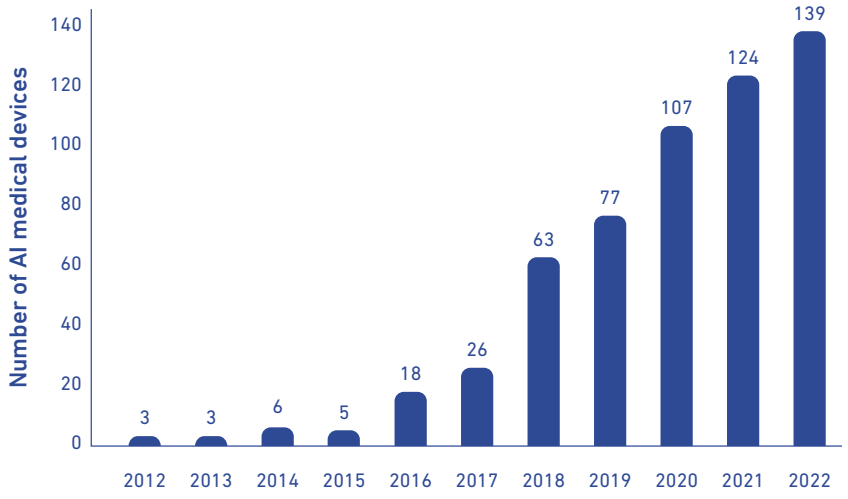
# Accelerating Breakthrough Scientific Discoveries

## What does the trend encompass?

AI and other emerging technologies are reshaping scientific research and accelerating discoveries through automated analysis, hypothesis generation, and experimental design in domains such as drug discovery, materials science, and climate research. While private sector investment is driving much of the innovation that is impacting the digital economy, open research tools are increasingly widening access and empowering communities.

In the US, for example, the Food and Drug Administration greenlit 139 AI-driven medical devices in 2022, compared with just five in 2015, as shown in Figure 46, with radiology and cardiovascular applications leading the way.

*Figure 46: Number of AI/ML-enabled medical devices approved in the US, 2012-22*




*Source: Perrault and Clark*[17]

## Why is it important?

By enabling scientists to analyze vast amounts of data, AI is reshaping the research lifecycle, from generating hypotheses to designing experiments. As noted in the Stanford AI Index, "the integration of AI into scientific research represents a critical inflection point in human knowledge creation."

Scientific breakthroughs driven by cutting-edge technologies such as AI remain largely confined to wealthy institutions. Many regions lack access to tools or researchers who can bridge AI and domain expertise, risking a growing gap in AI research capacity in underserved areas. While private investment drives growth in the digital economy, a complementary ecosystem

**The AI Scientist:** In August 2024, researchers introduced "The AI Scientist" — a fully automated, comprehensive model that can generate a research idea, devise, and perform an experiment, draft a paper, and review the paper against established research standards — all for under US$15.[18]

of open-source tools, affordable infrastructure, and virtual collaboration platforms to share technical and knowledge resources will be needed to broaden the distribution of benefits.

Leveraging the synergies of human expertise and AI capabilities can shape the digital economy, with humans providing the creative thinking and ethical judgment to guide AI's analytical power and ensure that shared values remain central to scientific discovery. Diverse funding models that blend public, private, and philanthropic capital can strengthen innovation and competitive dynamics while preserving scientific rigor and responsible innovation to address some of society's toughest challenges.

## Impacts on the horizon

The development of distributed, transparent, and explainable AI-based research platforms that maintain scientific rigor and global collaboration.

Risk-based governance frameworks and collaborative regulatory sandboxes focused on domain-specific challenges (i.e. finance, public health, generative AI, and public transport) as seen in Europe, the US, Sub-Saharan Africa, Brazil, and Singapore.

The emergence of AI systems optimized for low energy consumption and limited computational resources.

**Impact of AI on scientific research:** Although AI speeds up scientific research, it can also challenge the scientific method: the "black box" nature of AI compromises the transparency of the research process, making it harder for human researchers to critically evaluate or replicate AI-driven findings.[19]

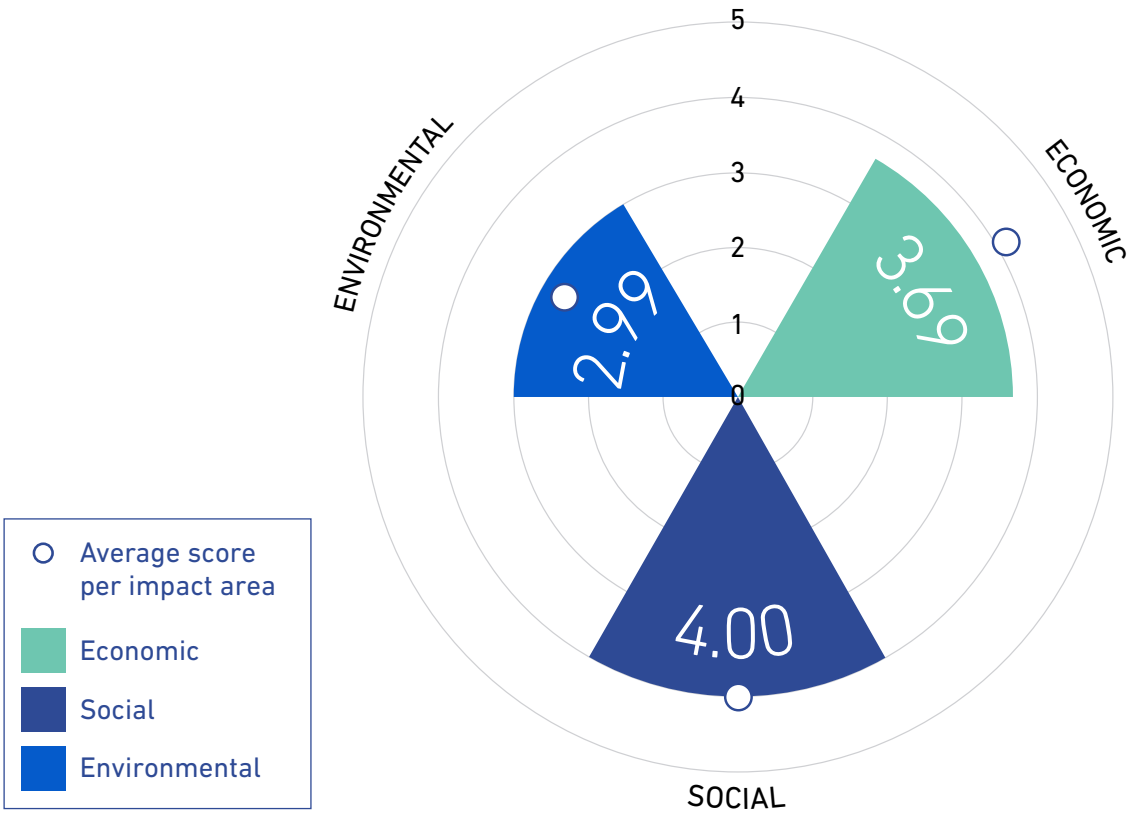
**AI regulation:** The push for "responsible AI" is evolving rapidly, with a growing number of organizations making commitments to mitigate risk and jurisdictions issuing regulatory frameworks such as the EU's AI Act. However, lack of standardization in reporting complicates benchmarking efforts in areas such as privacy, transparency, fairness, and safety.[20]

# Survey findings

### Economic, social, and environmental impact

Accelerating Scientific Discoveries has an especially high potential to bring environmental benefits, with survey respondents ranking it second among the 12 trends in this report with a score of 2.99. Government respondents were especially likely to be optimistic about this aspect. Respondents as a whole were less positive about its economic impact (3.69), where it ranks 11th, reflecting the challenges of translating scientific breakthroughs into immediate economic returns. The trend has a middling rank for social impact, with a score of 4.0.

*Figure 47: Trend 2.3 - Positive economic, social, and environmental impact*



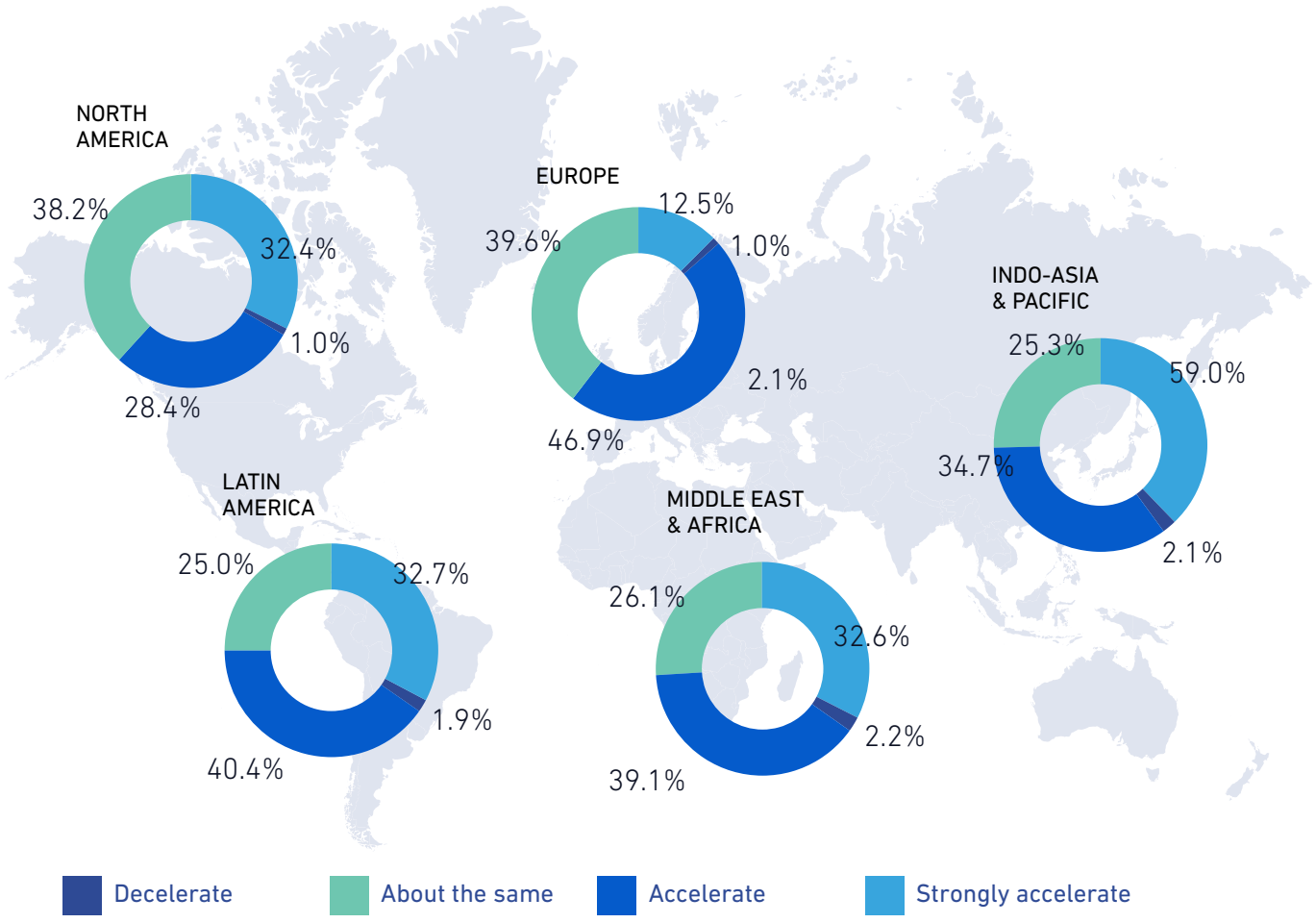

**Source:** *DCO 2024 Digital Economy Trends Survey.*
**Q:** *How would you assess the economic/social/environmental impact of these current digital trends in the next 12-18 months, at the global level?*
**Respondents:** *293 CTOs and senior technologists working in large companies (+250 employees), 59 policymakers, and 40 digital economy experts.*

Among private sector respondents, those working in healthcare and life sciences are the most enthusiastic about this trend, with 40% feeling very positive about its benefits for the economy, 37% for society, and 53% for the environment. Heavy industries respondents are also notably optimistic about economic benefits, while those in the retail and wholesale sector are the least likely to foresee economic gains.

### Pace of change

Nearly 75% of respondents predict that the pace of this trend will accelerate over the next 12-18 months, which positions it among the faster-moving trends. Respondents in the Indo-Asia and Pacific were the most likely to expect strong acceleration (38%), with those in Europe (40%) and North America (38%) the most likely to expect no change in its pace.

*Figure 48: Trend 2.3 - Pace of change per region*

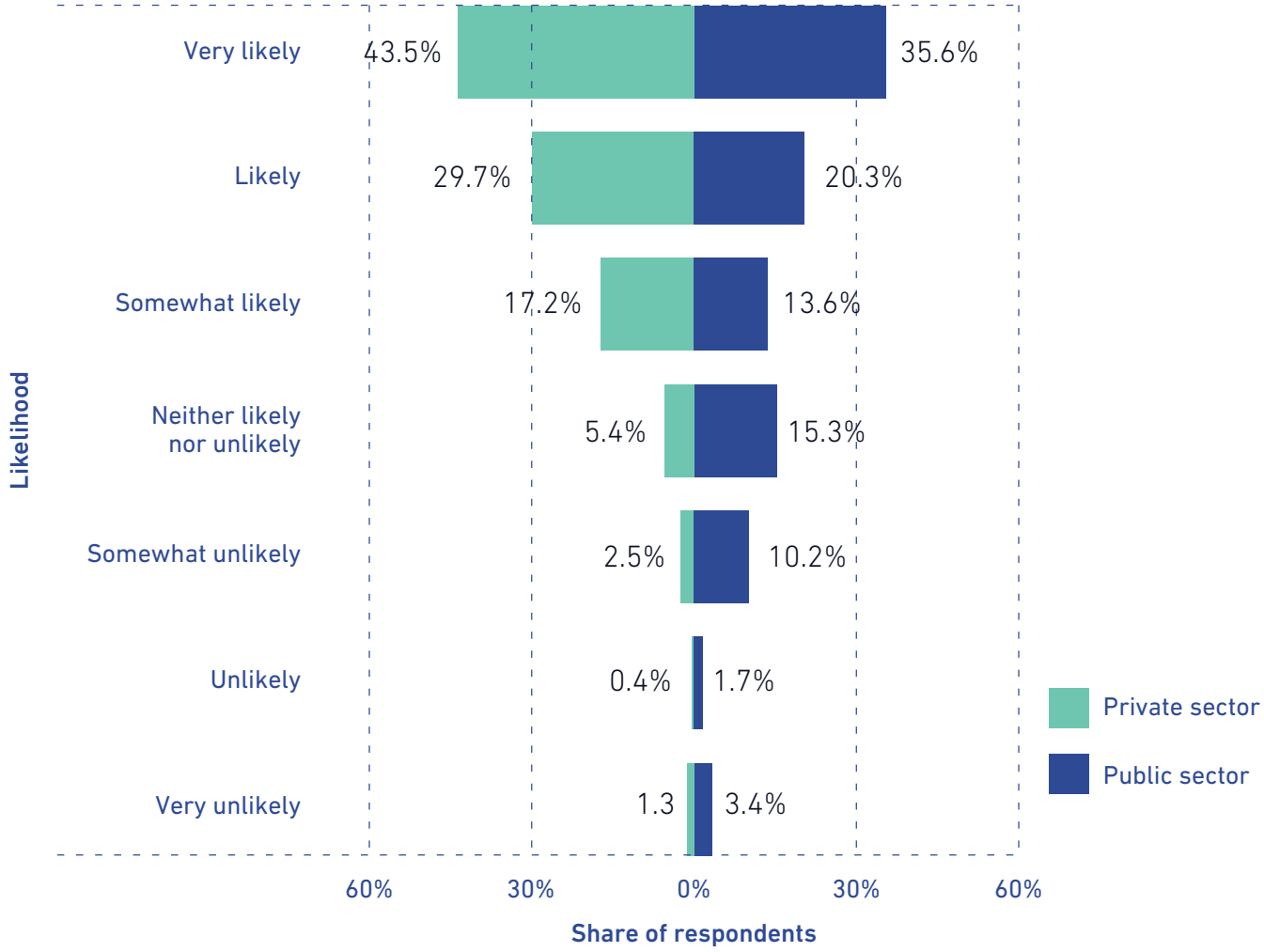



**Source:** *DCO 2024 Digital Economy Trends Survey.*
**Q:** *At a global level, how do you expect these legislative and regulatory activities to influence the adoption of digital economy trends in the next 12 to 18 months?*
**Respondents:** *293 CTOs and senior technologists working in large companies (+250 employees), 59 policymakers, and 40 digital economy experts.*

### Stakeholder impact

More than 90% of private sector respondents believe it is at least somewhat likely that regulatory changes will influence Accelerating Scientific Discoveries over the next 12-18 months, against just under 70% in the public sector.

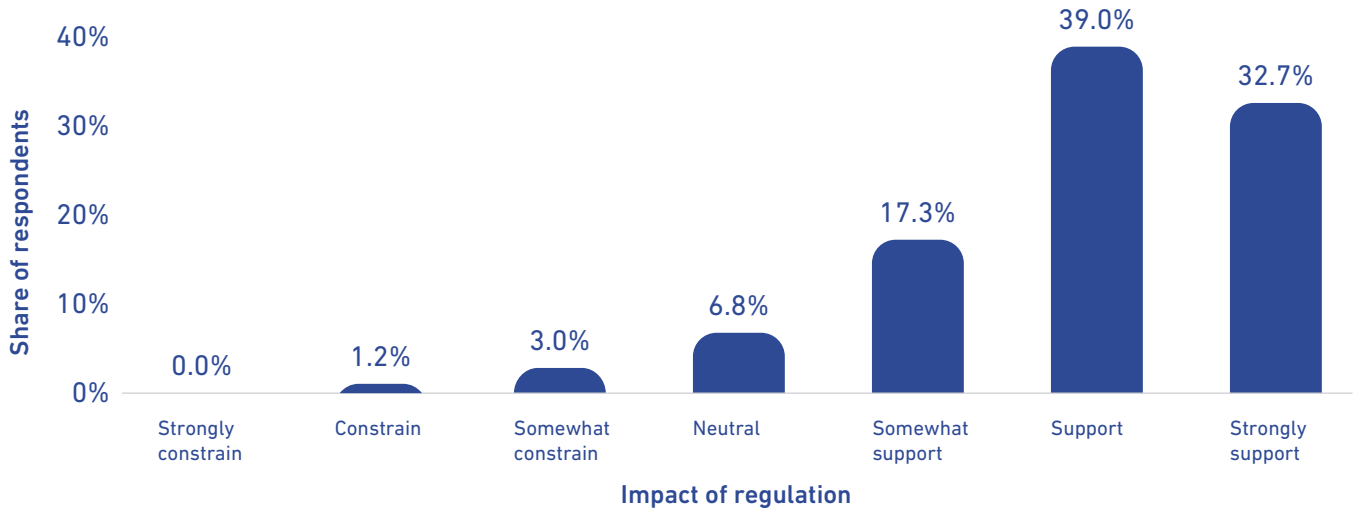
***Figure 49: Trend 2.3 - Perception of likelihood of legislation or regulation activity by stakeholder group***




**Source:** *DCO 2024 Digital Economy Trends Survey.*
**Q:** *At a global level, how likely do you think it is that we will see an increase in legislative and regulatory activities related to the following trends in the Digital Economy over the next 12 to 18 months?*
**Respondents:** *293 CTOs and senior technologists working in large companies (+250 employees), 59 policymakers, and 40 digital economy experts.*

Respondents broadly believe that regulations, if implemented, would be helpful — although more said they believed regulations would support rather than strongly support the trend. Very few respondents (4.2%) expect new regulations to constrain the acceleration of scientific discovery.

***Figure 50: Trend 2.3 - Expected impact of new legislation or regulation activity on trend adoption***




**Source:** *DCO 2024 Digital Economy Trends Survey.*
**Q:** *At a global level, how do you expect these legislative and regulatory activities to influence the adoption of digital economy trends in the next 12 to 18 months?*
**Respondents:** *293 CTOs and senior technologists working in large companies (+250 employees), 59 policymakers, and 40 digital economy experts.*

## Asking AI

**We asked three leading LLMs (ChatGPT-4o, Claude 3.5, and Llama 3.1) to assess the economic, social, and environmental impacts of this trend over the next 12-18 months. Here's what these models had to say:**

### Economic impact

The models expect a positive impact, with AI-driven scientific discovery poised to revolutionize key industries.

### Social impact

Llama points to this trend's potential to address some of the world's most pressing challenges, while ChatGPT cautions that the digital divide between well-resourced and under-resourced regions limits the scope for inclusive social impact.

### Environmental impact

The models note that the trend has the potential to lead to breakthroughs in fields such as climate science and sustainable development, while also highlighting that the energy consumption and e-waste associated with AI technologies may mitigate these benefits.

*Note: These insights from LLMs are not data driven. They are provided as directional and sentimental and the LLMs have not had access to the survey data.*[21]

## Key enablers

**AI-driven scientific advancement will rely on three interrelated enablers:**

**Digital infrastructure**

Cloud computing infrastructure with standardized application programming interfaces enables seamless collaborative research and provides the computing power required to process large volumes of research data.

**Digital innovation**

Having the venture capital availability, support, and incentives for innovation, and research and development.

**Digital finance**

Diverse funding combining private investment and public grants.

**Digital regulation and public administration**

Cross-border governance ensuring ethical research practices.

## Recommendations

### Private sector

**Foster transparency** through the public release of documentation about AI models, along with responsible data sharing practices to accelerate scientific research progress.

**Prioritize responsible AI development** incorporating fairness, accountability, explainability, and safety principles while investing in transparent research tools.

**Establish cross-sector partnerships with research institutions** to share computational resources and expertise, with an emphasis on the collaborative development of accessible scientific AI tools.

**Provide affordable access to tools and platforms** for smaller research organizations and startups.

### Public sector

**Drive investment in foundational AI research infrastructure** including shared datasets, computing resources, and collaborative platforms.

**Implement open data policies** that expand secure access to federal datasets while maintaining robust privacy protections to democratize scientific knowledge, and accelerate discoveries.

**Develop comprehensive guidelines for responsible AI use** in research, incorporating ethical frameworks and oversight mechanisms.

**Allocate funding for advanced computing systems**, such as high-performance computing and quantum technologies, to support scientific research.

### IGOs, IOs, and others

**Foster cross-border collaboration** between the private sector and research institutions to share best practices and resources on accelerating scientific discovery.

**Lead the development of global standards for responsible AI deployment** in scientific research.

**Support capacity building in developing regions** through targeted resource allocation and technical assistance programs.

CURRENT TREND

# 2.4

# Strengthening Digitalization of Financial Services

## What does the trend encompass?

The financial services sector is experiencing unprecedented transformation driven by the convergence of AI, big data, cloud computing, blockchain, and digital platforms. It is reshaping how traditional financial institutions operate in the digital economy, and changing who can provide financial services and how they reach businesses and consumers.

Technological advances have the potential to empower communities by broadening financial inclusion when combined with strong digital public infrastructure — including digital identification, payment systems, and data exchange platforms. As the Global Partnership for Financial Inclusion notes, digital financial services innovations are enabling new business models and non-bank service providers to significantly lower remittance costs and expand access for underserved populations.[24]

## Why is it important?

The digitalization of financial services is creating opportunities for new non-bank providers and business models to serve previously unreached populations through lower cost structures and more flexible service offerings. Traditional financial institutions are being pushed to innovate and adapt, improving experiences for their customers. This is not just benefiting individual financial well-being but also building a more resilient, inclusive, and equitable digital economy.

**Use case. Financial inclusion in India:** India's Jan Dhan initiative demonstrates how digital public infrastructure can enable faster progress in financial inclusion.[22] The digital ID system Aadhaar dramatically simplified bank account opening, enabling hundreds of millions to access formal financial services for the first time.

**Remittance charges:** Sending a US$200 remittance incurs a charge of 6.89%, compared with 4.11% for mobile-to-mobile transfers. Lower remittance costs particularly benefit underserved populations.[23]

*Figure 51: Adoption of open banking/open finance*

| Market driven | Regulatory led | Regulatory led — forthcoming |
|---|---|---|
| Argentina, Indonesia, Republic of Korea, South Africa, Switzerland, United States | Australia, Austria, Belgium, Brazil, Bulgaria, Chile, Colombia, Croatia, Czechia, Denmark, Finland, France, Germany, Greece, Hungary, India, Ireland, Italy, Japan, Luxembourg, Malaysia, Mexico, Netherlands, New Zealand, Norway, Poland, Portugal, Romania, Saudi Arabia, Singapore, Slovakia, Slovenia, Spain, Sweden, United Kingdom, Uruguay | Canada, Peru, Philippines, Thailand, Ukraine |

*Source: Bank for International Settlements*[25]

Figure 51 shows how open banking and finance initiatives, which involve sharing financial data with a customer's permission, are gaining traction worldwide. While the details differ — some are regulatory-led and mandatory, while others are market-driven and voluntary — these initiatives all aim to drive further innovation in financial products and business models.

## Impacts on the horizon

AI and novel data sets will increasingly enable financial institutions to empower people by personalizing financial products, services, and experiences to individual needs and goals.

Technology companies and fintech firms could become the primary providers of financial services for underserved segments of the digital economy.

Financial services may seamlessly integrate into 'super apps', adding functionality to digital commerce, social platforms, and business operations.

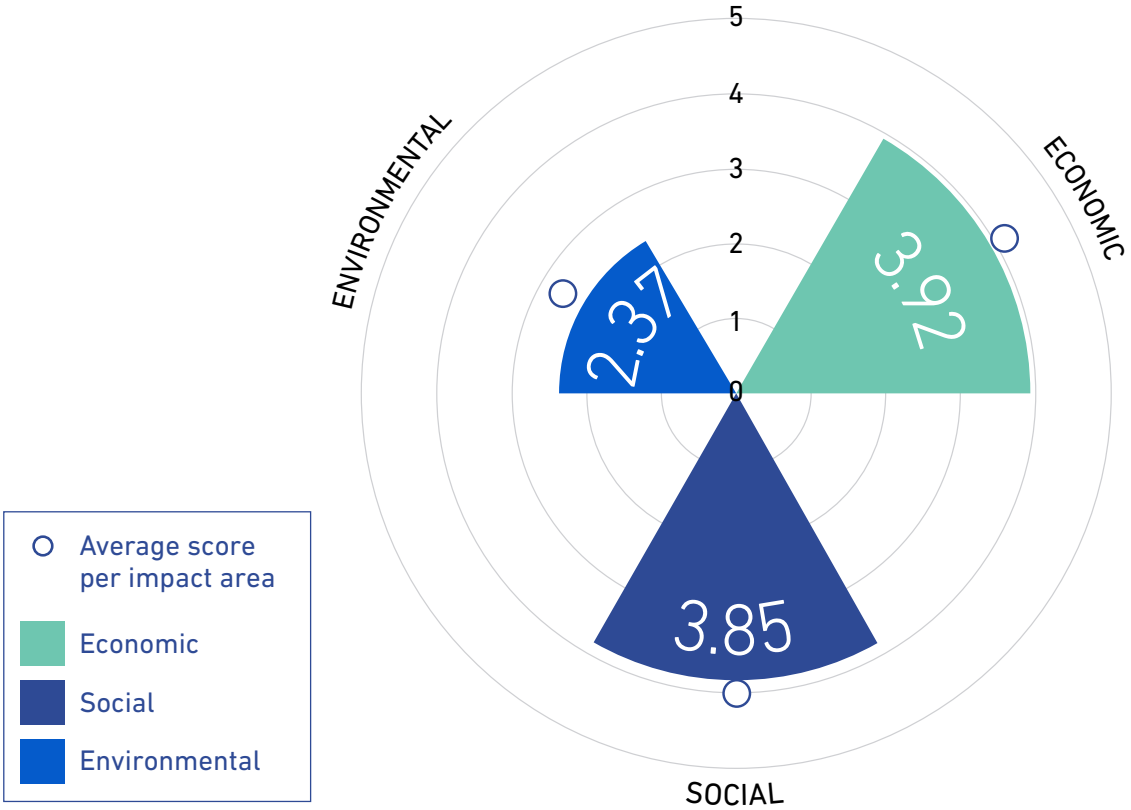
Governments and regulatory bodies will need to continually adapt to the rapid pace of innovation, striking a balance between fostering innovation and protecting consumers.

**AI in the insurance industry:** Insurance companies are using AI to assess risks by analyzing forms of data such as mobile usage, social media patterns, and digital payment histories, as well as traditional financial data. This enables them to offer coverage to previously underserved populations.[26]

# Survey findings

## Economic, social, and environmental impact

*Figure 52: Trend 2.4 - Positive economic, social, and environmental impact*




**Source:** *DCO 2024 Digital Economy Trends Survey.*
**Q:** *How would you assess the economic/social/environmental impact of these current digital trends in the next 12-18 months, at the global level?*
**Respondents:** *293 CTOs and senior technologists working in large companies (+250 employees), 59 policymakers, and 40 digital economy experts.*

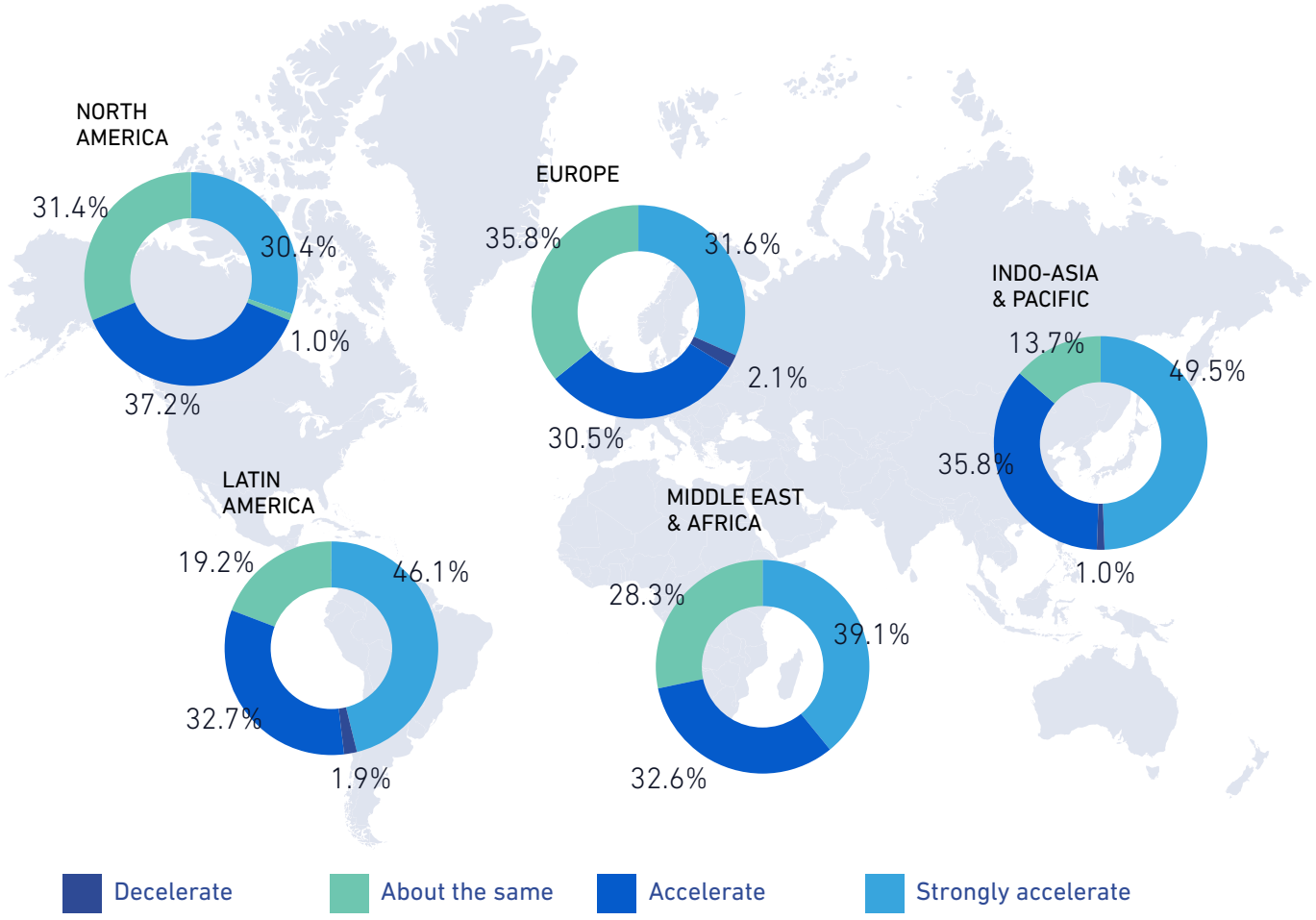
Survey respondents overall are relatively unenthused by the potential of Strengthening Digitalization of Financial Services to deliver economic or social benefits. The trend ranks ninth of 12 in both spheres, with scores of 3.92 and 3.85 respectively. However, respondents from the finance and professional services sector, who are closest to this trend, have the highest expectations: 47% expect very positive economic outcomes, and 33% predict significant social benefits. Respondents from the technology, media, and communications and automotive and transport sectors also exhibit high levels of optimism, reflecting the scope to improve transaction efficiency.

Public sector respondents are more cautious, but still broadly positive about potential economic and social impacts. Stakeholders generally do not expect this trend to have more than marginal positive impacts on the environment, with a score of 2.37 placing it second-last of the 12 trends.

### Pace of change

Nearly 75% of technology experts and policymakers predict that this trend's pace will accelerate over the next 12-18 months. Expectations are highest in Indo-Asia and Pacific, followed closely by Latin America and the Middle East and Africa.

*Figure 53: Trend 2.4 - Pace of change per region*

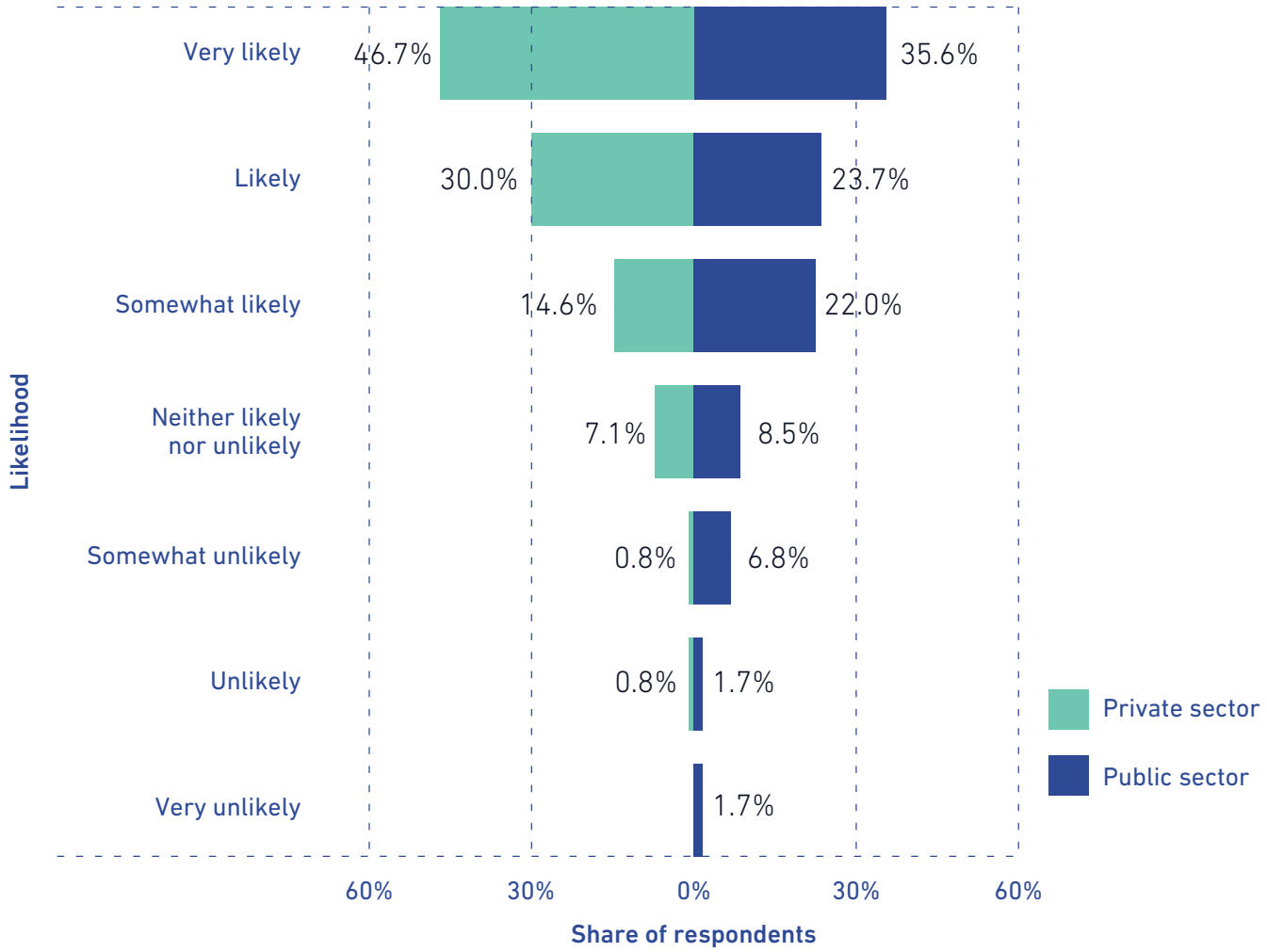



**Source:** *DCO 2024 Digital Economy Trends Survey.*
**Q:** *How do you expect the pace of change of these current digital trends to evolve in the next 12-18 months, at the global level?*
**Respondents:** *293 CTOs and senior technologists working in large companies (+250 employees), 59 policymakers, and 40 digital economy experts.*

### Stakeholder impact

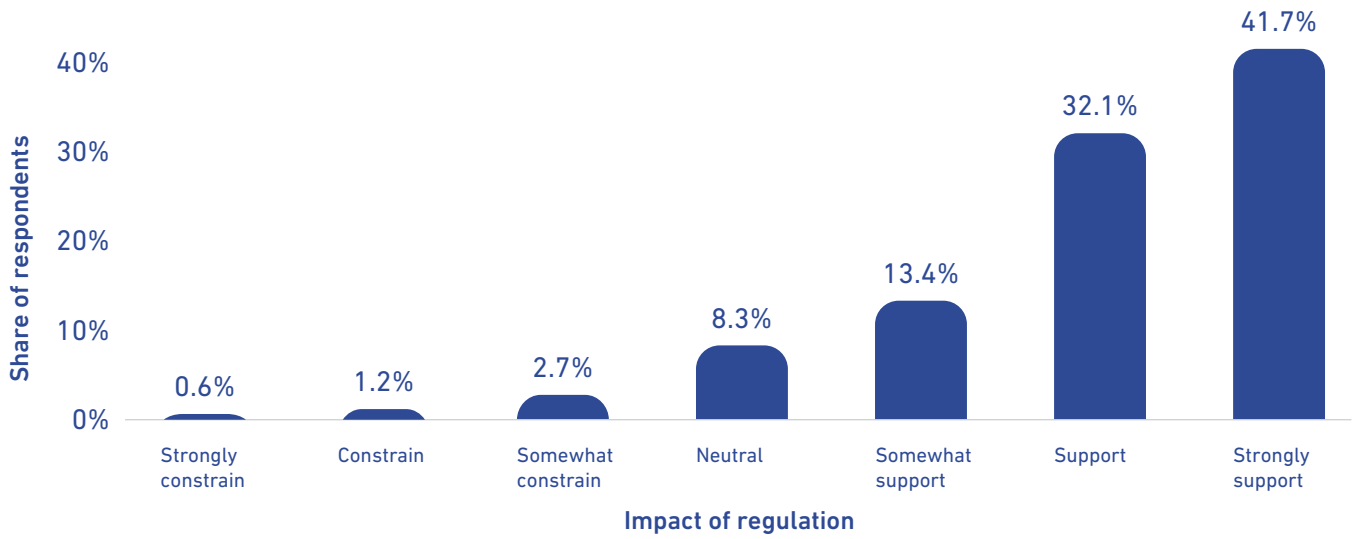
Most policymakers (81%) and industry experts (91%) believe it is at least somewhat likely that regulatory changes will affect the Strengthening Digitalization of Financial Services trend within the next 12-18 months. Almost half (47%) of private sector respondents rated the prospect as very likely.

*Figure 54: Trend 2.4 - Perception of likelihood of legislation or regulation activity by stakeholder group*




**Source:** *DCO 2024 Digital Economy Trends Survey.*
**Q:** *At a global level, how likely do you think it is that we will see an increase in legislative and regulatory activities related to the following trends in the Digital Economy over the next 12 to 18 months?*
**Respondents:** *293 CTOs and senior technologists working in large companies (+250 employees), 59 policymakers, and 40 digital economy experts.*

***Figure 55: Trend 2.4 - Expected impact of new legislation or regulation activity on trend adoption***




**Source:** *DCO 2024 Digital Economy Trends Survey.*
**Q:** *At a global level, how do you expect these legislative and regulatory activities to influence the adoption of digital economy trends in the next 12 to 18 months?*
**Respondents:** *293 CTOs and senior technologists working in large companies (+250 employees), 59 policymakers, and 40 digital economy experts.*

Around three-quarters of respondents believe that regulations, if enacted, will either support (33%) or strongly support (42%) the potential of this trend to empower people and boost the digital economy.

## Asking AI

**We asked three leading LLMs (ChatGPT-4o, Claude 3.5, and Llama 3.1) to assess the economic, social, and environmental impacts of this trend over the next 12-18 months. Here's what these models had to say:**

### Economic impact

All the models expect a positive economic impact from increased financial inclusion, improved access to financial services, and enhanced efficiency in financial transactions.

### Social impact

The models agree that the digitalization of financial services has the potential to address persistent financial exclusion, particularly in underserved populations, although disparities in access to digital infrastructure will remain a barrier.

### Environmental impact

ChatGPT and Llama foresee a somewhat positive indirect environmental impact from this trend due to efficiency gains, but this may be mitigated by increased energy consumption.

*Note: These insights from LLMs are not data driven. They are provided as directional and sentimental and the LLMs have not had access to the survey data.*[27]

## Key enablers

**Strengthening digitalization in financial services will depend on:**

**Digital infrastructure**

Interoperable digital financial infrastructure, including ID management, payment networks, and data platforms enabling reliable, secure, and accessible financial service capabilities

**Digital finance**

Encouraging public-private capital to support the digitalization of traditional banks and fintech innovation to expand access to digital financial services.

**Digital regulation and public administration**

Frameworks promoting innovation while protecting stability through sandbox testing and consumer safeguards.

## Recommendations

### Private sector

**Deploy AI and data analytics** to develop inclusive financial products while ensuring responsible innovation.

**Invest in secure, interoperable payment and service delivery** digital infrastructure for global scale.

**Develop innovative business models** by scaling technologies like AI, blockchain, and digital platforms to create affordable and accessible financial products tailored to underserved populations.

### Public sector

**Establish regulatory sandboxes** to safely test innovative financial products and business models.

**Develop robust digital public infrastructure** to enable inclusive financial products and services.

**Create balanced regulatory frameworks** that promote innovation while building trust, ensuring compliance, and protecting consumers in digital financial markets.

### IGOs, IOs, and others

**Facilitate cross-border cooperation** in financial regulation and standard-setting.

**Support developing nations** in building digital financial ecosystems.

**Advocate for best practices** in inclusive digital finance and enhanced consumer protection practices.

CURRENT TREND

# 2.5

# Evolving Digital Cultures, Social Connections, and Behaviors

## What does the trend encompass?

As digital technologies transform human interaction, innovations in content creation, online collaboration, and digital services are contributing to the growth of the digital economy and fostering new forms of social engagement and cultural expression. This trend empowers communities by enabling diverse voices to participate in the digital marketplace, while strengthening social bonds across geographic and cultural boundaries.

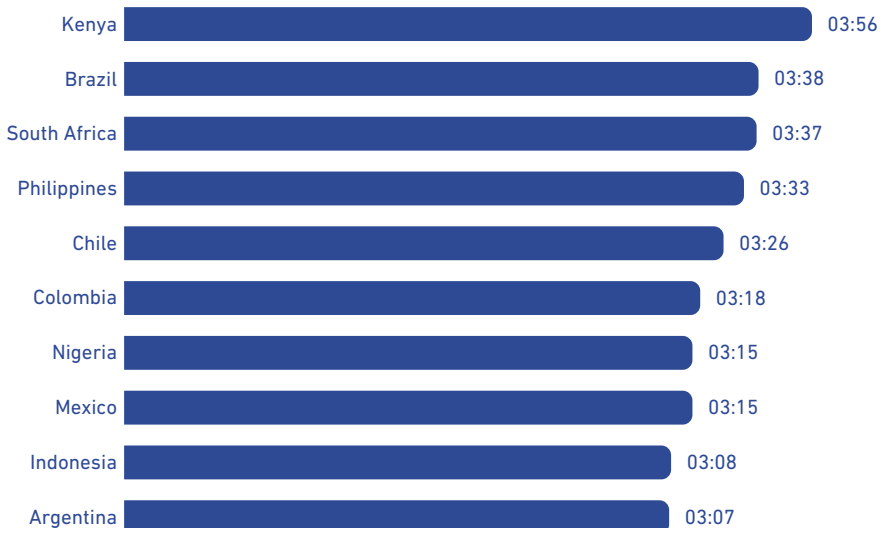
However, some evolving digital behaviors are giving rise to concerns about digital well-being, related to online misinformation, the accountability of influencers, and the authenticity of online experiences. As AI-driven personalization and algorithmic content curation become more sophisticated, alongside the rise of immersive technologies like Augmented reality (AR) and Virtual reality (VR), the tension between engaging user experiences and healthy digital behaviors grows more acute.

**Digital platforms usage:** Nearly 20% of consumers already use AI tools for recommendations and search. A generational divide is emerging, with 46% of younger generations using video-first platforms.[28]

## Why is it important?

The convergence of AI-enabled personalization, video-first communication, and social commerce creates unprecedented opportunities for connection, but raises challenges. As social media and digital platforms become primary channels for information discovery and community building, they influence trust, well-being, and social cohesion. The rise of social commerce platforms like Instagram Shopping and TikTok Shop underscore the changing reality in how people navigate between entertainment, community, and commerce.

*Figure 56: Daily social media usage by country (hours), 2024*




*Source: DataReportal*[29]

As Figure 56 shows, developing nations are at the forefront of social media use. Kenya tops the list, with people averaging nearly four hours of daily use, followed by Brazil, South Africa, and the Philippines. While social media can foster connectivity and economic opportunities, this trend also raises concerns about the scope for digital addiction, misinformation, and undue influence on public opinion and social behavior.

As cultural shifts accelerate, it is critical that leaders collaborate on policies to promote digital ethics, healthy engagement, trustworthy information flows, and inclusive participation across diverse socio-economic and cultural communities. Digital literacy programs and regulations can help to balance benefits with risks. The challenge is to create incentives for innovations that can build trust, protect mental health, and bridge divides through authentic personal connections.

## Impacts on the horizon

Innovative new regulatory frameworks for verifying the authenticity and credibility of information should emerge as AI-generated content becomes more prevalent in the digital economy.

The lines between entertainment, commerce, and community building could become increasingly blurred.

Growing awareness of digital well-being may influence user behavior and drive demand for more balanced and healthier platform design.

As rising generations develop their own distinctive digital cultures, nuanced strategies could be needed to empower communities by facilitating communication and engagement across the generations.

**Digital Wellness:** The US Surgeon General has linked growing screen time to a "loneliness epidemic". Industry and government can shape a healthier digital ecosystem by incorporating wellness features into platforms and developing resources for digital health.[30]

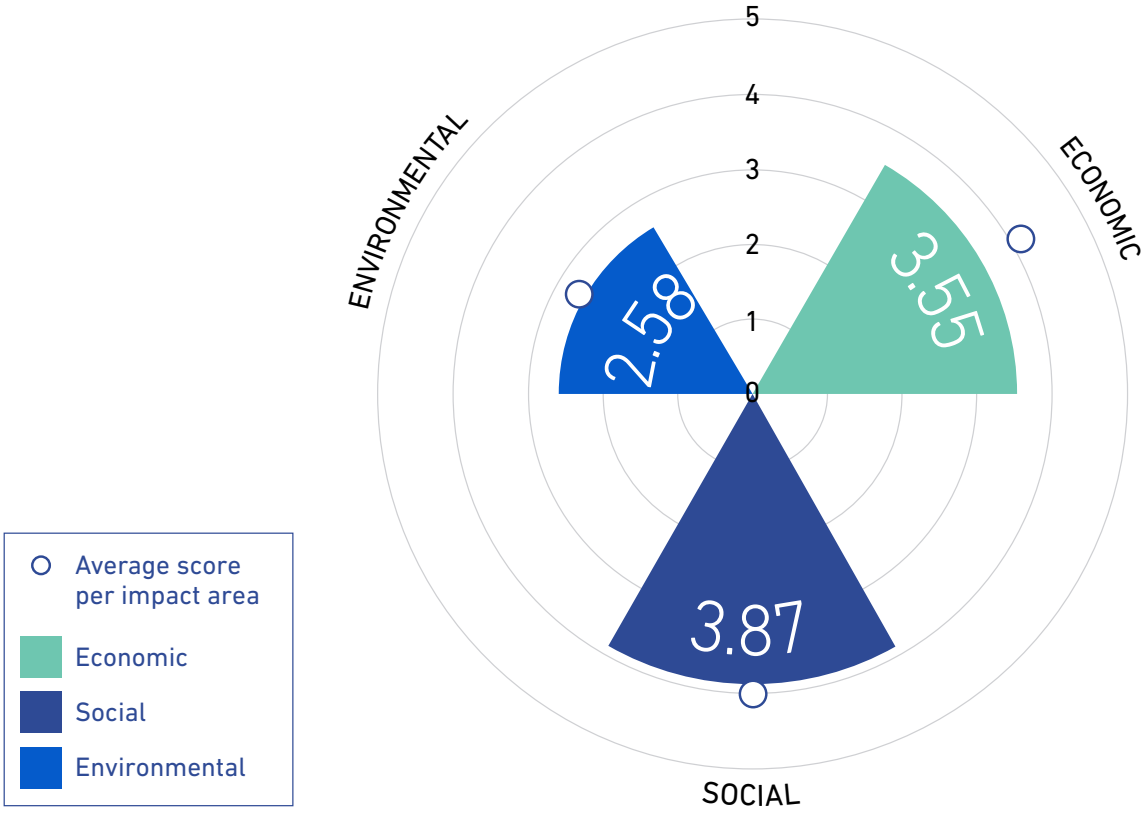
**Impact on youth mental health:** Social psychologist Jonathan Haidt argues that smartphones have "rewired" adolescent experiences, giving rise to concerns about anxiety and depression.[31] Some tech companies are beginning to reimagine their designs with young users' mental health in mind. Australia is at the forefront of legislative efforts to limit how youth can use social media.[32]

# Survey findings

### Economic, social, and environmental impact

Respondents rank Evolving Digital Cultures, Social Connections, and Behaviors relatively low among the trends in this report for its likely positive impact in the next 12-18 months. This is especially true in economic terms, where it ranks last with a score of 3.55. The scores for environmental (2.58) and social (3.87) impact place it 7th and 8th respectively out of the 12 trends. Experts in the technology, media, and communications sector are the most optimistic overall. Respondents in the Middle East and Africa foresee the most potential for positive economic impact, while those in Latin America are the most likely to anticipate social and environmental benefits. European respondents are the most pessimistic about the trend's potential for positive impact on society.

*Figure 57: Trend 2.5 - Positive economic, social, and environmental impact*

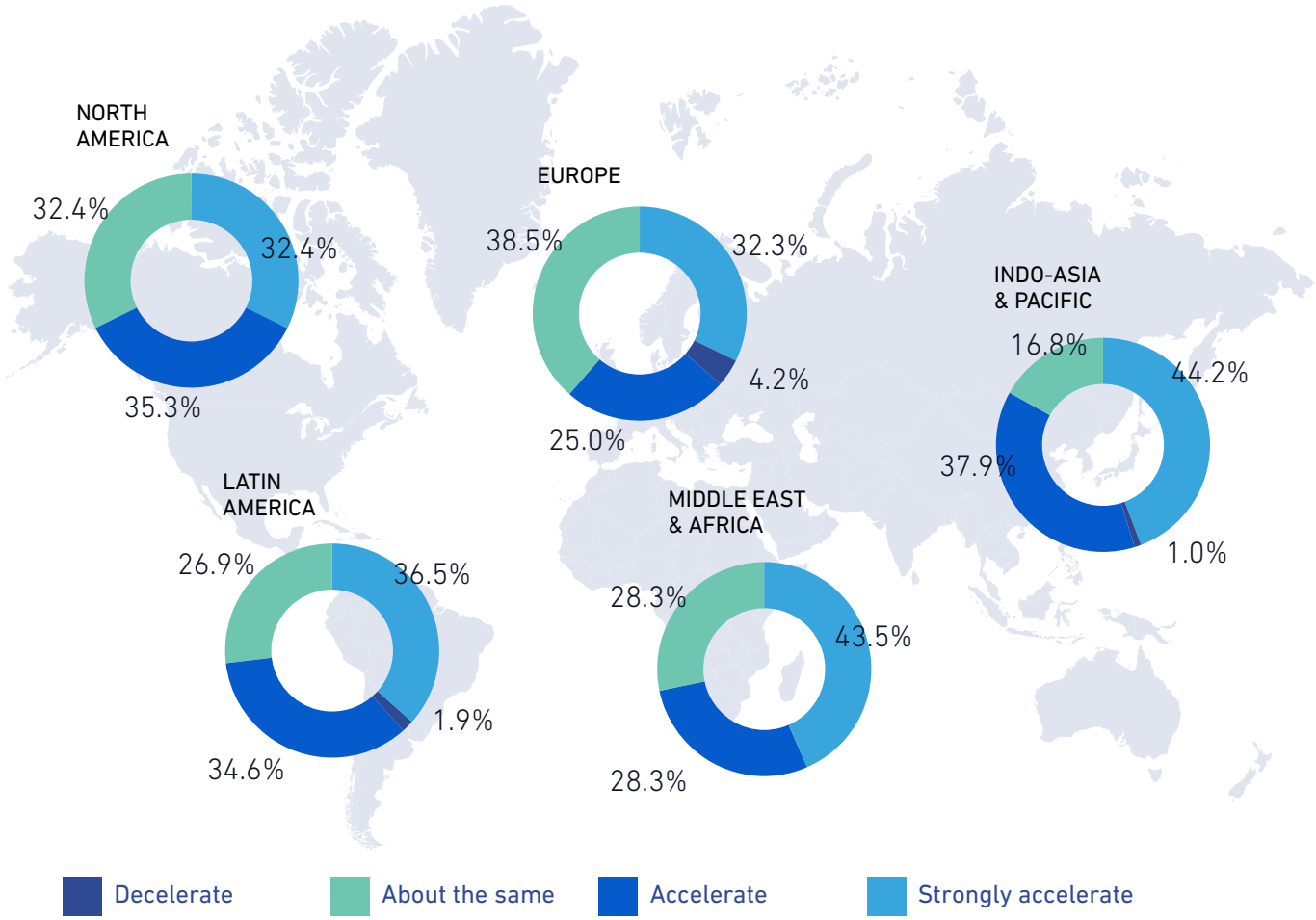



**Source:** *DCO 2024 Digital Economy Trends Survey.*
**Q:** *How would you assess the economic/social/environmental impact of these current digital trends in the next 12-18 months, at the global level?*
**Respondents:** *293 CTOs and senior technologists working in large companies (+250 employees), 59 policymakers, and 40 digital economy experts.*

### Pace of change

Despite expecting this trend to have a relatively constrained impact, respondents expect the pace of change to be faster than for most others in this report. Those in Indo-Asia and Pacific and the Middle East and Africa are the most likely to expect a strong acceleration.

***Figure 58: Trend 2.5 - Pace of change per region***

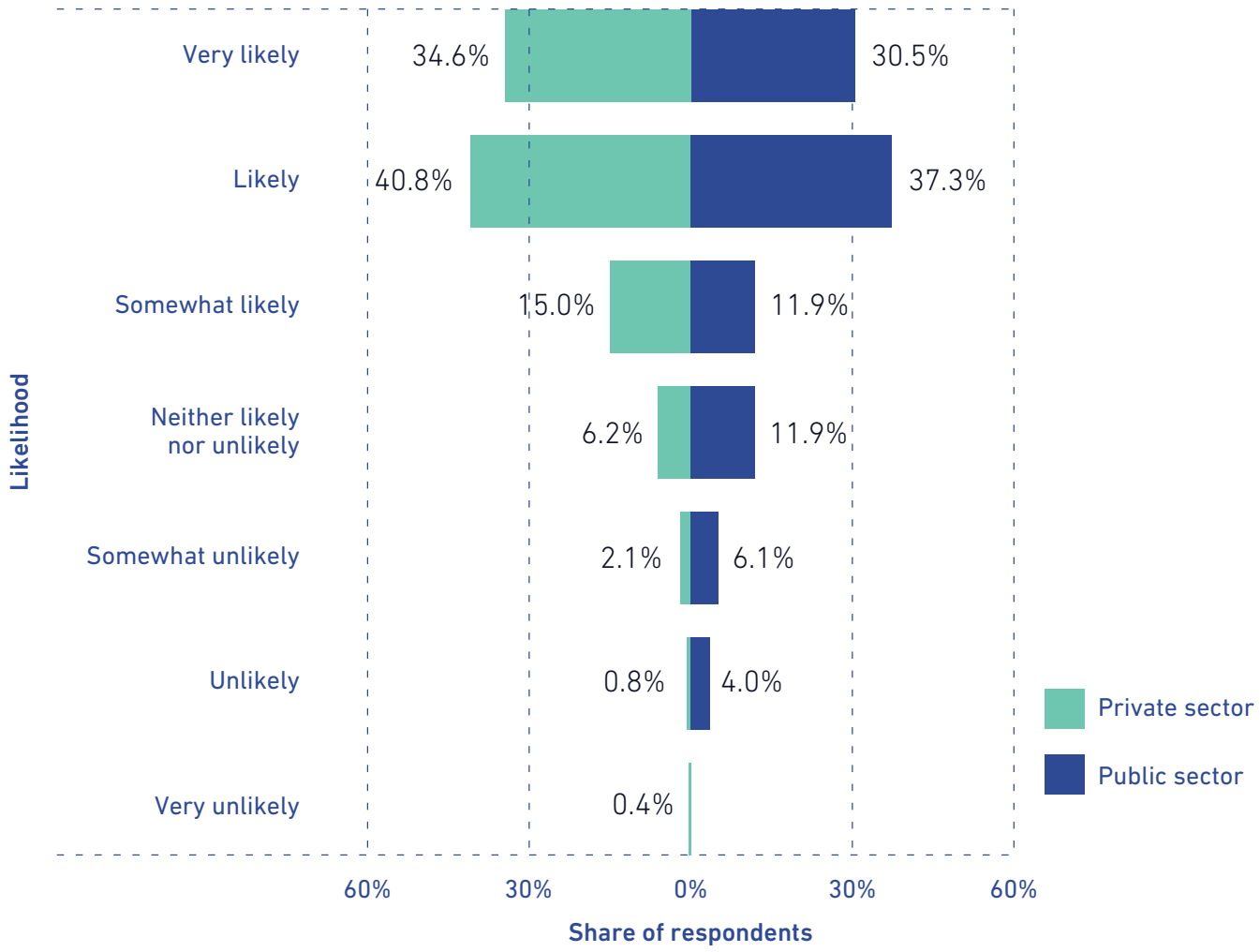



**Source:** *DCO 2024 Digital Economy Trends Survey.*
**Q:** *How do you expect the pace of change of these current digital trends to evolve in the next 12-18 months at the global level?*
**Respondents:** *293 CTOs and senior technologists working in large companies (+250 employees), 59 policymakers, and 40 digital economy experts.*

### Stakeholder impact

Around 68% of policymakers and 75% of private sector respondents think regulatory changes affecting this trend are likely or very likely within the next 12-18 months. Such regulations could be focused, for example, on misinformation or children's digital well-being. Digital economy experts are less likely to expect new regulations — as are respondents from Europe, which has already seen significant regulation enacted such as the Digital Services Act and the Digital Markets Act.[33]

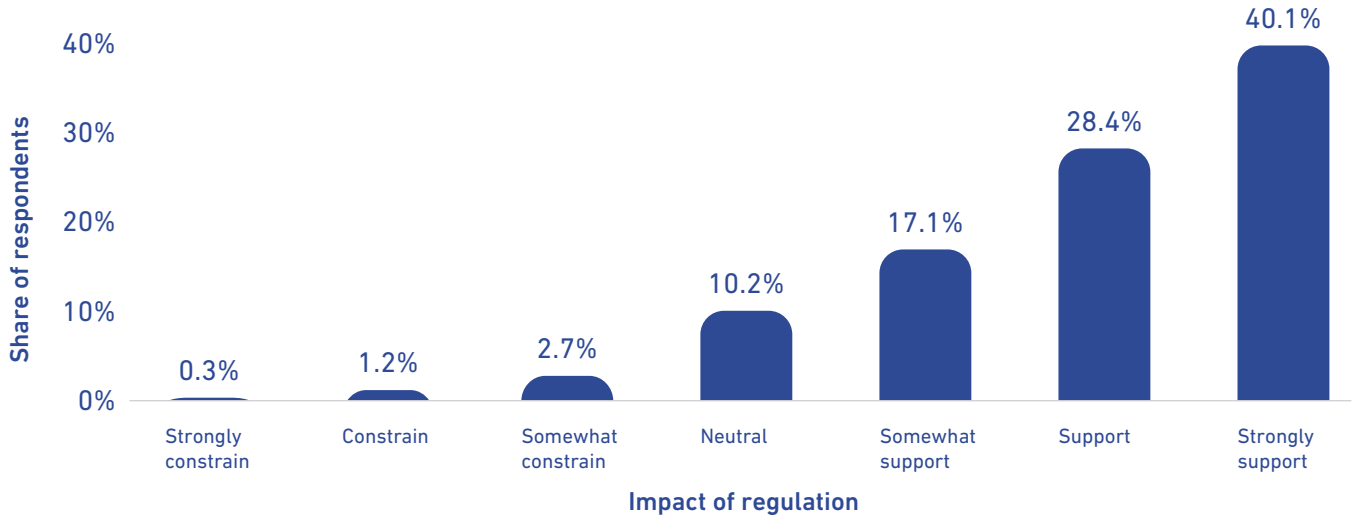
*Figure 59: Trend 2.5 - Perception of likelihood of legislation or regulation activity by stakeholder group*




**Source:** *DCO 2024 Digital Economy Trends Survey.*
**Q:** *At a global level, how likely do you think it is that we will see an increase in legislative and regulatory activities related to the following trends in the Digital Economy over the next 12 to 18 months?*
**Respondents:** *293 CTOs and senior technologists working in large companies (+250 employees), 59 policymakers, and 40 digital economy experts.*

Just over 40% of survey respondents expect new regulations to strongly support the adoption of the trend, for example by helping to create trust in social media and digital platforms. Respondents from the technology, media, and communications sector were especially optimistic that new regulations would have a positive impact.

***Figure 60: Trend 2.5 - Expected impact of new legislation or regulation activity on trend adoption***




**Source:** *DCO 2024 Digital Economy Trends Survey.*
**Q:** *At a global level, how do you expect these legislative and regulatory activities to influence the adoption of digital economy trends in the next 12 to 18 months?*
**Respondents:** *293 CTOs and senior technologists working in large companies (+250 employees), 59 policymakers, and 40 digital economy experts.*

## Asking AI

**We asked three leading LLMs (ChatGPT-4o, Claude 3.5, and Llama 3.1) to assess the economic, social, and environmental impacts of this trend over the next 12-18 months. Here's what these models had to say:**

### Economic impact

ChatGPT and Llama expect innovations in social commerce platforms and AI-enhanced engagement to deliver a positive economic impact.

### Social impact

All the models see positive and negative impacts on social cohesion, mental well-being, and digital literacy, with ChatGPT and Llama cautiously optimistic and Claude more pessimistic.

### Environmental impact

The models all anticipate no environmental impact from this trend over the next 12 -18 months.

*Note: These insights from LLMs are not data driven. They are provided as directional and sentimental and the LLMs have not had access to the survey data.*[34]

## Key enablers

**Healthy evolution in digital culture and behaviors rests on advances in:**

### Digital infrastructure

Providing both connectivity and tools for interaction and exchange across digital platforms in ways that can balance engagement with well-being, enabling content verification and preserving privacy.

### Digital capabilities

Educational frameworks that develop critical thinking and foster constructive online behavior, equipping individuals and communities with the knowledge to engage inclusively and creatively on digital platforms.

### Digital regulation and public administration

Digital policies addressing emerging challenges such as online misinformation and digital wellness, while promoting inclusive and sustainable innovation and boosting collaborative content creation.

## Recommendations

### Private sector

**Integrate ethical algorithms and content moderation practices** to encourage constructive social interactions, minimize misinformation, and promote a safe and positive user experience.

**Invest in tools and features** that minimize misinformation and promote authentic connection and healthy digital behaviors.

**Empower content creators by providing monetization models, tools, and resources**, with a focus on empowering local talent and underrepresented voices in the digital marketplace.

### Public sector

**Create regulatory frameworks that protect digital well-being**, combat online misinformation, and ensure equal access to online platforms for all communities.

**Support digital literacy programs** that equip users with critical thinking skills and promote responsible online behavior to counter online harmful content.

**Invest in digital archiving and technology-driven cultural preservation initiatives** to protect and promote national heritage in the digital age.

### IGOs, IOs, and others

**Facilitate cross-cultural dialogue** on healthy digital culture development.

**Implement enforceable digital wellness standards** developed by public health experts to address digital addiction behaviors and excessive online screen time.

**Support cross-border digital literacy initiatives** that strengthen skills in areas like cybersecurity, AI, and programming, teach critical assessment of synthetic media, and promote healthy online behaviors and digital trust.

EMERGING TREND

# 2.6

# Embracing Immersive Hybrid Experiences

## What does the trend encompass?

Immersive hybrid experiences that blend the digital and physical worlds are poised to transform the digital economy, reshaping entertainment and extending gamification into industrial, educational, and professional domains. This trend fosters deeper social connections and cultural exchange by leveraging XR technologies to create new ways for people to collaborate, learn, share experiences, and build relationships in digital spaces.

> "Ultimately, XR media, which is my way of saying metaverse, is really the big winner in this. This is the emergent trend. It is going to change virtually every sector".
>
> *Bruce Armstrong Taylor, The Digital Economist, 2nd Expert Panel*

The convergence of XR technologies, AI, and advanced sensing capabilities is transforming how organizations operate, train workforces, and deliver services. The industrial metaverse is emerging as a powerful tool for optimization and innovation. Digital twins and spatial simulations are enabling companies to design, test, and optimize processes in virtual environments before implementing them in the physical world.

## Why is it important?

Advances in the spatial computing environment are making immersive hybrid experiences increasingly engaging and interactive, redefining how people create, collaborate, and connect in today's digital-first world. These experiences offer significant opportunities as virtual realities begin to rival physical ones and, in some cases, provide safer, faster, and more cost-efficient solutions.

Immersive hybrid experiences empower communities by transforming educational learning experiences, enabling new forms of value creation and fostering new forms of social interaction, even for individuals with physical disabilities. For example, in education, they replace traditional methods with dynamic and immersive learning environments, while in professional settings, they enable gamified training and virtual prototyping.

Technologies are becoming more affordable and user-friendly, making XR experiences more accessible to a broader audience. This is critical to prevent the emergence of a new form of digital divide.

**Increased spending:** Worldwide spending on AR and VR is projected to grow by 66.3% a year over the next five years.[35]

**Industrial efficiency gains:** Deloitte reports that digital twins, spatial simulations, and augmented work instructions are making factories and businesses more efficient and safer.[36]

**Virtual learning:** Stanford University and Technical University Denmark found that virtual teaching methods increased learning effectiveness by 76% compared with traditional approaches.[37]

"The printed book is now at an end in how we learn and how we react as humans"

*Bruce Armstrong Taylor, The Digital Economist, 2nd Expert Panel*

## Impacts on the horizon

Immersive technologies with AI-powered assistants providing contextual guidance will revolutionize how organizations conduct training, collaborate, and perform complex tasks.

More sophisticated avatars and multi-sensory experiences will create new forms of digital presence and communication, transforming how people connect across physical distances.

The line between physical and digital experiences will continue to blur, creating new opportunities for hybrid experiences in retail, education, healthcare, and entertainment.

**Use case. Treatment of veterans:** The US Department of Veteran Affairs is using VR to treat PTSD, anxiety, depression, and chronic pain by allowing veterans to confront and process traumatic memories in a virtual space while working with a therapist.[38]

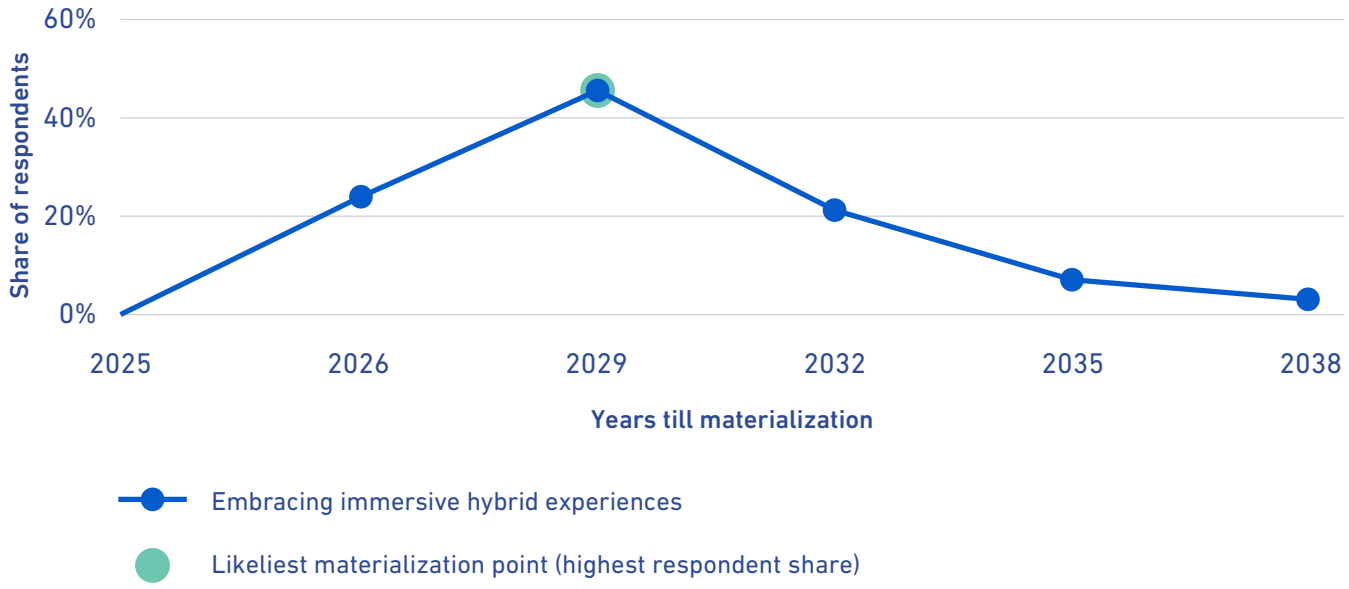
**Use case. Smart XR glasses:** Smart XR glasses have improved production efficiency on Airbus A330 aircraft, enabling operators to mark seat placements six times faster and eliminating errors on the assembly line.[39]

# Survey findings

### When will this trend materialize?

Ninety percent of respondents expect this trend to materialize in the next eight years, with most (45%) anticipating a 3-5 year timeframe.

*Figure 61: Trend 2.6 - Likely materialization*

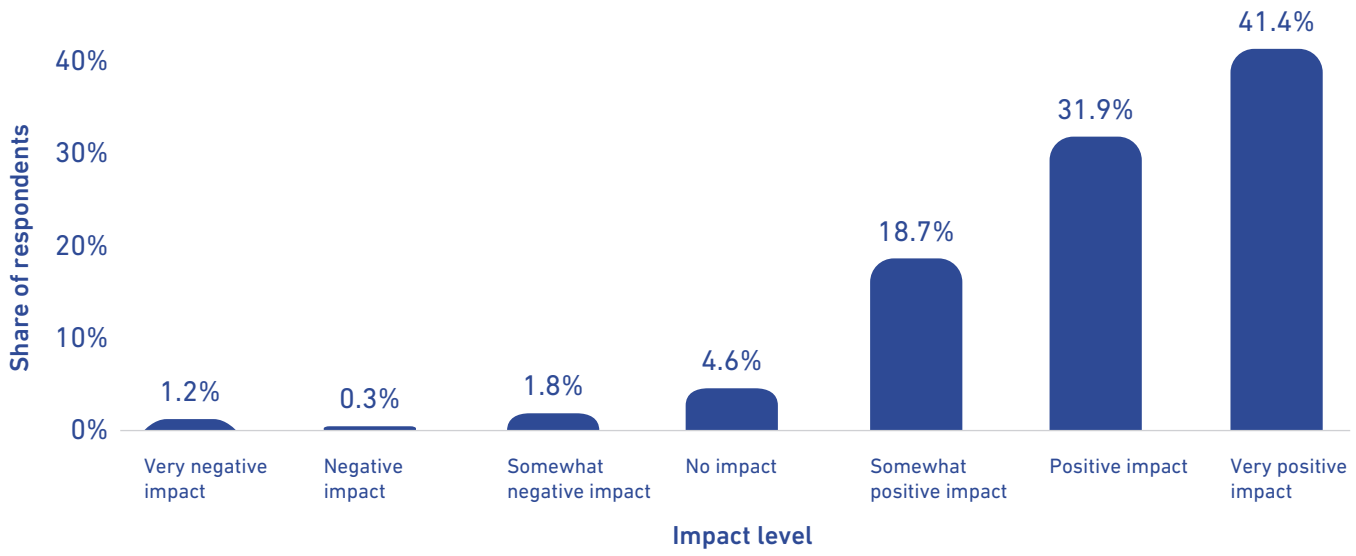



**Source:** *DCO 2024 Digital Economy Trends Survey.*
**Q:** *At a global level, when do you expect the following emerging Digital Economy trends to affect businesses and societies?*
**Respondents:** *240 CTOs and senior technologists working in large companies (+250 employees), 59 policymakers, and 38 digital economy experts.*

### Socio-economic impact

Respondents from the Middle East and Africa and Indo-Asia and Pacific regions are the most optimistic about the potential socio-economic impacts of this trend over the next 3-5 years. Private sector respondents from energy and utilities are particularly positive, while those from the heavy industries and extractive sector are the least optimistic.

*Figure 62: Trend 2.6 - Expected socio-economic impact in 3-5 years*




**Source:** *DCO 2024 Digital Economy Trends Survey.*
**Q:** *At a global level, to what extent do you believe the following emerging trends will have a net positive or negative socio-economic impact in the next 3-5 years?*
**Respondents:** *240 CTOs and senior technologists working in large companies (+250 employees), 59 policymakers, and 38 digital economy experts.*

## Asking AI

**Prompt:**
**"Act as a global expert on the digital economy. What are the potential near-term benefits, challenges, and considerations for the trend of Embracing Immersive Hybrid Experiences?"**

### ChatGPT-4o response:

**Benefits**

Immersive hybrid experiences enhance engagement, collaboration, and accessibility by blending physical and digital spaces, unlocking new revenue streams and global reach across industries like education, retail, and entertainment.

**Challenges**

High costs, digital fatigue, and fragmented platforms create barriers to widespread adoption, while concerns over privacy and data security grow with the increased use of biometric and immersive data.

**Considerations**

Prioritize equitable access, robust data protection frameworks, and sustainable infrastructure development to maximize benefits while addressing social and environmental impacts.

*Note: These insights from LLMs are not data driven. They are provided as directional and sentimental and the LLMs have not had access to the survey data.*[40]

## Key enablers

**Progress in immersive hybrid experiences will depend on:**

**Digital infrastructure**

High-bandwidth networks and edge computing enabling seamless XR experiences.

**Digital innovation**

Expertise in spatial computing and immersive design driving innovation and adoption.

**Industry digital transformation**

Addressing digital identity, privacy, and safety while ensuring interoperability.

## Recommendations

### Private sector

**Invest in XR infrastructure and training programs** to enable workforce adoption of immersive technologies.

**Develop inclusive and accessible immersive experiences** that consider diverse user needs.

**Create clear governance frameworks** for managing digital assets and identities in immersive environments.

### Public sector

**Establish standards and guidelines** for safety, privacy, and accessibility in immersive experiences.

**Support research and development** in XR technologies through funding and partnerships.

**Implement immersive technologies** in public services to improve citizen engagement and service delivery.

### IGOs, IOs, and others

**Facilitate global cooperation** in developing standards for immersive technologies.

**Support initiatives to bridge the immersive technology divide** between regions.

**Promote best practices** for the ethical development and deployment of XR technologies.

**Support cross-border research and partnerships** to advance the development of immersive hybrid experiences that benefit global communities.

# 3
# Trust and Security

CURRENT TREND

**3.1**

Evolving Digital Governance

CURRENT TREND

**3.2**

Increasing Resources for Cybersecurity

CURRENT TREND

**3.3**

Advancing Industrial Policies for the Digital Economy

EMERGING TREND

**3.4**

Preparing for the Quantum Era

EMERGING TREND

**3.5**

Ensuring a Digitally Safe and Inclusive World

EMERGING TREND

**3.6**

Governing Superintelligent AI

# Overview

The Trust and Security theme acknowledges that the digital economy can only reach its full potential if individuals and businesses have confidence in their ability to interact and transact securely online. Cybersecurity is becoming an increasingly critical challenge, driven by the rapid advancement of generative AI and the growing interconnectedness of systems. Meanwhile, the emergence of quantum computing threatens to undermine existing cryptographic techniques that protect digital communications and secure information systems infrastructure. Furthermore, the rise of business models that exploit user vulnerabilities underscores the urgent need to reassess incentive structures to maintain and strengthen trust in the digital economy.

Successfully doing so would entail:

Stakeholders working together to define digital governance frameworks that tackle issues such as privacy and protection, interoperability of digital systems, ethical use of technologies, transparency, and fairness.

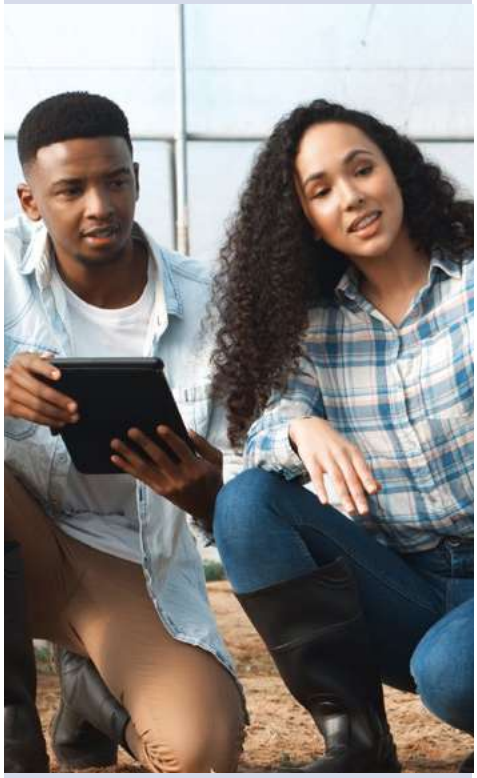
National industrial policies focused on the digital economy to maintain trust and security as AI and quantum computing transforms key sectors.

International collaboration and forward planning to address risks linked to breakthroughs on the horizon, such as quantum computing and superintelligent AI, before they materialize into economic opportunities.

# Current trends

## 3.1: Evolving Digital Governance

Adaptive and holistic digital governance frameworks are needed to build trust and ensure security as the rapid integration of emerging technologies transforms the digital economy. Key focus areas include data governance, ethics, fairness, bias mitigation, transparency, the impact of AI on labor markets, and the complexities of international cooperation.



## 3.2: Increasing Resources for Cybersecurity

Cybersecurity threats are growing in sophistication with the emergence of generative AI and the possibility of quantum computing breakthroughs. Adapting security measures, allocating additional resources, developing robust security frameworks, educating and training cybersecurity professionals, and promoting international cooperation are crucial for maintaining public trust in the digital economy.

## 3.3: Advancing Industrial Policies for the Digital Economy

Deepening digitalization and advancements in AI technologies are increasing the demand for robust digital infrastructure, including specialized hardware, and sustainable energy sources. Strategic funding, investment incentives, and supportive digital policy frameworks are essential to ensure that the foundational pillars of the digital economy remain secure, efficient, competitive, and sustainable.

# Emerging trends

## 3.4: Preparing for the Quantum Era

The race toward quantum computing will accelerate as nations make significant investments in research, education, and infrastructure. This momentum will also amplify efforts to develop and implement 'post-quantum' security measures, as quantum breakthroughs could potentially undermine existing cryptography and security systems, posing significant risks to the digital economy.

## 3.5: Ensuring a Digitally Safe and Inclusive World

As digital services become essential for economic participation and addressing socio-economic disparities, the consequences of not providing ubiquitous and affordable access to connectivity and digital public goods will grow exponentially. Innovative business models and supportive policy frameworks are essential to foster trust and security in the digital economy.

## 3.6: Governing Superintelligent AI

The potential for rapidly deploying superintelligent systems across the digital economy raises significant ethical and safety challenges, including unintended consequences and loss of trust and security. Addressing these concerns requires adaptive regulatory frameworks and international collaboration to ensure these technologies benefit society equitably.

CURRENT TREND

# 3.1 Evolving Digital Governance

## What does the trend encompass?

Digital governance is undergoing a fundamental change. Going beyond technical compliance, it increasingly acknowledges the complex socio-economic nature of digital technologies and their ability to advance the lives of individuals, societal well-being, and inclusive development. Digital governance, encompassing collaboration among stakeholders, transparency, accountability, ethical technology use, and data privacy, is crucial to maintain trust in the digital economy, ensuring that technological progress serves the broader needs of humanity.

## Why is it important?

Effective digital governance has become a key differentiator for both public and private sector organizations. For governments, it provides the foundation for secure digital public services and developing the digital economy. For businesses, strong digital governance frameworks enable innovation while managing risks and building trust with stakeholders.

This transformation is characterized by three fundamental shifts:

From siloed policies to integrated systems.

From reactive regulation to proactive guidance.

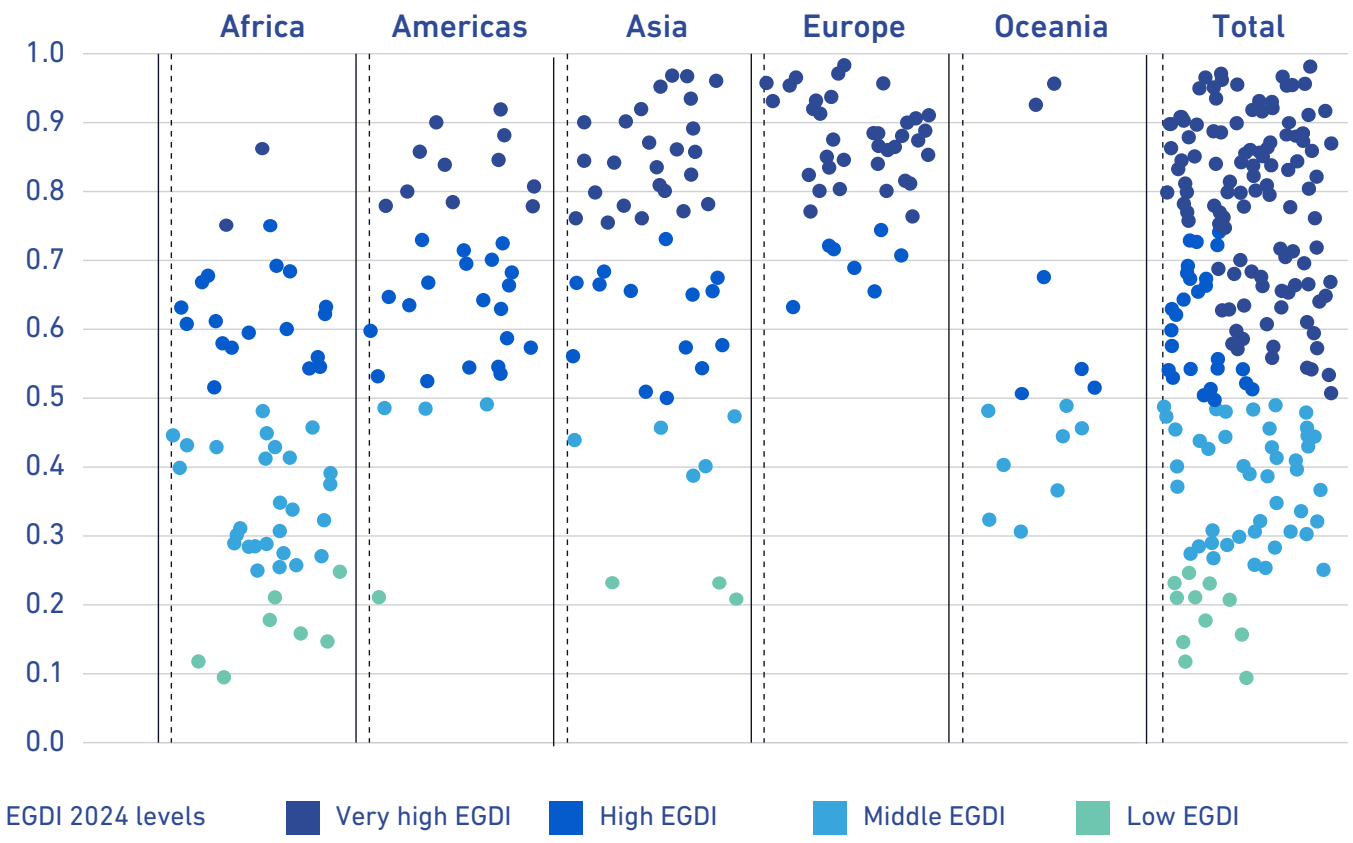
From technical compliance to human-centered approaches.

Well-designed frameworks enable cross-border data flows and international collaboration while providing mechanisms to address emerging challenges around AI ethics and platform-provider accountability. Some organizations are responsibly using AI to create value through innovation while coordinating across multiple regulatory authorities, which are increasingly working together. For example, when a bank develops an AI system for detecting fraud, it must ensure the system protects customer privacy while complying with financial regulations and competition laws.[2]

**Use case:** Pakistan's National Database and Registration Authority platform, which leverages biometric technologies to streamline the delivery of secure digital public services to citizens, and Brazil's Open Finance initiative, which fosters competition through interoperable data-sharing systems, exemplify the global shift toward more inclusive and effective digital governance frameworks.[1]

**Digital Divide:** The E-Government Development Index (EGDI) 2024 underscores a persisting global digital divide. The regional snapshot shown in Figure 63 reveals that European countries have the most robust digital government capabilities and that Asia is exhibiting remarkable growth on this front. However, Africa and Oceania face substantial challenges, with the majority of countries falling into the 'low' or 'middle' EGDI categories.

*Figure 63: Regional snapshot of countries by EGDI level, 2024*




*Source: UN E-Government Survey, 2024*

The European Health Data Space (EHDS) framework shows how regulatory oversight can protect privacy while allowing technological advances in a highly sensitive sector. It enables healthcare providers to share patient data with other health professionals across borders, while requiring patients to grant permission before their data can be used for medical studies.[3]

**Use case**

Australia's myGov platform has established clear governance frameworks for data sharing and digital identity verification, enabling streamlined service delivery while upholding robust privacy protections and high standards of accessibility and inclusion.[4]

## Impacts on the horizon

Regulatory approaches are expected to evolve toward more principle-based frameworks that are flexible and capable of adapting to rapid technological advancements and their economic implications.

Emphasis is growing on international cooperation, the integration of ethical guidelines, risk-based approaches, and sector-specific governance models to address high-risk applications effectively.

New mechanisms, such as algorithmic auditing, AI system certification, standardized impact assessment frameworks, and real-time monitoring and reporting systems, may emerge to enhance trust and security in the digital economy.

Transparency requirements for digital platforms and mechanisms for enforcing digital rights are likely to be strengthened to ensure greater accountability and user trust.

Multi-stakeholder governance frameworks are likely to see widespread adoption, emphasizing industry self-regulation, codes of conduct, strengthened public-private partnerships, and improved mechanisms for cross-border governance coordination.

Digital public infrastructure may evolve through the development of comprehensive governance frameworks for digital identity systems, the establishment of standardized protocols for data sharing and interoperability, and the integration of privacy-preserving technologies.

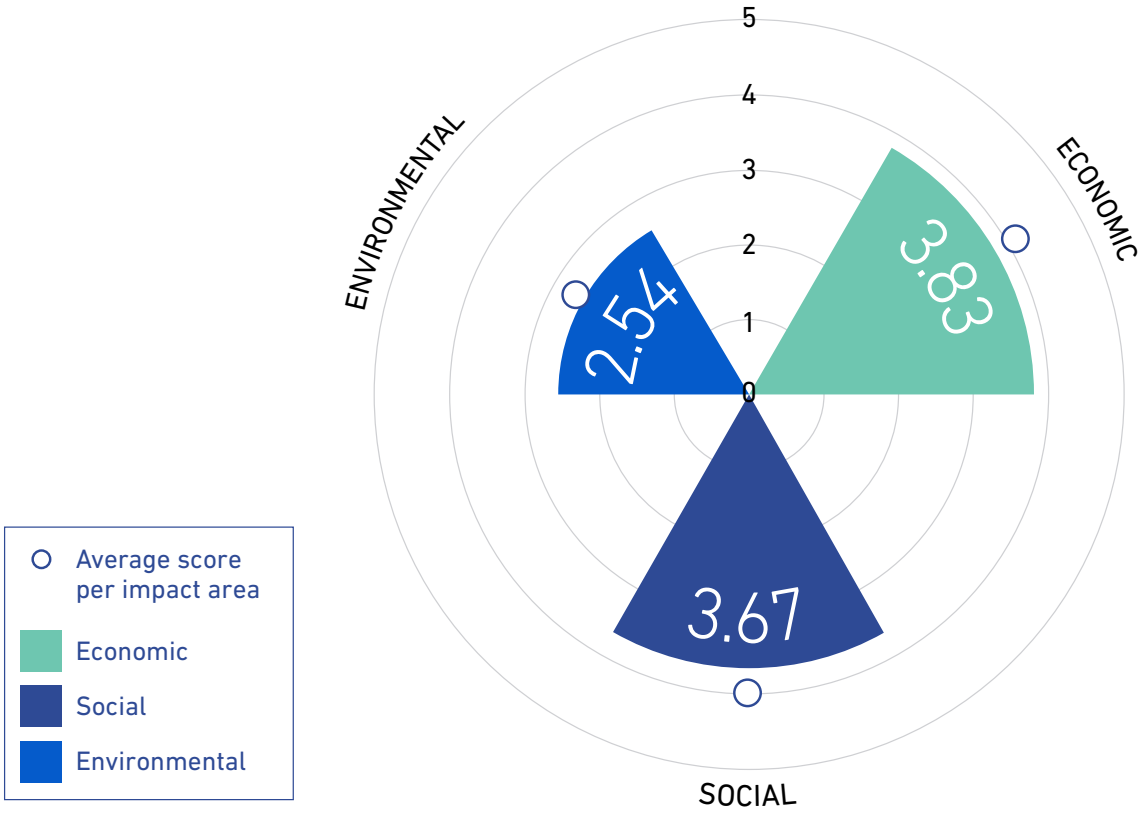
# Survey findings

### Economic, social, and environmental impact

Survey respondents consider Evolving Digital Governance to be one of the trends with the lowest potential to deliver positive impacts across economic, social, and environmental dimensions over the next 12-18 months. Indeed, it scores lower than the average of the 12 current trends across all dimensions, with scores of 3.83 for economic, 3.67 for social, and 2.54 for environmental. This could reflect how technological advances tend to outpace policy and regulatory implementation, which may take longer to achieve an impact.

Respondents in the Middle East and Africa are more optimistic than those in other regions about this trend's economic impact, scoring it 5.28. Meanwhile, those in Latin America are especially positive about its potential for environmental impacts. These respondents gave it an overall score of 3.83, the highest among all current trends..

*Figure 64: Trend 3.1 - Positive economic, social, and environmental impact*



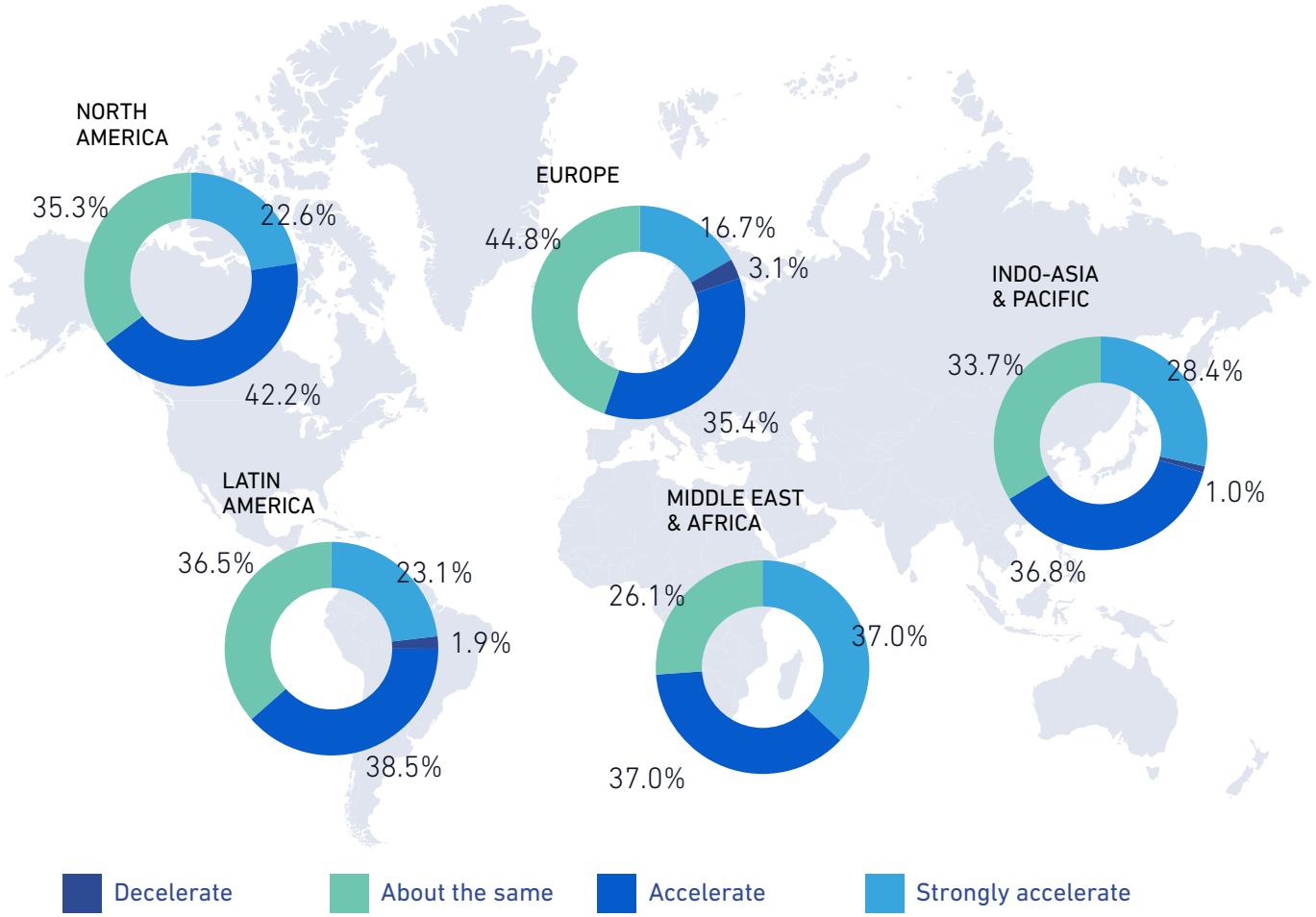

**Source:** *Source: DCO 2024 Digital Economy Trends Survey.*
**Q:** *How would you assess the economic/social/environmental impact of these current digital trends in the next 12-18 months, at the global level?*
**Respondents:** *293 CTOs and senior technologists working in large companies (+250 employees), 59 policymakers, and 40 digital economy experts.*

### Pace of change

Respondents expect the pace of change for Evolving Digital Governance to be the slowest of all trends. A possible explanation is that government regulations often operate at a much slower pace than commercial digital innovation. This dual-speed dynamic could exacerbate the digital divide, allowing developed economies to gain disproportionate advantages, and raises concerns about equity, sustainability, and fairness.

Between 25% and 45% of respondents across all regions anticipate the trend's pace to remain constant during this period, with some respondents in Europe, Latin America, and Indo-Asia and Pacific even expecting it to decelerate. Respondents in the Middle East and Africa stand out as more optimistic, with over one-third of respondents expecting the trend to strongly accelerate over the next 12-18 months.

*Figure 65: Trend 3.1- Pace of change per region*

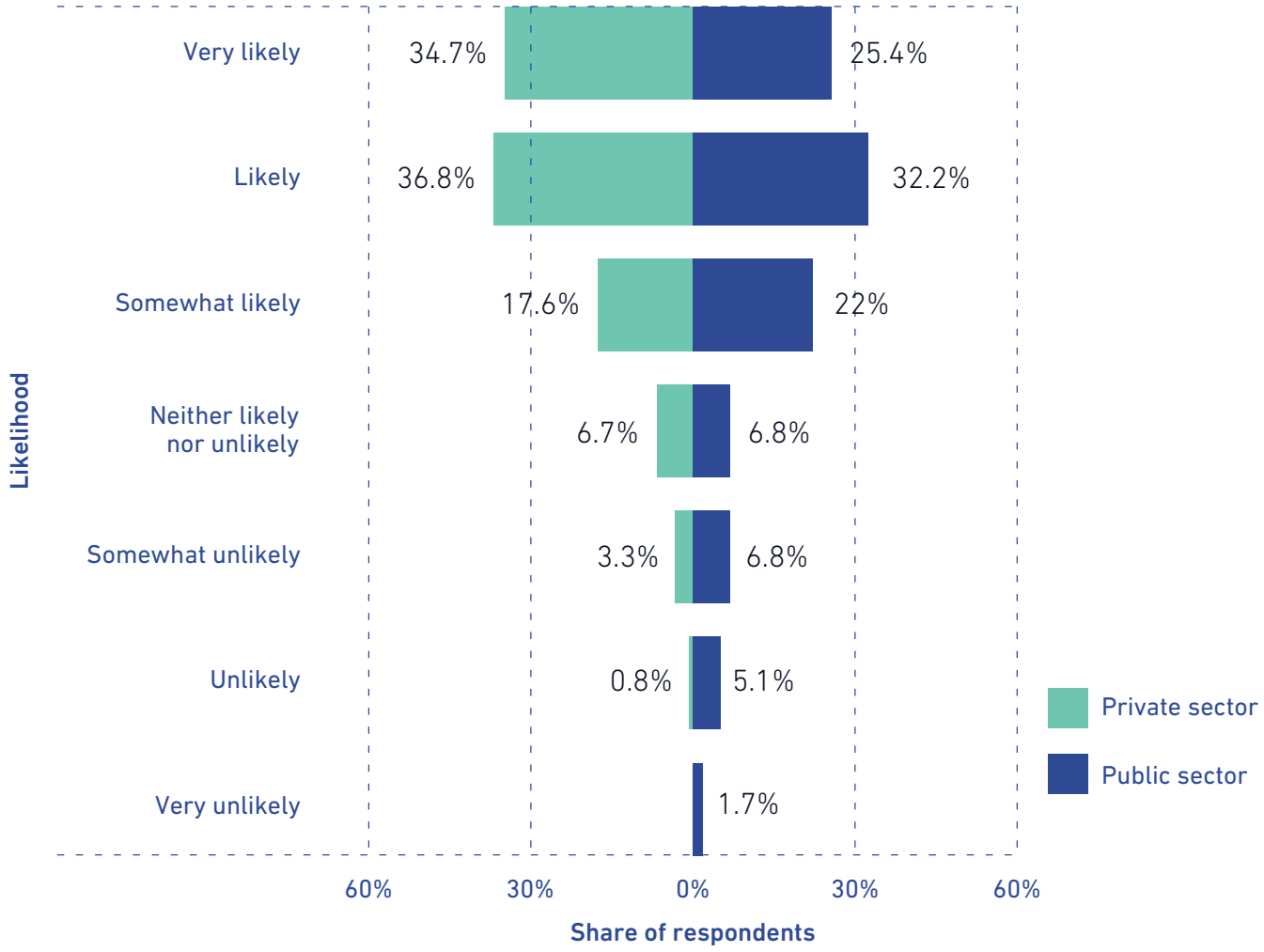



**Source:** *DCO 2024 Digital Economy Trends Survey.*
**Q:** *How do you expect the pace of change of these current digital trends to evolve in the next 12-18 months at the global level?*
**Respondents:** *293 CTOs and senior technologists working in large companies (+250 employees), 59 policymakers, and 40 digital economy experts.*

### Stakeholder impact

Only about 30% of respondents think that new regulation in this area is very likely in the next 12-18 months, lower than for most other trends — although digital economy experts are an exception, seeing it as more likely than for most other trends. As with most trends, CTOs and senior technologists foresee new regulation as more likely than policymakers.

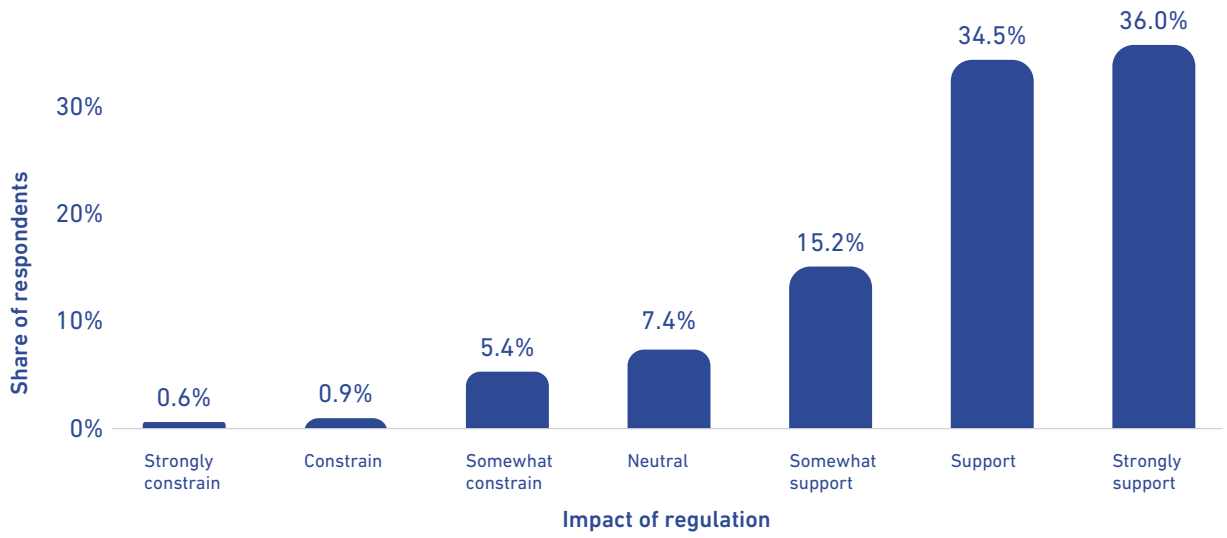
*Figure 66: Trend 3.1 - Perception of likelihood of legislation or regulation activity by stakeholder group*




**Source:** *Source: DCO 2024 Digital Economy Trends Survey.*
**Q:** *At a global level, how likely do you think it is that we will see an increase in legislative and regulatory activities related to the following trends in the Digital Economy over the next 12 to 18 months?*
**Respondents:** *293 CTOs and senior technologists working in large companies (+250 employees), 59 policymakers, and 40 digital economy experts.*

Overall, 36% of respondents expect new regulations and legislation to strongly support the adoption of Evolving Digital Governance. Private sector respondents are more likely to expect this than public sector respondents (42% versus 33%).

***Figure 67: Trend 3.1- Expected impact of new legislation or regulation activity on trend adoption***




**Source:** *DCO 2024 Digital Economy Trends Survey.*
**Q:** *At a global level, how do you expect these legislative and regulatory activities to influence the adoption of digital economy trends in the next 12 to 18 months?*
**Respondents:** *293 CTOs and senior technologists working in large companies (+250 employees), 59 policymakers, and 40 digital economy experts.*

## Asking AI

**We asked three leading LLMs (ChatGPT-4o, Claude 3.5, and Llama 3.1) to assess the economic, social, and environmental impacts of this trend over the next 12-18 months. Here's what these models had to say:**

### Economic impact

All the models expect evolving digital governance to have a positive economic impact by enabling more innovative, efficient, and trustworthy digital services across sectors.

### Social impact

Claude and Llama anticipate the trend to have a positive social impact by promoting human-centered approaches, protecting personal data, and enabling inclusive access to digital services. ChatGPT notes the potential for regional disparities in adoption.

### Environmental impact

The models all recognize that digital governance frameworks can contribute to sustainability efforts, but its impact in the short term is likely to be modest.

*Note: These insights from LLMs are not data driven. They are provided as directional and sentimental and the LLMs have not had access to the survey data.*[5]

## Key enablers

**The evolution of digital governance requires:**

**Digital infrastructure**

Distributed and open technical architectures designed to be highly secure and privacy-enhancing, and resilient, ensuring reliability and inclusivity in supporting digital ecosystems.

**Industry digital transformation**

Business objectives and outcomes tied to globally standardized non-financial indicators that align with socio-economic outcomes. This includes outcome-focused, cross-sectoral, and adaptive regulatory frameworks designed to function across sovereign borders.

**Digital capabilities**

Comprehensive and targeted digital literacy initiatives aimed at educating non-experts on the fundamental commercial, legal, and technical factors driving the digital economy.

## Recommendations

### Private sector

**Develop comprehensive internal digital governance frameworks** that integrate emerging standards, ethical AI principles, and accountability mechanisms, with a focus on enhancing trust and security, while establishing clear protocols for responsible innovation.

**Invest in technical infrastructure and expertise** for implementing transparency tools, conducting algorithmic audits, and ensuring compliance with evolving sector-specific regulatory requirements.

**Implement practices that prioritize fairness, transparency, and accountability** to ensure the responsible and ethical use of emerging digital technologies.

### Public sector

**Create adaptive regulatory frameworks that balance innovation with public interest protection**, incorporating mechanisms for regular review and updates as technology evolves.

**Build and maintain robust digital public infrastructure with strong governance mechanisms**, ensuring inclusive access while protecting privacy and security.

**Actively participate in multi-stakeholder digital governance initiatives** and industry collaborations to shape standards while sharing best practices for responsible innovation.

### IGOs, IOs, and others

**Facilitate knowledge sharing and capacity building across regions**, with a particular focus on supporting developing nations to establish effective digital governance frameworks.

**Coordinate multi-stakeholder initiatives to address global challenges** in digital governance while ensuring inclusive participation from diverse stakeholders.

**Develop platforms for sharing best practices, case studies, and research** on effective digital governance across countries and stakeholders.

CURRENT TREND

# 3.2

# Increasing Resources for Cybersecurity

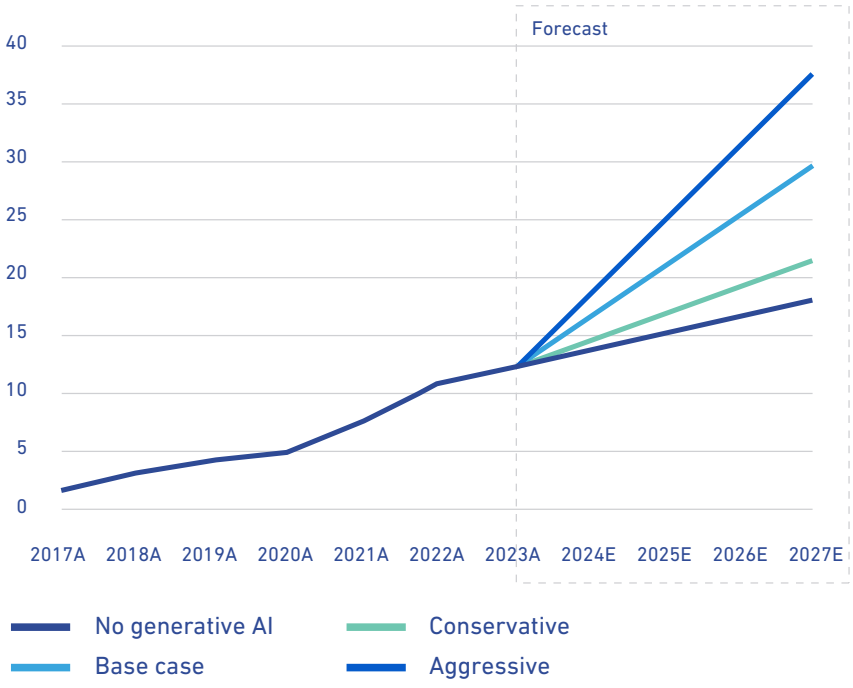
## What does the trend encompass?

AI, quantum computing, state-sponsored attacks, and evolving attack surfaces are reshaping how organizations approach their digital defense. As cyber threats continue to evolve and adapt, organizations are recognizing that effective cybersecurity requires collaboration on intelligence and response capabilities. No single entity can effectively combat cyber threats alone in today's digital economy — particularly small and medium-sized enterprises (SMEs), which often lack the resources to maintain comprehensive cybersecurity programs independently.

## Why is it important?

Cyber-attacks cost organizations an average of US$4.7 million per incident.[8] Cybercriminals are leveraging generative AI to craft increasingly sophisticated cyber-attacks, outpacing traditional fraud detection systems. By 2027 losses from fraud could reach twofold what it would be if generative AI did not exist, as shown in Figure 68.[9] SMEs in particular face difficulties in recruiting and retaining qualified cybersecurity talent.

*Figure 68: Fraud loss scenarios with Generative AI*




*Source: The FBI's Internet Crime Complaint Center; Deloitte Center for Financial Services*

**AI-powered cybersecurity:** An overwhelming 93% of security professionals expect AI-enabled threats to affect their organizations.[6]

AI is also fast becoming a cornerstone of defense, with projections indicating that by 2025 almost 80% of organizations will have implemented some form of AI-powered cybersecurity solution.[7]

**Global cybersecurity market:** Market Insights projects that the global cybersecurity market reached US$185.7 billion in 2024 with the US accounting for 43% of the revenue. The market is expected to continue to grow at a compound annual growth rate of 7.92% from 2024 to 2029.[10]

As demonstrated by the 'Octo Tempest' ransomware attack in 2023,[11] modern cyber threats target both cloud and on-premises infrastructure, requiring comprehensive security. Nation states increasingly target both public and private sector assets. Sophisticated supply chain attacks often target SMEs, which makes their security challenges a systemic vulnerability that must be addressed to ensure an equitable and resilient digital economy.

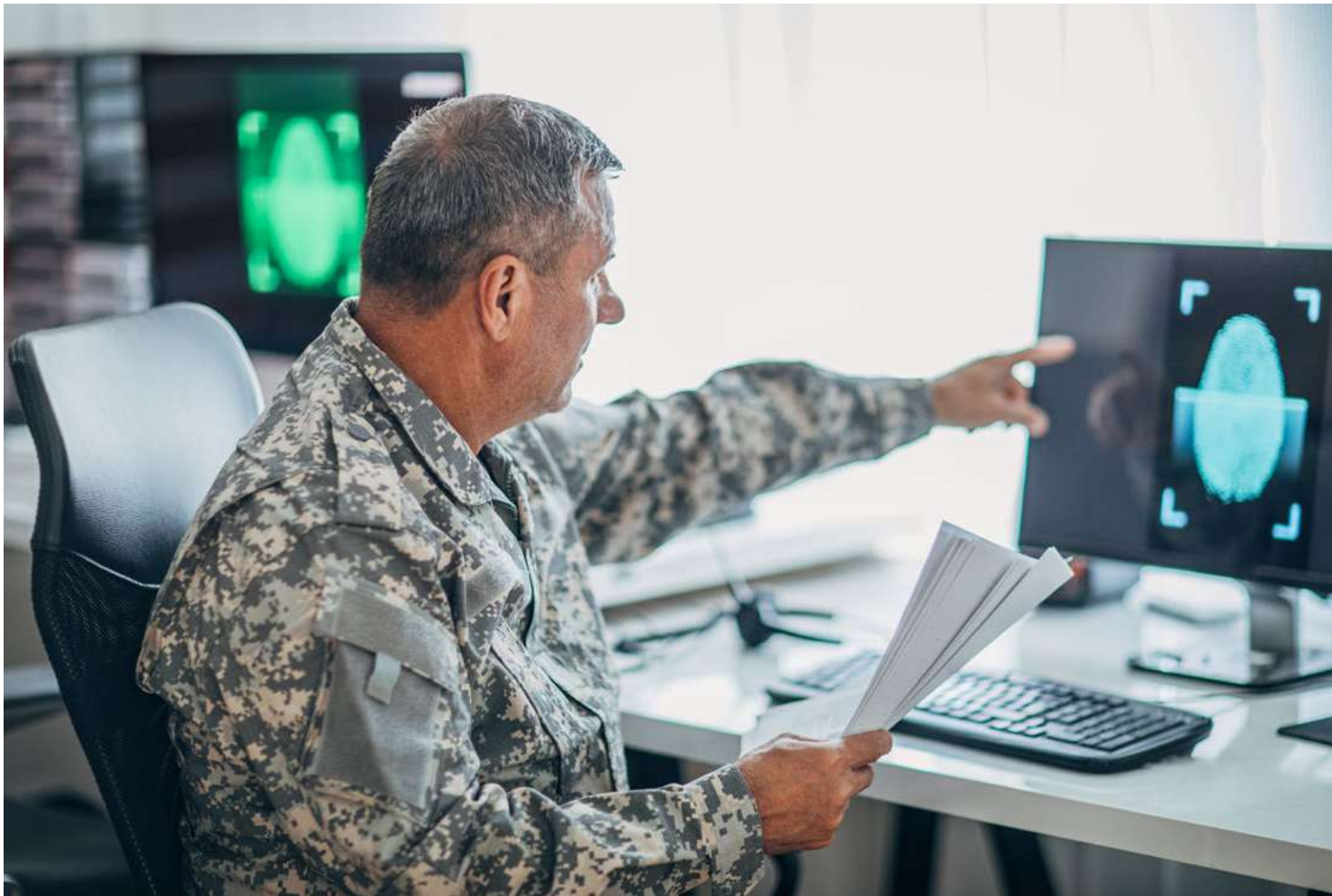
**Cyber attacks:** According to recent studies, over 60% of small businesses that suffer a significant cyber attack cease operations within six months.[12]

## Impacts on the horizon

Cybersecurity will increasingly rely on developing advanced AI capabilities and quantum-resistant cryptography, with security platforms based in the cloud and automated tools for orchestrating responses.

Public-private partnerships and cross-border collaboration frameworks will be critical to maintaining security in the digital economy, along with managed cybersecurity services specifically designed for SMEs.

Evolving international security standards and regulatory frameworks will need to be complemented by workforce development programs and innovative cybersecurity training initiatives.



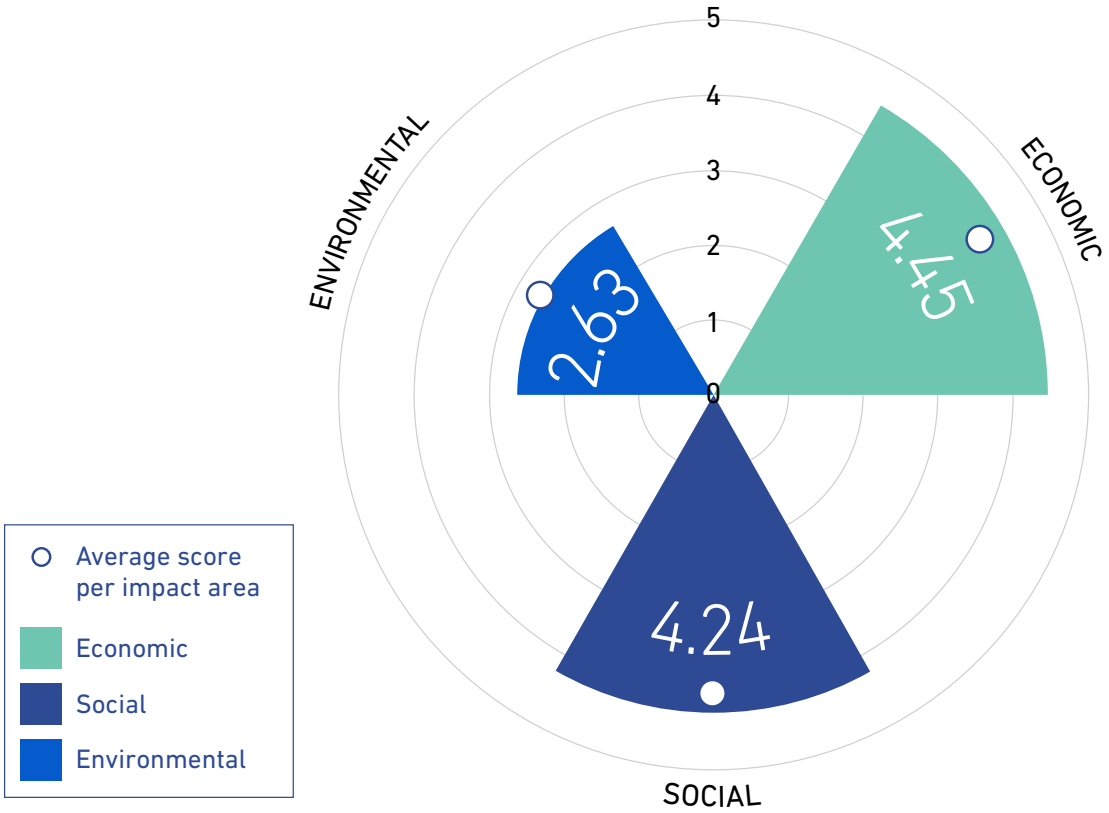
# Survey findings

### Economic, social, and environmental impact

Increasing Resources for Cybersecurity is perceived as having a significant social (4.24) and economic (4.45) impact, ranking third and fourth respectively among the 12 trends. This holds true across stakeholder groups, likely reflecting the escalating complexity of cyber threats and the importance of data safety for both private and public sectors.

Its environmental impact, while comparatively limited (2.63), aligns with the lower average environmental impact score of digital trends, placing it fifth among the 12 trends. This reflects the indirect nature of cybersecurity investments on sustainability goals.

*Figure 69: Trend 3.2 - Positive economic, social, and environmental impact*




**Source:** *Source: DCO 2024 Digital Economy Trends Survey.*
**Q:** *How would you assess the economic/social/environmental impact of these current digital trends in the next 12-18 months at the global level?*

**Respondents:** *293 CTOs and senior technologists working in large companies (+250 employees), 59 policymakers, and 40 digital economy experts.*

Respondents from Indo-Asia and Pacific assigned the highest scores across economic (4.83), social (4.54), and environmental (3.13) dimensions. Similarly, respondents from the Middle East and Africa were similarly enthusiastic about its potential economic and social impacts (5.26 and 4.26 respectively). Private sector respondents from the technology, media, and communications sectors were most likely to predict a very high economic impact, followed by those from heavy industries and extractives, and healthcare and life sciences.

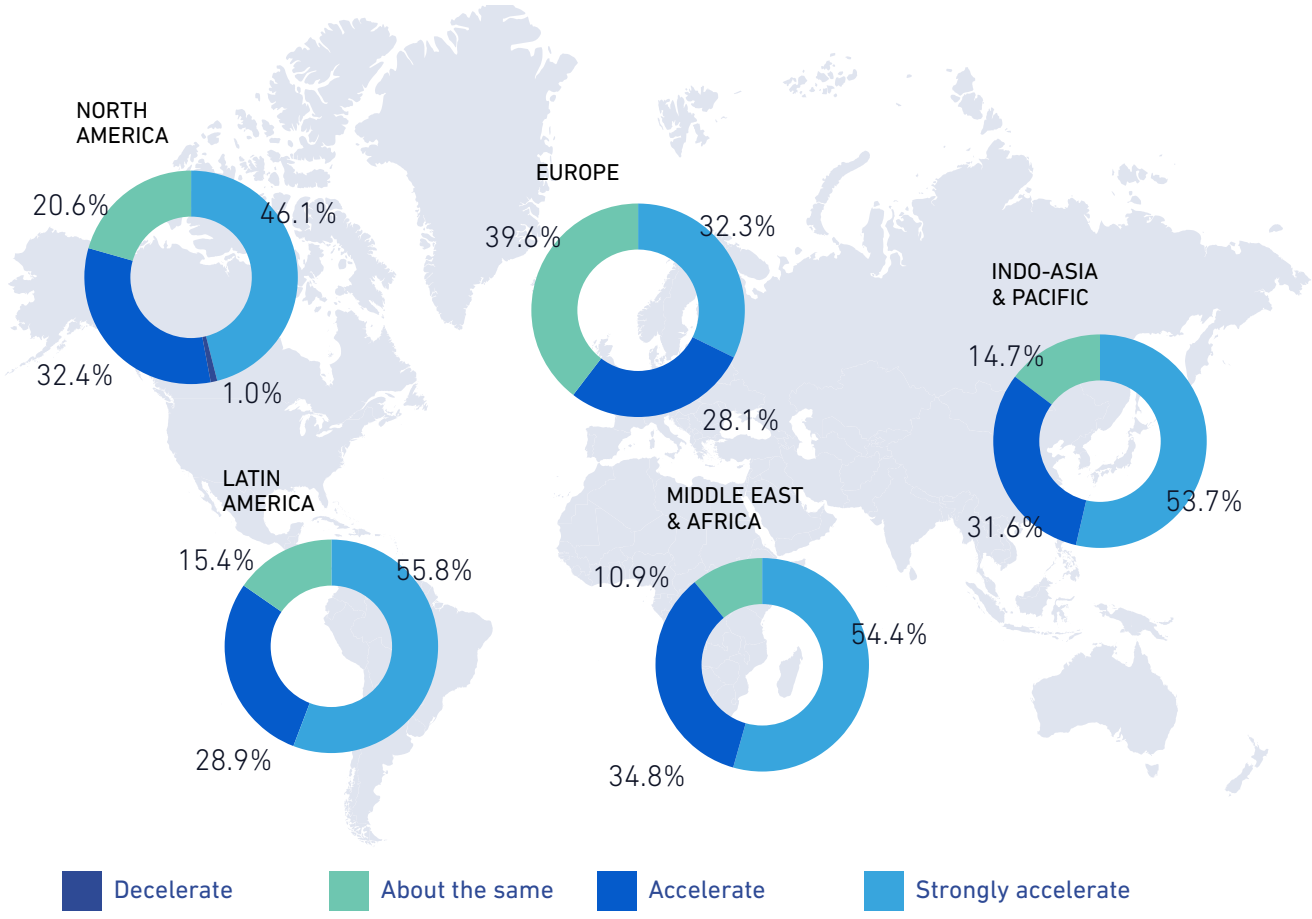
### Pace of change

No other trend is expected to accelerate more quickly than Increasing Resources for Cybersecurity. Over 75% of respondents worldwide expect its pace to accelerate over the next 12 months, including 40% who predict it will do so to a strong degree.

Respondents from Indo-Asia and Pacific and the Middle East and Africa were especially likely to forecast acceleration, as were those from healthcare and life sciences. In Latin America, 84% expect acceleration, with 56% strongly optimistic. Meanwhile, North America shows a slightly more measured outlook, with 78% (cumulatively) predicting acceleration, but with a smaller share (46%) anticipating strong acceleration compared with other regions. Europe is more reserved, with 60% expecting acceleration and 40% predicting no change.

Public sector respondents were somewhat less likely to anticipate acceleration than their private sector counterparts, which may indicate the need for more collaborative efforts to foster a unified approach.

*Figure 70: Trend 3.2 - Pace of change per region*



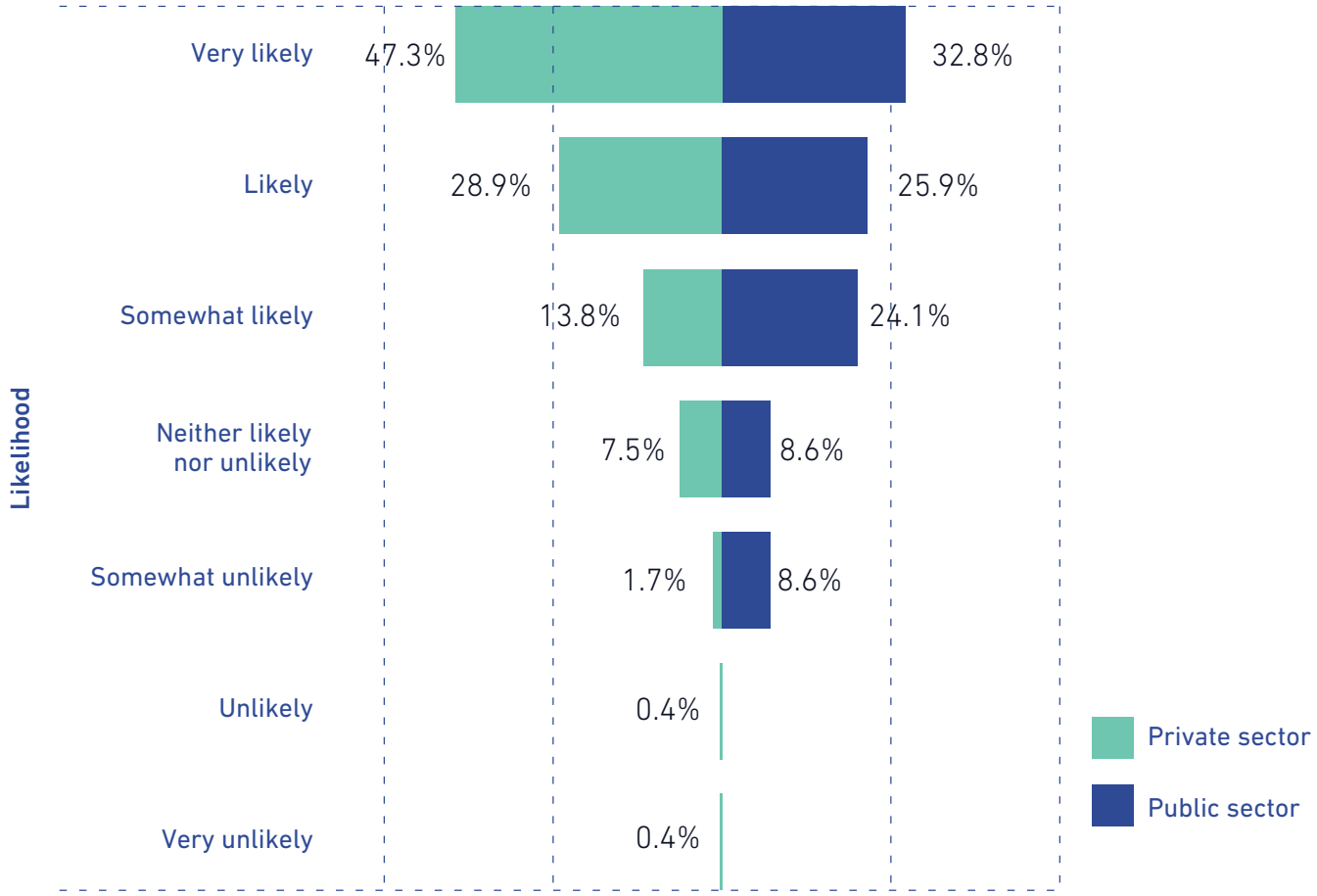

**Source:** *DCO 2024 Digital Economy Trends Survey.*
**Q:** *How do you expect the pace of change of these current digital trends to evolve in the next 12-18 months at the global level?*
**Respondents:** *293 CTOs and senior technologists working in large companies (+250 employees), 59 policymakers, and 40 digital economy experts.*

### Stakeholder impact

Survey results reveal strong expectations of new legislative activity for Increasing Resources for Cybersecurity among private sector respondents, with over 76% saying it is likely or very likely, compared with just 59% in the public sector. This divergence highlights the private sector's increasing emphasis on cybersecurity as a critical area for legislative focus, driven by growing threats and the need for robust frameworks to manage risks effectively.

Respondents in the Indo-Asia and Pacific region were the most likely to expect new legislative action, followed by Latin America. Across industries, expectations are the highest in the automotive and transport and healthcare and life sciences sectors.

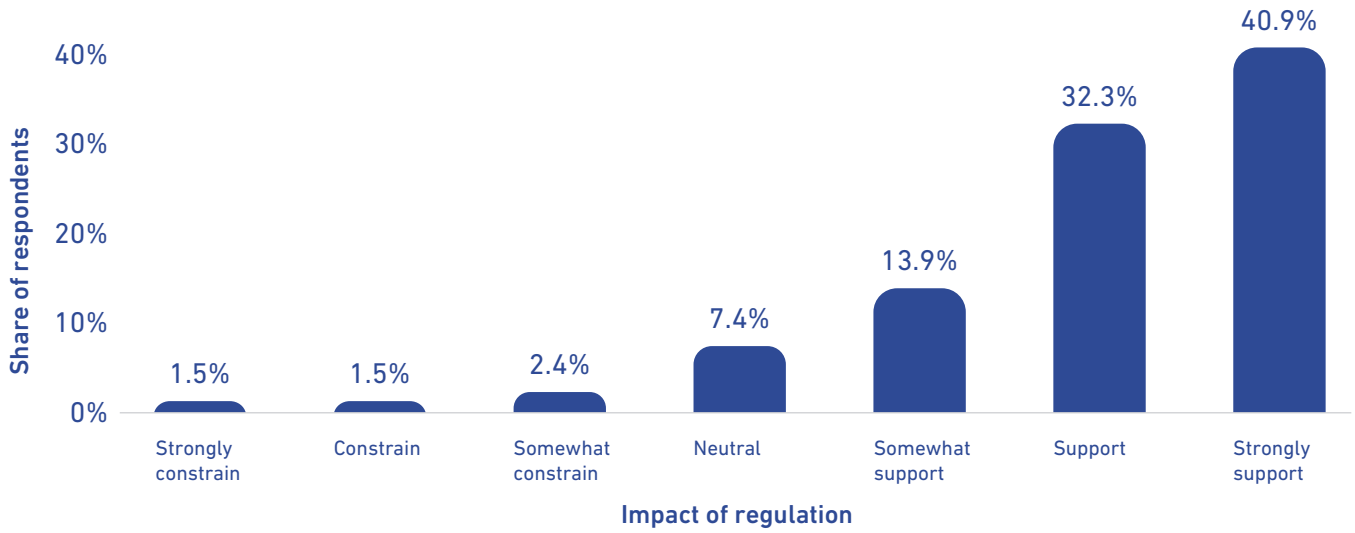
***Figure 71: Trend 3.2 - Perception of likelihood of legislation or regulation activity by stakeholder group***




**Source:** *Source: DCO 2024 Digital Economy Trends Survey.*
**Q:** *At a global level, how likely do you think it is that we will see an increase in legislative and regulatory activities related to the following trends in the Digital Economy over the next 12 to 18 months?*
**Respondents:** *293 CTOs and senior technologists working in large companies (+250 employees), 59 policymakers, and 40 digital economy experts.*

Just over 40% of respondents globally believe that upcoming regulations will strongly support efforts to increase cybersecurity resources, with the private sector expressing more optimism than the public sector. Confidence that new regulations will have a beneficial impact is highest in Indo-Asia and Pacific and automotive and transport.

***Figure 72: Trend 3.2 - Expected impact of new legislation or regulation activity on trend adoption***




**Source:** *DCO 2024 Digital Economy Trends Survey.*
**Q:** *At a global level, how do you expect these legislative and regulatory activities to influence the adoption of digital economy trends in the next 12 to 18 months?*
**Respondents:** *293 CTOs and senior technologists working in large companies (+250 employees), 59 policymakers, and 40 digital economy experts.*

## Asking AI

**We asked three leading LLMs (ChatGPT-4o, Claude 3.5, and Llama 3.1) to assess the economic, social, and environmental impacts of this trend over the next 12-18 months. Here's what these models had to say:**

### Economic impact

The models expect a positive economic impact, with upfront investment costs likely to be outweighed by the potential to significantly reduce economic losses from cyber-attacks.

### Social impact

All the LLMs expect a positive social impact, as enhanced cybersecurity ultimately leads to increased trust and confidence in the digital economy.

### Environmental impact

The models all agree that the trend toward increasing resources for cybersecurity does not appear to have a direct environmental impact.

*Note: These insights from LLMs are not data driven. They are provided as directional and sentimental and the LLMs have not had access to the survey data.*[13]

## Key enablers

**Digital security in the age of AI depends on :**

**Digital infrastructure**

Robust digital infrastructure, including next-generation cloud platforms, quantum-resistant cryptography, and intelligent security networks, will serve as critical resources for enhancing cybersecurity capabilities.

**Digital innovation**

Venture capital investment in security innovation and human resource development initiatives.

**Digital capabilities**

Effective digital governance frameworks including international security standards and information security literacy programs across both public and private sectors.

# Recommendations

## Private sector

**Large enterprises should lead quantum-ready security adoption**, share threat intelligence, and support industry-wide public-private security initiatives.

**SMEs should leverage cloud security platforms**, join security coalitions, and prioritize core asset protection.

**Establish or join industry-wide cybersecurity alliances** to share threat intelligence, best practices, and response strategies.

**Invest in developing and adopting AI-driven security solutions** and quantum-resistant encryption technologies to stay ahead of emerging threats.

**Provide cybersecurity-as-a-service solutions** tailored for SMEs, including affordable tools, managed services, and training programs.

## Public sector

**Establish quantum security standards and AI governance frameworks** to strengthen cybersecurity and protect against emerging digital threats.

**Create collaborative cyber defense centers** and digital threat sharing platforms to improve real-time response capabilities.

**Launch government-funded initiatives to support SMEs** in implementing basic cybersecurity measures, such as subsidized tools or grant programs for infrastructure upgrades and capacity building skills in cybersecurity.

**Invest in education and training programs** to upskill the workforce and address the growing demand for cybersecurity experts.

## IGOs, IOs and others

**Drive the development of global security standards** to ensure interoperability and trust across borders.

**Foster cross-border incident response capabilities** to address transnational cyber threats, collaborate on major incidents, and improve collective resilience.

**Support security capacity building** by providing technical assistance and funding to enhance cybersecurity in low- and middle-income countries.

**Promote multilateral cooperation** to tackle global cybersecurity challenges collaboratively.

CURRENT TREND

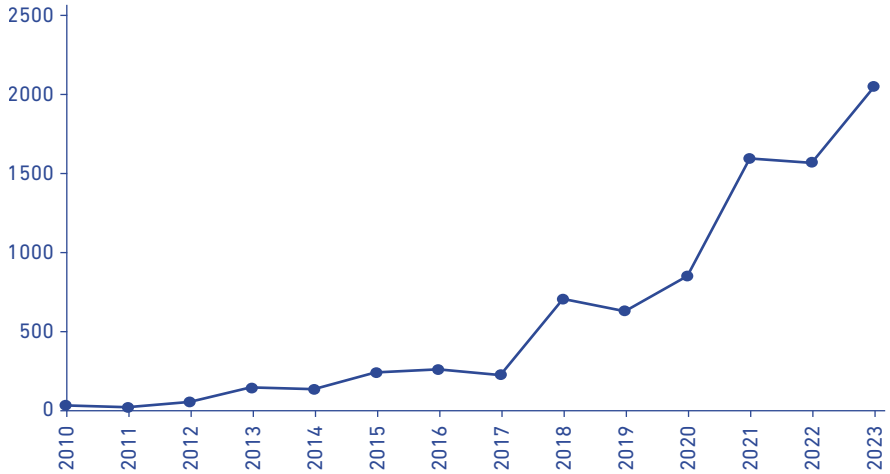
# 3.3

# Advancing Industrial Policies for the Digital Economy

## What does the trend encompass?

Nations are integrating digital strategies within larger industrial policies — particularly in strategic sectors such as manufacturing, automotive, and healthcare — as they seek greater innovation and competitiveness in their economic strategy.[14] These digital-first industrial policies often feature strategic cross-industry collaboration and workforce development programs to build digital skills and capacities. They aim to drive automation, foster new business models, and reshape global value chains, while balancing digital growth with sustainability through holistic approaches to optimizing energy use.

*Figure 73: Number of new industrial policy measures, 2010–2023*




Source: Ohnsorge, Raiser and Leiyu Xie

Many of these industrial policy measures are closely intertwined with national AI and data strategies. As shown in Figure 73, between 2017 and 2023, the use of industrial policy surged nine-fold, led by advanced economies, which accounted for two-thirds of new policies in 2023. In fact, the IMF and Global Trade Alert identified over 2,500 industrial policy interventions in 2023, targeting sectors like advanced digital technologies and their components, including semiconductors and critical minerals.[15] Some countries are coordinating efforts at the regional level. For example, the Gulf Organization for Industrial Consulting is fostering policy harmonization, resource pooling, and knowledge sharing in the Gulf Cooperation Council (GCC) region.[16] Others, for example the US CHIPS Act and the EU Green Deal, are investing billions of dollars to revitalize industrial sectors by accelerating technology adoption and development.

**Policy innovation in Rwanda:** Rwanda has developed specialized solutions that address local needs while building domestic technological capabilities to strengthen their economic growth.[17] In particular, Rwanda's Digital Innovation Initiative showcases how smaller nations can focus on advancing key sectors, such as agriculture, by leveraging digital technologies, including AI to improve productivity by 30%.

**Jordan's AI plan:** Jordan's AI Strategy and Implementation Plan includes 68 initiatives that aim to create jobs, improve the efficiency and quality of government services, and promote innovation and entrepreneurship.[18]

## Why is it important?

As digital technologies such as AI, IoT, and quantum computing drive industrial competitiveness, they are transforming efficiency, innovation, and productivity across industries. This shift underscores the need for nations to integrate their industrial and digital strategies to maintain an innovative and competitive edge. By aligning these strategies, countries can develop tailored solutions for critical sectors like manufacturing, healthcare, and automotive, unlocking their full potential. At the same time, ensuring that these systems are sustainable, ethically responsible, and secure helps build public trust and positions nations as leaders in the evolving digital economy.[19]

## Impacts on the horizon

To strengthen sovereign independence, more industrial policies will focus on reducing their reliance on foreign technologies to strengthen their autonomy and protect proprietary, sensitive, or citizen data.

Industrial policies that promote the development of localized and edge-based solutions will support the growth of industrial ecosystems that reshape global value chains and competitiveness.

As industries adopt human-centered principles in the use of AI, broadband, robotics, data fabrics, and distributed ledger technologies, new business models will emerge with greater opportunities for high-value local job creation.

**Industrial policies and the metaverse:** The industrial metaverse is evolving as an invaluable component of national industrial policies. Using a constellation of emerging technologies, including AI, XR, digital twins, edge computing, and blockchain, the industrial metaverse's human-centric approach and focus on sustainability aligns with the strategic economic goals of nations looking to unlock new levels of productivity, innovation, and economic success.

As the Institute of Electrical and Electronics Engineers notes[20], there are multiple ways the industrial metaverse can align with national industrial policies:

- **Supporting strategic industries**: Governments can leverage the industrial metaverse to promote the growth and development of strategic industries, such as clean energy, advanced manufacturing, and digital technologies.
- **Attracting foreign direct investment**: By showcasing a commitment to technological advancement and providing a platform for businesses to connect and collaborate, the industrial metaverse can attract foreign direct investment in high-value sectors.
- **Enhancing competitiveness**: The industrial metaverse enables industry sectors to adopt advanced technologies, improve productivity, and access new markets, thereby enhancing their overall competitiveness.[21]

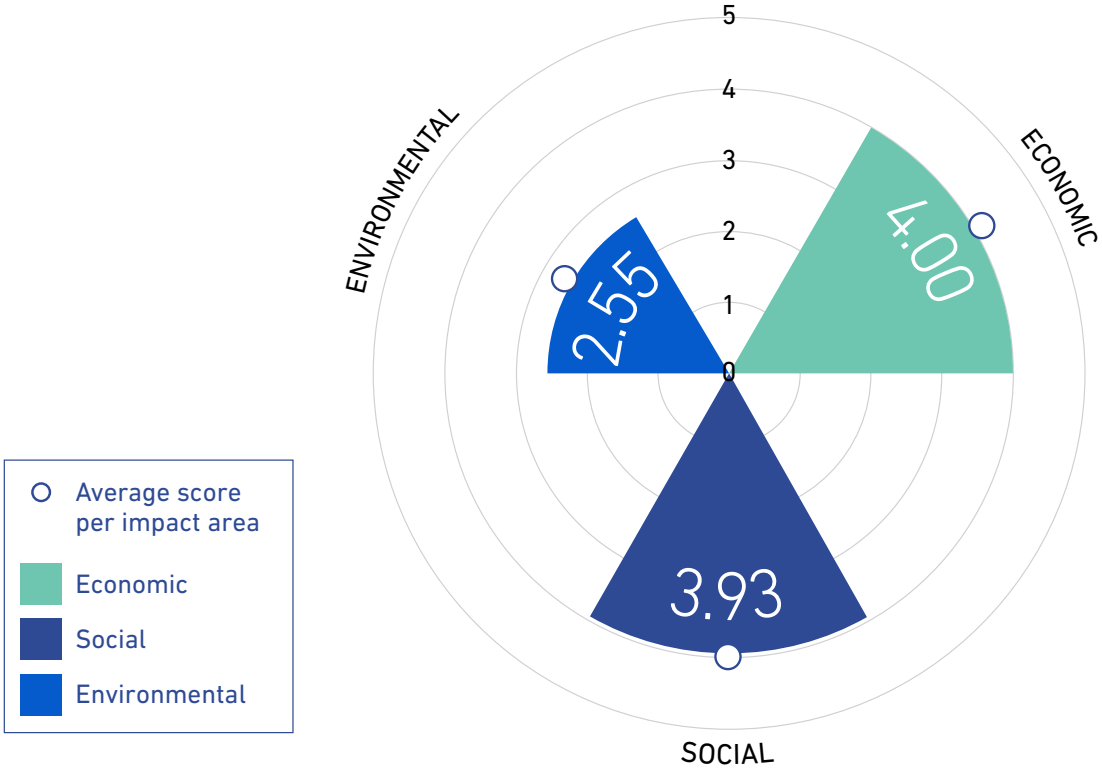
# Survey findings

### Economic, social, and environmental impact

Advancing Industrial Policies for the Digital Economy is rated in the lower half of all trends for its expected economic, social, and environmental impacts in the next 12-18 months. Respondents expect similar impacts across economic and social (4.00 and 3.93) and a smaller environmental impact (2.55). The trend consistently ranks in the third quarter (7-9) across all impact areas.

Experts give the lowest scores of any stakeholder group, likely reflecting skepticism about the immediate feasibility of implementing these policies. Public sector respondents are especially likely to foresee environmental benefits, as are professionals from the agribusiness, food, and beverage sector. Private sector respondents are generally more optimistic about this trend's economic and social impacts, with the highest scores coming from technology, media, and communications. Other sectors, including heavy industries (5.54), energy and utilities (4.60), and manufacturing (4.37), also rate its economic impact highly, highlighting alignment with industrial transformation priorities.

*Figure 74: Trend 3.3 - Positive economic, social and environmental impact*




**Source:** *Source: DCO 2024 Digital Economy Trends Survey.*
**Q:** *How would you assess the economic/social/environmental impact of these current digital trends in the next 12-18 months at the global level?*

**Respondents:** *293 CTOs and senior technologists working in large companies (+250 employees), 59 policymakers, and 40 digital economy experts.*

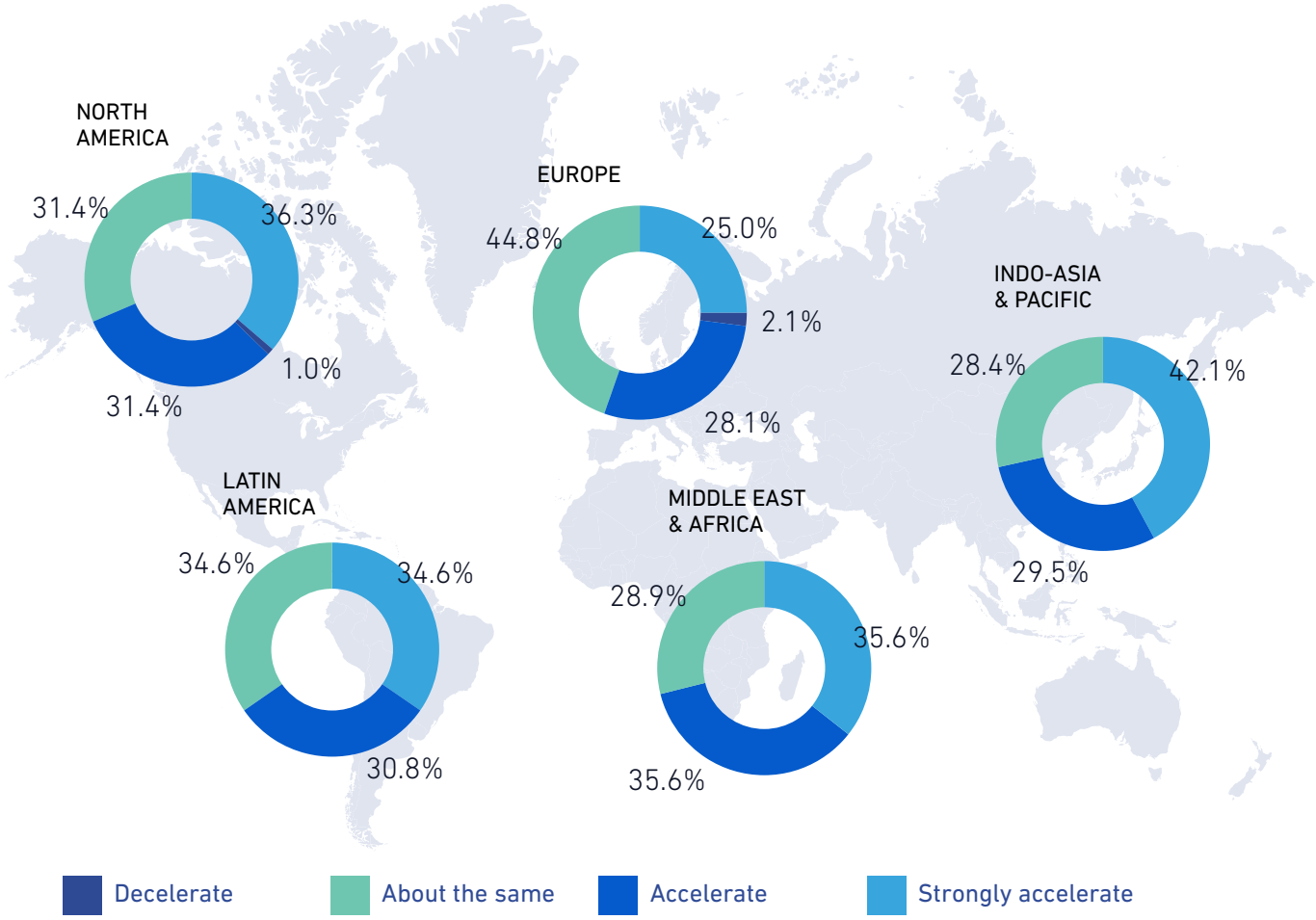
Respondents from Indo-Asia and Pacific and the Middle East and Africa are the most positive about the economic impacts of this trend, with the latter region also standing out for its high expectations of environmental benefits.

### Pace of change

Just over a third of respondents anticipate that the pace of Advancing Industrial Policies for the Digital Economy will accelerate strongly over the next 12-18 months, placing it 6th among the 12 trends. Across all regions, the trend consistently ranks near the middle in terms of pace of change. Notable regional differences emerge when examining individual shares of respondents expecting strong acceleration, with 42.1% in Indo-Asia and Pacific, 36.2% in North America, 35.5% in the Middle East and Africa, 30.8% in Latin America, and 25.0% in Europe.

Private sector respondents expect faster acceleration than their public sector counterparts, with professionals in the automotive and transport sector especially likely to foresee a rapid pace of change.

*Figure 75: Trend 3.3 - Pace of change per region*



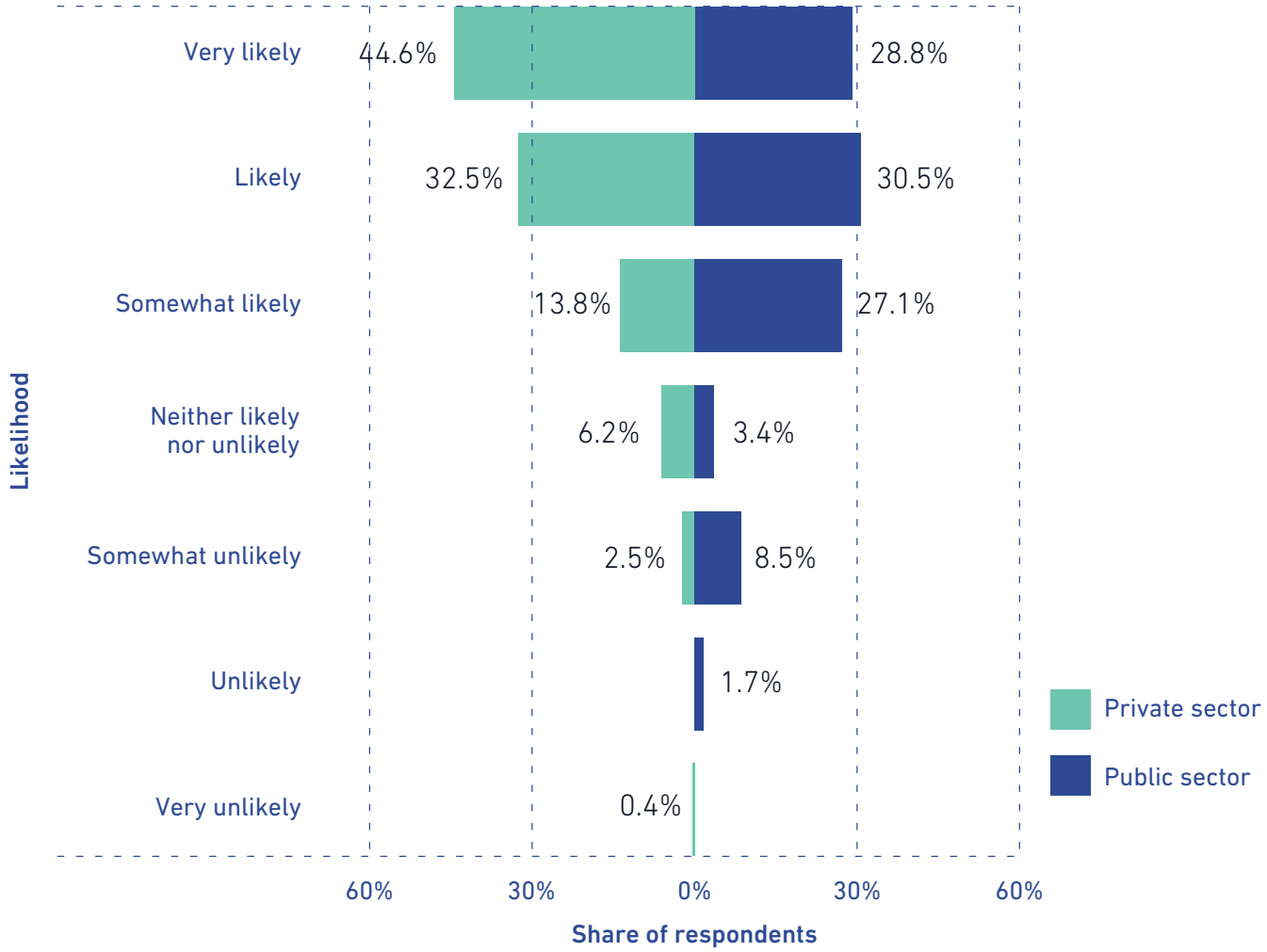

**Source:** *DCO 2024 Digital Economy Trends Survey.*
**Q:** *How do you expect the pace of change of these current digital trends to evolve in the next 12-18 months at the global level?*

**Respondents:** *293 CTOs and senior technologists working in large companies (+250 employees), 59 policymakers, and 40 digital economy experts.*

### Stakeholder impact

A higher proportion of private sector (44.6%) respondents believe that new legislation or regulations are very likely than those in the public sector (28.8%), with expectations the highest among those in the extractive industry. More respondents from the Middle East and Africa expect legislative or regulatory action on this trend than any other trend.

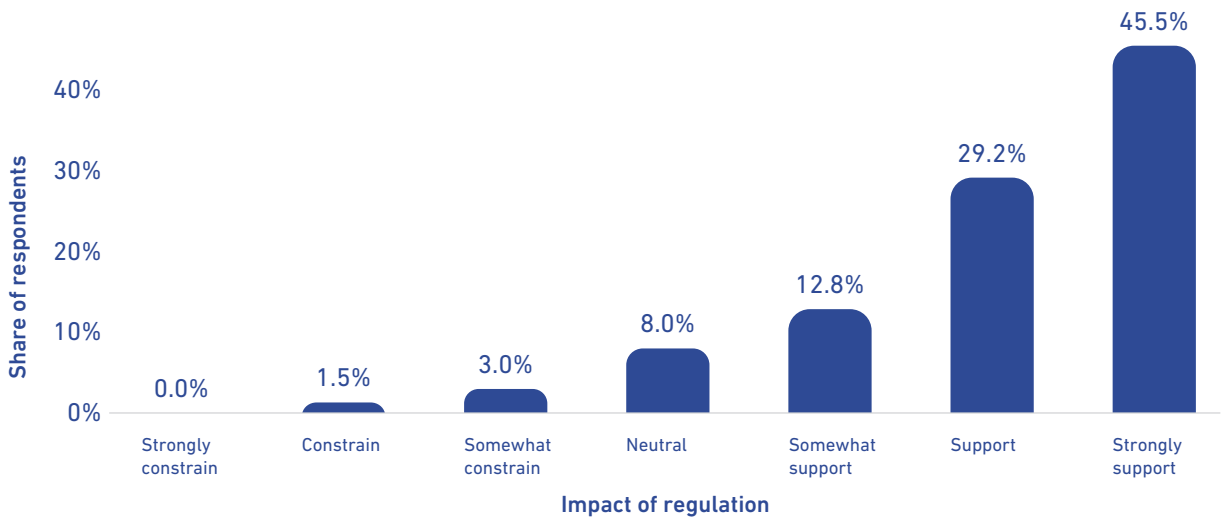
*Figure 76: Trend 3.3 - Perception of likelihood of legislation or regulation activity by stakeholder group*




**Source:** *Source: DCO 2024 Digital Economy Trends Survey.*
**Q:** *At a global level, how likely do you think it is that we will see an increase in legislative and regulatory activities related to the following trends in the Digital Economy over the next 12 to 18 months?*
**Respondents:** *293 CTOs and senior technologists working in large companies (+250 employees), 59 policymakers, and 40 digital economy experts.*

Overall, 45.5% of respondents expect new regulation to strongly support this trend, the second-highest figure among the 12 trends. Expectations are similar across stakeholder groups, with professionals in healthcare and life sciences, automotive and transport, and manufacturing especially likely to expect that new regulations will be supportive. On a regional basis, Indo-Asia and Pacific agrees more with this point than the others.

***Figure 77: Trend 3.3 - Expected impact of new legislation or regulation activity on trend adoption***




**Source:** *DCO 2024 Digital Economy Trends Survey.*
**Q:** *At a global level, how do you expect these legislative and regulatory activities to influence the adoption of digital economy trends in the next 12 to 18 months?*
**Respondents:** *293 CTOs and senior technologists working in large companies (+250 employees), 59 policymakers, and 40 digital economy experts.*

## Asking AI

**We asked three leading LLMs (ChatGPT-4o, Claude 3.5, and Llama 3.1) to assess the economic, social, and environmental impacts of this trend over the next 12-18 months. Here's what these models had to say:**

### Economic impact

The models expect that integrating digital strategies into industrial policies will have a positive economic impact, although it may vary by region.

### Social impact

The models agree that an emphasis on workforce development and creating new job opportunities could lead to positive social outcomes.

### Environmental impact

All three LLMs expect a moderately positive impact from industrial policies that acknowledge environmental sustainability as a key consideration in their design.

*Note: These insights from LLMs are not data driven. They are provided as directional and sentimental and the LLMs have not had access to the survey data.*[22]

## Key enablers

**Modern industrial policies increasingly require:**

**ICT core business**

Regional computing centers integrated with industrial manufacturing hubs and centers of excellence.

**Digital regulation and public administration**

AI development frameworks aligned with national industrial strategies and sector-specific priorities, with tight coordination between the public and private sectors.

**Digital capabilities**

Development of university courses focused on the use of advanced technologies to cultivate the skills of tomorrow, and the establishment of technical universities and research institutes dedicated to technological innovation to remain at the forefront of research.

# Recommendations

## Private sector

**Align corporate research and development and technology development plans with national industrial policies** to maximize the benefits of support mechanisms and incentives provided by governments.

**Foster collaboration between research institutions and industry** to accelerate technological innovation and translate research into practical applications.

**Participate in the development of international standards** and best practices digital technologies including AI.

**Adopt advanced data protection and privacy measures** to safeguard sensitive data, ensuring compliance with international security standards and fostering trust.

## Public sector

**Develop integrated industrial policies** that position new digital technologies as foundational to driving economic growth and innovation.

**Invest in fundamental research and the development of infrastructure** to advance digital technologies at the national level.

**Create initiatives to attract, train, and retain talent in digital technologies** like AI, IoT, and quantum computing, ensuring sustained growth in industrial sectors.

**Invest in digital literacy and training programs** to enhance data protection and cybersecurity awareness, boosting security and trust across all sectors of the digital economy.

## IGOs, IOs, and others

**Encourage countries to design industrial policies** that are transparent, evidence-based, and targeted toward addressing market failures.

**Facilitate the development of frameworks to monitor** industrial policies' effectiveness and spillovers, including analyzing their impact on global trade, investment, and financial flows.

**Support capacity building in developing nations** to prevent the emergence of a two-speed world in digital technologies adoption and innovation, ensuring equitable access to digital technologies advancements and opportunities.

**Promote international standards for ethical development and use of digital technologies** while respecting national regulation to advance industrial policies for the digital economy.

CURRENT TREND

# 3.4

# Preparing for the Quantum Era

## What does the trend encompass?

Quantum computing may be the next great technological leap for the digital economy. It promises computational capabilities that dwarf today's most powerful systems. Maintaining trust and security in the quantum era will demand unprecedented coordination between stakeholders, new standards for interoperability, robust governance frameworks, and investment in technology and expertise.

The most immediate ramification of quantum computing is its threat to current security systems. Today's cryptographic protocols, which safeguard everything from financial transactions to national security communications, will become vulnerable to quantum-enabled decryption. Banks and investment firms are leading the race to develop quantum-resistant encryption before quantum computers can break current standards. The US government has set 2035 as the target for full migration to post-quantum cryptography standards.[23]

Academic institutions are expanding quantum education — MIT's Quantum Engineering Program is one such example.[25] Meanwhile, the private sector is investing in applications that combine quantum and classical computing, including IBM's Qiskit Runtime service, which aims to accelerate machine learning applications.[26] Governments are also funding projects that incorporate quantum computing: for example, the EU's OpenSuperQ project aims to address challenges in energy and logistics.[27] International partnerships are emerging on technical development, workforce training, and regulatory frameworks.

## Why is it important?

Beyond security concerns, quantum computing promises breakthroughs across multiple sectors. In financial services, quantum algorithms could potentially revolutionize portfolio optimization, risk assessment, and fraud detection. In healthcare and pharmaceuticals, quantum simulations will improve drug discovery and enable personalized medicine by modeling complex molecular interactions.[28] Materials scientists anticipate quantum-enabled discoveries leading to more efficient batteries and solar cells, accelerating the transition to a sustainable future.[29]

Each sector will require specialized training programs and technical standards.[30] Organizations must build quantum literacy across their workforce to protect existing systems and prepare for quantum-enabled innovation. The quantum revolution will demand unprecedented coordination between regulators, industry leaders, and international organizations.[31] Equitable access to quantum computing will be needed to prevent a growing digital divide.

**Quantum transition costs:** The US federal government estimates that it will cost US$7.1 billion to transition existing systems to quantum-resistant cryptography.[24]

## Impacts on the horizon

The quantum challenge to security systems will require the unprecedented modernization of infrastructure, with organizations having to comprehensively update their systems, protocols, and workforce capabilities.

The convergence of quantum and AI technologies will create new competitive dynamics. Organizations will need to master both domains, balancing immediate AI deployment with longer-term quantum preparation.

The financial services and pharmaceutical sectors are likely to lead quantum adoption, establishing frameworks for broader industry.

# Survey findings

### When will these trends materialize?

Survey results indicate that Preparing for the Quantum Era is the emerging trend considered the furthest from materializing. Technical and operational challenges, including developing supporting infrastructure and cybersecurity frameworks, are holding back its deployment. The highest share of respondents (45%) expect this trend to materialize significantly around 2032.

*Figure 78: Trend 3.4 - Likely materialization*


**Source:** *DCO 2024 Digital Economy Trends Survey.*
**Q:** *At a global level, when do you expect the following emerging Digital Economy trends to affect businesses and societies?*

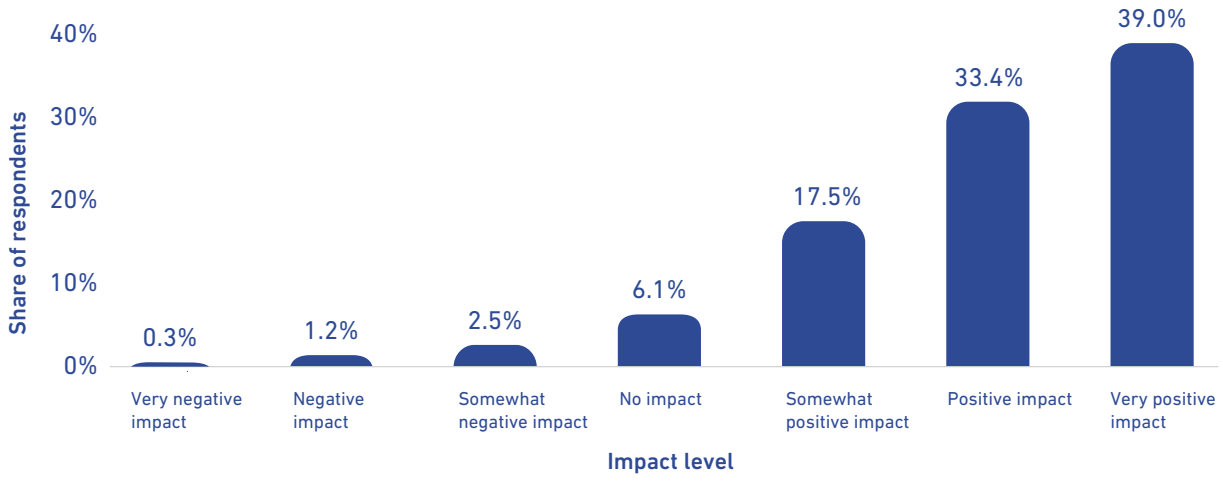
**Respondents:** *240 CTOs and senior technologists working in large companies (+250 employees), 59 policymakers, and 38 digital economy experts.*

### Socio-economic impact

Survey results indicate that the emerging trend of Preparing for the Quantum Era is expected to generate significant socio-economic value, with 40% of respondents anticipating a very positive impact and an additional 35% predicting a positive impact. However, approximately 10% foresee only a somewhat positive impact, and a minimal share anticipates no impact or negative outcomes. These mixed responses reflect the potential of quantum computing to transform industries, balanced against concerns about readiness, barriers to adoption, and uneven regional preparedness.

Among private sector respondents, professionals in the energy and utilities sector are most likely to expect a very positive socio-economic impact, followed by those in agribusiness and food. Expectations are highest in Indo-Asia and Pacific and the Middle East and Africa, with significantly more caution in Europe and North America. Experts and government stakeholders are the least optimistic stakeholder groups, perhaps reflecting concerns around regulatory frameworks and societal readiness.

***Figure 79: Trend 3.4 - Expected socio-economic impact in 3-5 years***




**Source:** *DCO 2024 Digital Economy Trends Survey.*
**Q:** *At a global level, to what extent do you believe the following emerging trends will have a net positive or negative socio-economic impact in the next 3-5 years?*
**Respondents:** *240 CTOs and senior technologists working in large companies (+250 employees), 59 policymakers, and 38 digital economy experts.*

## Asking AI

**Prompt:**
**"Act as a global expert on the Digital Economy. What are the potential near-term benefits, challenges, and considerations for the trend of 'Preparing for the Quantum era'"?**

### Response from ChatGPT-4o:

**Revolutionized computing**

Quantum technologies enable breakthroughs in fields like drug discovery, climate modelling, and cryptography.

**Security risks**

Quantum decryption threatens current encryption standards, requiring urgent updates to cryptographic systems.

**Global collaboration**

Equitable access, standardized frameworks, and ethical deployment are essential for harnessing quantum's potential responsibly

*Note: These insights from LLMs are not data driven. They are provided as directional and sentimental and the LLMs have not had access to the survey data.*[32]

## Key enablers

**The foundational requirements for facilitating quantum integration include:**

**Digital innovation**

Strategic partnerships between academia, industry, and government are needed to develop quantum literacy and expertise, create the necessary talent pools and democratize access to quantum resources.

**Digital regulation and public administration**

Frameworks, particularly for quantum-resistant cryptography, will need to offer clear security guidance through international standards and governance models, while fostering innovation and ensuring interoperability.

**Digital infrastructure**

Investments in hybrid quantum-classical digital infrastructure will enable organizations to build their quantum capabilities incrementally, balancing near-term results with long-term readiness.

## Recommendations

### Private sector

**Establish quantum security task forces to assess vulnerabilities**, develop transition plans, and coordinate with industry partners on quantum-resistant security protocols.

**Adopt quantum-resistant security** by investing in quantum-safe cryptography to protect data.

**Create cross-functional quantum literacy programs** that combine technical training with business strategy, ensuring organizations can evaluate both risks and opportunities.

**Invest in hybrid quantum-classical computing capabilities through strategic partnerships**, focusing on practical applications that deliver near-term value while building long-term quantum readiness.

### Public sector

**Formulate and enforce regulatory frameworks** for the adoption of quantum-resistant technologies.

**Set security standards to protect national infrastructure and data** while providing incentives for the early adoption of quantum-resistant cryptography.

**Establish national quantum research centers** that combine academic expertise with industry applications to drive advancements in quantum computing, ensuring that innovations are translated into practical capabilities.

**Create international coordination mechanisms for quantum technology development**, balancing national security interests with the need for global collaboration.

**Regularly review and adapt national cybersecurity strategies** for emerging quantum threats.

### IGOs, IOs, and others

**Foster global dialogue on quantum ethics and governance**, ensuring quantum benefits are equitably distributed across developed and emerging economies.

**Coordinate cross-border quantum security standards and protocols**, enabling secure international transactions in the quantum era.

**Develop global quantum literacy programs and knowledge-sharing platforms** that accelerate workforce development in order to prevent a quantum divide.

CURRENT TREND

# 3.5

# Ensuring a Digitally Safe and Inclusive World

## What does the trend encompass?

Digital spaces are becoming more emotionally engaging, presenting new challenges to trust and security. The rise of AI-powered immersive technologies requires well-designed governance frameworks to protect user safety, wellbeing, and social cohesion within the digital economy.

Three challenges stand out. First, convincing AI-generated content threatens to undermine trust in legitimate information sources, government, media, and democratic processes.

Second, AI companions are rapidly gaining mainstream popularity, outpacing the development of regulatory oversight. Searches for AI companions increased by 2,400% in 2023 alone.[35] These chatbot applications pose risks by potentially exploiting lonely and vulnerable users, collecting extensive personal data, and fostering addiction as well as emotional dependency. Current monetization rates of US$0.03 per hour are projected to increase fivefold as companies develop more sophisticated engagement strategies.[36]
Third, as social interaction moves into more immersive virtual environments such as the metaverse, it becomes crucial to protect vulnerable users from harassment, manipulation, and exploitation while promoting accessibility and inclusion for all.

## Why is it important?

Lessons from social media's impact on psychological health indicate that emerging technologies could amplify existing challenges around social isolation, manipulation, and erosion of trust, undermining mental well-being and reshaping social structures. The collection and monetization of emotional data, combined with advanced psychological profiling capabilities, creates an urgent need for protective frameworks. The risks are potentially pronounced for young and socially isolated individuals, who may be particularly vulnerable to manipulation or exploitation where seeking emotional support.

**Societal risk:** The World Economic Forum ranks misinformation and disinformation as the leading threat to society in the next two years.[33]

**Coalition for Content Provenance and Authenticity:** Leading technology and media companies have come together in the Coalition for Content Provenance and Authenticity to develop shared technical standards and protocols to combat misinformation by enabling people to trace the origin and evolution of digital content.[34]

**AI companion apps:** According to Mozilla Foundation research, over 90% of AI companion apps share or sell sensitive data to third parties, including information about a user's emotional and psychological state.[37]

The market for AI companion services could be worth US$57 billion by 2030.[38]

**Using technology to foster community:** The US Surgeon General calls for a balanced approach to technological adoption, encouraging the use of digital platforms to bridge physical distances and foster global interactions while implementing safeguards against their potential to contribute to social isolation, emotional detachment, and misinformation.[39]

Collaborative action is urgently needed to protect social cohesion and user well-being as AI-enabled technologies reshape digital engagement, trust, and relationships. This includes creating robust frameworks for content authentication and synthetic media detection,[42] implementing comprehensive protections for emotional and psychological data,[43] and developing digital governance approaches that foster innovation while preserving human connection and trust.[44]

Reels over real: Over the past decade, time spent with friends has decreased by 40% while social media use has doubled.[40]

## Impacts on the horizon

The convergence of AI companions, synthetic media, and immersive technologies will fundamentally transform how society builds trust, sustains relationships, and protects vulnerable populations within the digital economy.

Trust in institutions could be eroded as synthetic media becomes increasingly sophisticated.

AI-driven relationships could see the emergence of new social patterns and mental health challenges, while the growth of platforms monetizing emotional data underscores the urgent need for regulatory oversight.

"Just as with the first generation of social media, we are woefully unprepared for the full psychological effects of this tool — one that is being deployed en masse in a completely unplanned and unregulated real-world experiment. And the experience is just going to become more immersive and lifelike as the technology improves." James Muldoon, author, *Why More People are Falling in Love with Chatbots*.[41]

# Survey findings

### When will these trends materialize?

Most survey respondents expect this emerging trend to materialize is 2029. It will take time to address the technical, regulatory, and societal challenges of creating robust digital governance frameworks, building digital resilience, and ensuring equitable access across diverse economies and user bases.

*Figure 80: Trend 3.5 - Likely materialization*

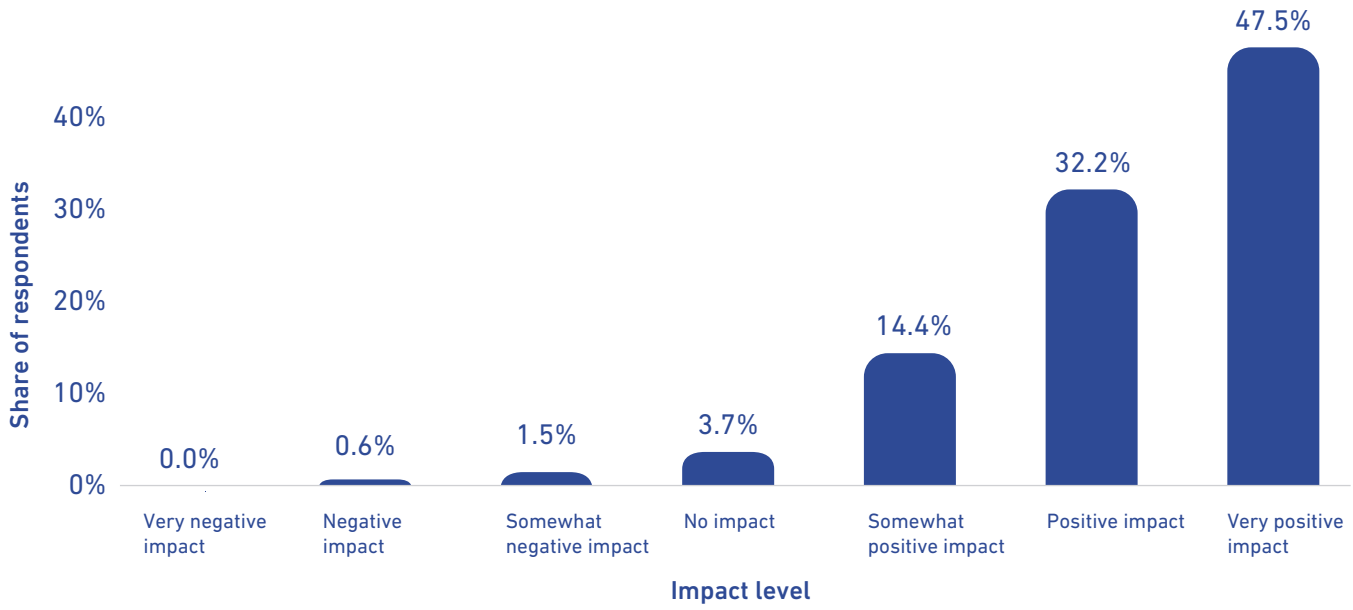

**Source:** *DCO 2024 Digital Economy Trends Survey.*
**Q:** *At a global level, when do you expect the following emerging Digital Economy trends to affect businesses and societies?*

**Respondents:** *240 CTOs and senior technologists working in large companies (+250 employees), 59 policymakers, and 38 digital economy experts.*

### Socio-economic impact

Almost half of survey respondents expect the Ensuring a Digitally Safe and Inclusive World trend to deliver a very positive socio-economic impact. Corporate respondents demonstrate a higher level of confidence than experts and government respondents. Professionals from the technology, media, and communications sector, which will be the most affected by this trend, are more optimistic than average, with 59% expecting a very positive impact. Respondents from Latin America and Indo-Asia and Pacific are more positive than those from Europe and North America.

*Figure 81: Trend 3.5 - Expected socio-economic impact in 3-5 years*




**Source:** *DCO 2024 Digital Economy Trends Survey.*
**Q:** *At a global level, to what extent do you believe the following emerging trends will have a net positive or negative socio-economic impact in the next 3-5 years?*
**Respondents:** *240 CTOs and senior technologists working in large companies (+250 employees), 59 policymakers, and 38 digital economy experts.*

## Asking AI

**Prompt:**
**"Act as a global expert on the digital economy. What are the potential near-term benefits, challenges, and considerations for the trend of 'Ensuring a Digitally Safe and Inclusive World'?**

### Response from Llama 3.1

**Benefits**

Improved online safety through AI-powered content moderation, enhanced cybersecurity measures, and increased digital literacy, leading to greater trust and confidence in digital interactions.

**Challenges**

Balancing online safety with freedom of expression, addressing the digital divide and unequal access to digital technologies, and mitigating the risks of digital addiction and mental health impacts.

**Considerations**

Developing inclusive and accessible digital infrastructure, ensuring diversity and representation in AI development, and establishing global standards for online safety and digital human rights.

*Note: These insights from LLMs are not data driven. They are provided as directional and sentimental and the LLMs have not had access to the survey data.*[45]

## Key enablers

**Technological, regulatory, and social interventions will all be critical:**

**Digital innovation**

Advanced authentication systems combining AI detection, blockchain verification, and user protection tools to enhance digital safety and inclusion.

**Digital regulation and public administration**

Clear regulatory frameworks defining boundaries for emotional data collection and synthetic content creation.

**Digital capabilities**

Comprehensive digital literacy programs empowering users while protecting vulnerable populations.

## Recommendations

### Private sector

**Implement AI content detection, content moderation, and authentication systems** in core digital products.

**Establish clear data governance** for emotional AI and users' psychological data.

**Develop transparent, ethical AI business models** that protect vulnerable users.

**Enhance user safety in immersive environments** with AI moderation and real-time reporting to prevent exploitation and harm.

### Public sector

**Create regulatory frameworks for synthetic media and AI companion oversight**, consumer protection, digital safety, to ensure the protection of citizens in the digital space.

**Fund digital literacy programs and integrate these into educational curriculums** at all levels to equip citizens with the skills needed to navigate online spaces safely and responsibly.

**Establish standards for emotional data collection**, processing, usage, and protection via digital solutions and platforms.

### IGOs, IOs, and others

**Coordinate cross-border standards** for online content authentication and verification.

**Develop shared frameworks for the online protection** of vulnerable populations globally.

**Lead research into the societal impacts** of AI-mediated relationships.

**Advocate for the establishment of an international oversight committee** to enforce, monitor, and report on digital safety to ensure inclusivity and that marginalized voices are represented.

CURRENT TREND

# 3.6 Governing Superintelligent AI

## What does the trend encompass?

Superintelligent AI promises to be a watershed moment in human civilization. By processing and analyzing vast amounts of data at unprecedented scale and speed, it could reveal solutions to humanity's most pressing challenges that have eluded human discovery — from health to climate change to clean energy to sustainable development. However, it could also be capable of unleashing tremendous harm.

Humans have a limited window to develop effective oversight mechanisms before superintelligent AI emerges. While expert predictions about its arrival vary dramatically, from years to centuries, the complexity of establishing robust governance frameworks demands prompt and coordinated action. Historical precedents show that international cooperation is achievable for technologies that pose existential risks, such as nuclear weapons and advanced biological research.

Governance frameworks must balance encouraging innovation with ensuring equitable access, maintaining democratic principles, and ensuring a diversity of voices in decision-making processes. The challenge combines technical complexity, ethical considerations, geopolitical dynamics, and market concentration, with three nations dominating research capabilities and five organizations controlling 75% of global AI compute resources.[47] Current efforts to govern LLMs are providing a valuable testing ground.

## Why is it important?

Superintelligent AI could profoundly shape humanity's future in ways that are still emerging. By taking proactive steps now, the global community can shape development pathways that maximize benefits while minimizing risks. Coordinated international action could lead to unprecedented cooperation in scientific research, cybersecurity, and global stability; equitable access to health, education, and economic opportunities; and coordinated responses to global challenges. A fragmented approach risks exacerbating global inequalities.

**Rise of the machines?:** A 2023 survey of AI researchers suggests a 50% probability of achieving "high-level machine intelligence", in which machines can beat humans at every task, by 2047.[46]

**Use case:** In November 2023, the UK government launched the AI Safety Institute to evaluate AI capabilities against safety benchmarks and develop protocols for responsible AI development.[48]

**Oligopoly in AI:** AI infrastructure is largely controlled by major companies such as Amazon, IBM, Google, Oracle, and Microsoft.[49] AI funding is dominated by the US and China[50] and its research output is predominantly produced by the same countries plus the UK.[51]

**Use case:** In 2023, the US National Artificial Intelligence Advisory Committee proposed a new multi-agency institutional structure to "create safe AI ecosystems in the U.S. and help lead other nations in doing the same". Its recommendations include collaboration with industry, academia, and international partners to identify and manage risks.[52]

## Impacts on the horizon

Superintelligent AI promises to transform the digital economy by driving productivity gains and will call for governance to prevent the concentration of power.

Access and distribution models in the digital economy will determine whether superintelligent AI bridges or widens global inequalities and builds or undermines security and trust.

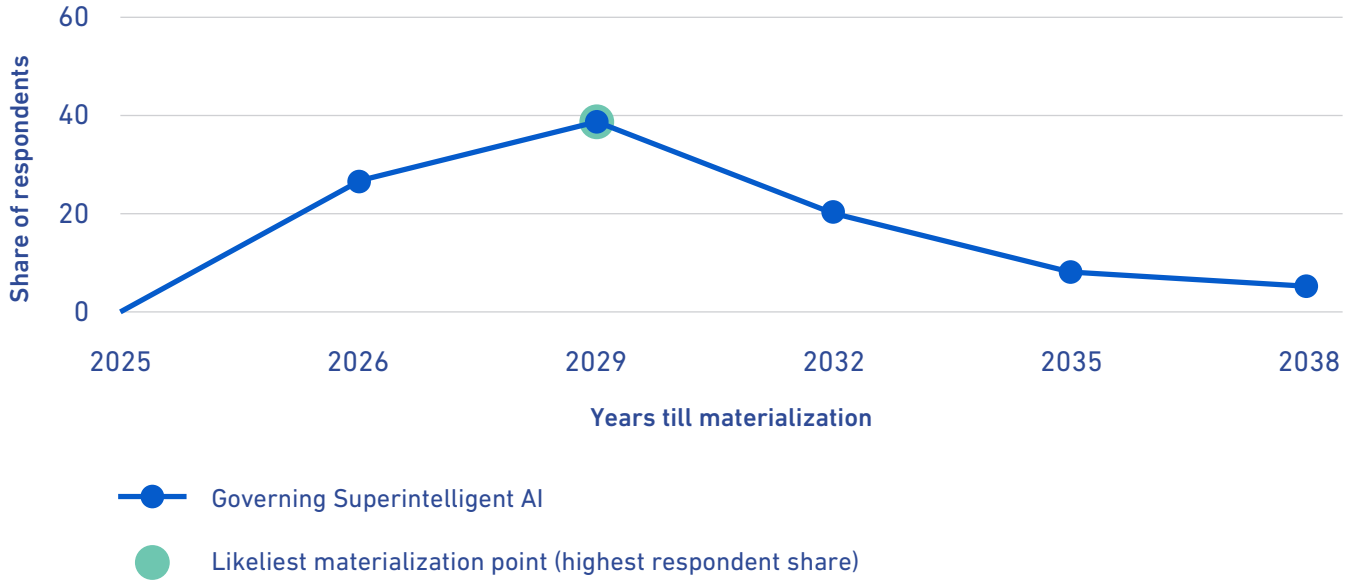
Breakthroughs in climate, health, and energy research are likely to occur and will depend on the equitable sharing of AI research capabilities.

# Survey findings

### When will the trends materialize

Around 40% of survey respondents expect this emerging trend to materialize around 2029. Most of the remainder expect longer rather than shorter timescales. Substantial complexities are associated with creating governance frameworks for such a potentially transformative technology.

*Figure 82: Trend 3.6 - Likely materialization*




**Source:** *DCO 2024 Digital Economy Trends Survey.*
**Q:** *At a global level, when do you expect the following emerging Digital Economy trends to affect businesses and societies?*

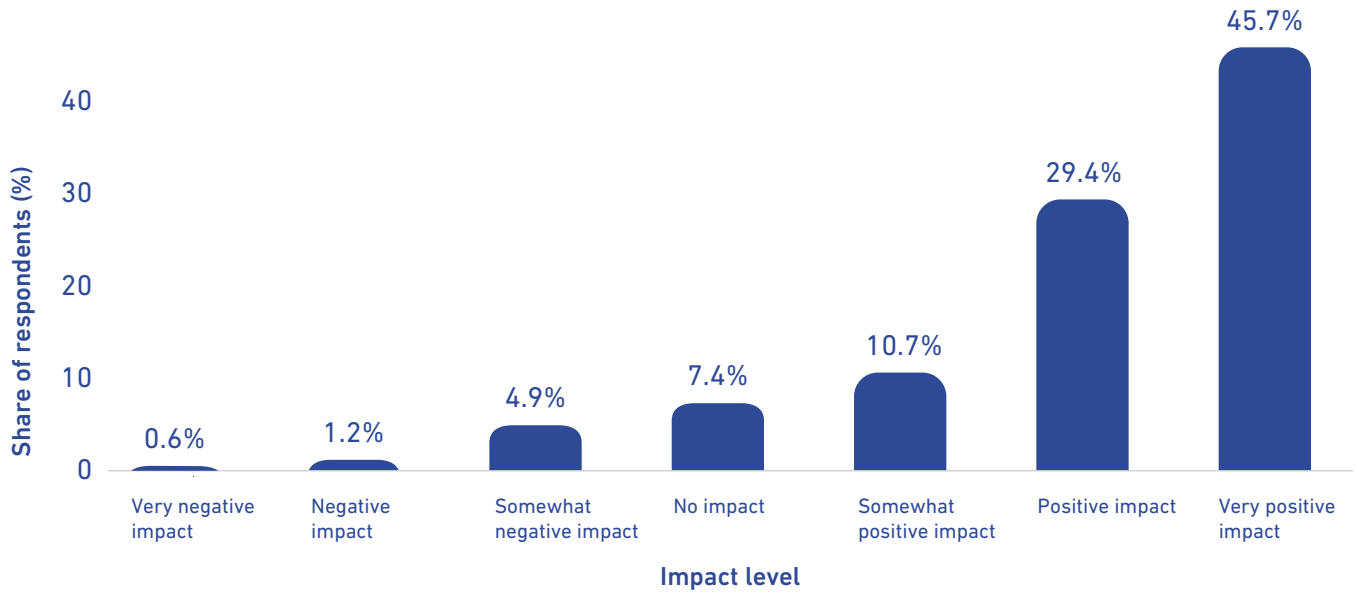
**Respondents:** *240 CTOs and senior technologists working in large companies (+250 employees), 59 policymakers, and 38 digital economy experts.*

### Socio-economic impact

About three-quarters of respondents view Governing Superintelligent AI as having a positive or very positive socio-economic impact in the next 3-5 years, ranking it third among six emerging trends. However, it also has the highest share of respondents expecting negative or no socio-economic impact.

Optimism varies regionally, with 60% of Indo-Asia and Pacific respondents expecting a very positive impact, compared with just 35% in Europe. The private sector is particularly optimistic, with 81% foreseeing positive or very positive impacts, especially among technology, media, and communications professionals, while public sector respondents are more cautious, with 64% expecting positive outcomes.

*Figure 83: Trend 3.6 - Expected socio-economic impact in 3-5 years*




**Source:** *DCO 2024 Digital Economy Trends Survey.*
**Q:** *At a global level, to what extent do you believe the following emerging trends will have a net positive or negative socio-economic impact in the next 3-5 years?*
**Respondents:** *240 CTOs and senior technologists working in large companies (+250 employees), 59 policymakers, and 38 digital economy experts.*

## Asking AI

**Prompt:**
**"Act as a global expert on the digital economy. What are the potential near-term benefits, challenges, and considerations for the trend of 'Governing Superintelligent AI'?**

### Response from ChatGPT-4o

**Benefits**

Super intelligent AI can drive unprecedented innovation and efficiency across industries, addressing complex global challenges like healthcare and climate change.

**Challenges**

Ensuring ethical use and preventing misuse of AI poses significant regulatory and societal hurdles, particularly around bias, privacy, and control.

**Considerations**

Robust governance frameworks, global collaboration, and proactive regulation are critical to align AI advancements with human values and safety.

*Note: These insights from LLMs are not data driven. They are provided as directional and sentimental and the LLMs have not had access to the survey data.*[53]

## Key enablers

**The foundation for effective digital governance rests on these enablers:**

**Digital infrastructure**

Advanced monitoring systems and testing frameworks to evaluate AI capabilities and enforce evolving safety standards along with transparent protocols and verification measures.

**Digital regulation and public administration**

Specialized governance bodies with technical expertise on AI and enforcement authorities that can work seamlessly across jurisdictions.

**Industry digital transformation**

Dynamic forums and mechanisms that enable rapid responses to emerging challenges, develop thoughtful long-term strategic planning, and strengthen trust across public, private, and civil society actors.

## Recommendations

### Private sector

**Actively participate in discussions with governments, NGOs, and other stakeholders** to shape policies that balance innovation with public safety and trust.

**Proactively adopt transparent development practices**, including regular reporting on safety research and capability advancements as a means of fostering collaboration and trust among stakeholders for more informed regulatory responses.

**Integrate robust safety protocols into every stage of the AI development lifecycle** including risk assessments, red-teaming exercises to test for vulnerabilities and potential misuse, and the development of kill switches or other mechanisms to control rogue AI.

**Prioritize and invest in research focused on the alignment and control of superintelligent AI.** Support independent research efforts, collaborating with academic institutions, and engaging with international organizations focused on AI safety.

### Public sector

**Establish specialized AI oversight bodies equipped with technical expertise and enforcement authority** to be responsible for developing and implementing regulations, monitoring compliance, and coordinating with international partners to address the global challenges of superintelligent AI.

**Invest in robust public sector computing infrastructure** to facilitate independent research, testing, and evaluation of advanced AI systems as a means for developing countermeasures to potential threats.

**Prioritize the development of adaptive regulatory frameworks** that can evolve alongside advancements in AI capabilities to ensure that regulations remain relevant and effective as AI systems become more complex and powerful.

**Proactively invest in workforce reskilling programs** that emphasize AI literacy, adaptive learning, and collaboration with private sector innovations

### IGOs, IOs, and others

**Establish an international agency specifically dedicated to governing superintelligent AI** that would be modeled after organizations like the International Atomic Energy Agency, which would have the authority to inspect AI systems, mandate audits, set safety standards, and impose restrictions on deployment to ensure responsible development and mitigate potential risks.

**Establish protocols and frameworks to address potential misuse or accidents involving superintelligent AI**, including rapid response teams and international cooperation mechanisms for AI-related emergencies.

**Facilitate multilateral dialogue and agreements with governments, private sector, academia, and civil society** to foster consensus on critical issues such as transparency, accountability, and equitable access to AI technologies.

**Develop a global framework for governing the access, use, and distribution of large-scale computing resources** essential for developing advanced AI to address concerns about concentration of power. Provide equitable technology transfers, access to resources, and robust support for responsible development practices.

# Conclusion

In this second edition, the **DCO Digital Economy Trends 2025** builds on the foundation of the first edition to provide a comprehensive analysis of the key trends shaping the digital economy and their implications for stakeholders.

The report highlights the unprecedented potential of the digital economy to drive innovation and growth in 2025: it is anticipated to expand three times faster than the global economy as a whole. Yet, the trends will impact sectors, industries, regions, and individuals in different ways as well as raising new challenges such as cybersecurity, digital exclusion, and environmental sustainability.

The evolution of the digital economy will ultimately depend on how the 18 trends outlined in this report are leveraged by stakeholders. Their decisions will shape aspects such as business models, consumer behavior, innovation, production methods, and the global exchange of digital goods and services. Leaders in all communities should take an active, forward-looking, and collaborative approach on the following key areas:

- **Ethical innovation:** Policymakers and industry leaders should prioritize frameworks that **integrate ethical guidelines into technological development, ensuring that innovation aligns with societal well-being and environmental sustainability**. These frameworks should support the creation of sustainable intelligent ecosystems, empower communities through inclusive digital growth, and enhance trust and security in the digital economy. By addressing aspects such as collaborative data ecosystems, digital cultures, and governance of super-intelligent Artificial Intelligence (AI). This balance will be essential to foster trust and long-term value in the digital economy.

- **Public-private collaboration:** Stronger partnerships between the public and private sectors, supported by international organizations and civil society, are crucial for accelerating the deployment of digital public infrastructure, driving digital transformation, and advancing digital skills development. These collaborations should also focus on **harnessing sustainable intelligent ecosystems by deploying localized AI and strengthening collaborative data frameworks, empowering communities through continuous learning and inclusive digitalization, and ensuring trust and security through enhanced governance and cybersecurity.** Optimized collaboration models should focus on aligning goals, pooling resources, and leveraging complementary expertise to address the diverse needs of sectors, industries, and regions.

- **Equitable access:** Mechanisms must be established to ensure that new technological advancements are affordable and accessible to all, mitigating risks such as digital exclusion, job displacement, and excessive energy consumption. This requires fostering inclusive digital policies that expand global connectivity and empower communities through digital skills development and continuous learning by providing targeted subsidies. Additionally, it is vital to prioritize **trust and security by advancing industrial policies and ensuring a digitally safe and inclusive world**, creating a foundation for equitable participation in the evolving digital economy.

Ultimately, realizing the full potential of the digital economy going forward will demand not just technological advancement, but a fundamental commitment to inclusive digital governance, environmental responsibility, and equitable access to digital opportunities. Through collaborative action and targeted investments, leaders can help shape a digital economy that truly serves the broader interests of society.

# Appendix

## Methodology

The research behind the DCO Digital Economy Trends 2025 report followed a rigorous methodology to identify and assess the impact of trends. The following section explains the methodology in detail.

### Definitions

**Digital economy**
The economic activity reliant on, significantly enhanced, or enabled by digital technologies and their applications. This includes activities that increase human well-being or lead to social or environmental benefits.

**Trend**
In the context of this report, a digital economy trend results from the emergence/deployment of a digital technology or platform that supports or accelerates innovation, access to information and services, and connecting individuals, communities, and markets. A digital economy trend offers measurable, positive financial, social, and/or environmental benefits. Trends are differentiated by:

- **Current trends -** time horizon: 12-18 months; demonstrated impact on stakeholders; certain (ongoing).
- **Emerging trends -** time horizon: longer, e.g. 3-5 years; no impact yet and not yet ongoing; future impact and trajectory uncertain, but potentially disruptive.

A trend must have a discernable/measurable evolution/path (increasing/rising/falling).

**Enabler**
An enabler is a physical, human, financial, policy, or regulatory factor necessary to establish and/or accelerate the evolution and impact of a trend, e.g. physical communication networks or data storage; data regulation. Generally, enablers fall under the powers of the state or forms of public-private agreements.

### Trend identification process

The 2025 Digital Economy Trends set consists of 12 current and 6 emerging trends, which were identified through a three-step process:

1. Literature review of various sources on the digital economy by international organizations, think-tanks, consulting firms, academic papers, etc.
2. A long list of trends selected based on DET trend criteria (see below). The long list is then streamlined based on further research.
3. The final list was validated by experts in an expert workshop (see the acknowledgement section of this report for full list of experts).

## DET trend criteria

The following criteria were applied to select these trends:

1. **Expected impact:** the digital trend is anticipated to make a positive impact on at least one of four key impact areas:
   - Access to information, insights, and knowledge
   - Access to markets and geographies
   - Improved operational efficiency
   - Strengthening relationships with customers, communities, and citizens

2. **Time horizon:**
   - **Current**: the trend's impact is already measurable and/or anticipated to grow in the near-term (12-18 months).
   - **Emerging**: the trends are starting to materialize but it is difficult to identify how/when they will impact the digital economy.

3. **Scope:** the trend forms part of the digital economy and affects business, the environment, and society in emerging and advanced economies, across multiple regions and industries (> 3).

4. **Relevance:** the trend is/will be relevant to governments, international organizations, business, technology innovators, and society at large.

Trends that would be considered as intentionally disruptive attacks or acts of war, or trends that might advantage individual countries but would be harmful at the global level, were **excluded**.

To assess the impact of the trends, each trend was assessed based on three data sources:

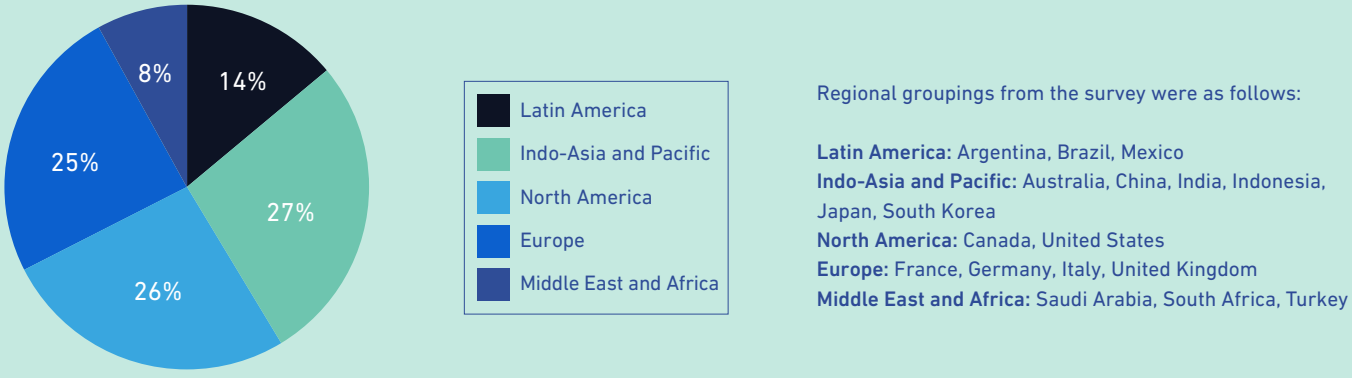
- CTO survey
- Global expert survey
- Secondary data from reputable organizations to complement the survey

## Survey methodology

The CTO survey:

1. Target: CTOs and senior technologists from companies with more than 250 employees and active in at least two countries
2. Geographic coverage: G20 countries, regional distribution (see Figure A1)
3. Method and time: online in October-November 2024
4. Survey content: the survey consisted of 24 questions in total

*Figure 84: CTO survey respondents by region*




Regional groupings from the survey were as follows:

**Latin America:** Argentina, Brazil, Mexico
**Indo-Asia and Pacific:** Australia, China, India, Indonesia, Japan, South Korea
**North America:** Canada, United States
**Europe:** France, Germany, Italy, United Kingdom
**Middle East and Africa:** Saudi Arabia, South Africa, Turkey

*Source: Authors' calculations*

### The global expert survey

1. Target: 60 policymakers at both the federal and state level (if applicable) from G20 countries and 40 experts from the Horizon Group expert network from academia, civil society, and think-tanks relevant to the digital economy
2. Geographic coverage: Global
3. Method and time: Online in October-November 2024

Following survey data collection, the data underwent a cleaning process to detect unusual patterns in individual responses. Responses not meeting the quality criteria (response time, pattern, etc.) were discarded.

## Mapping of DCO Digital Economy Trends 2024 to the 2025 trend set

The trend set has evolved between 2024 and 2025. However, the 2025 trend set builds on the important work done in 2024. The two trend sets ensure continuity and can be mapped as follows (current trends: no 1-12 and emerging trends no 13-18).

| No. | Trends 2025 | Corresponding trends 2024 |
|---|---|---|
| 1 | Deploying Specialized, Accessible, and Localized AI | Accelerating Environmental Sustainability Through Gen AI |
| 2 | Delivering Hyper-Personalization | Industry 5.0 and Circular Economy<br>Hyper-personalization through virtual experiences |
| 3 | Evolving Digital Governance | AI-Powered Digital Government |
| 4 | Extending Global Connectivity | No correspondence |
| 5 | Powering a Sustainable Digital Economy | Green Technologies<br>Blockchain's Green Revolution |
| 6 | Increasing Resources for Cybersecurity | Risk-averse IoT<br>Safeguarding in the Digital Age |
| 7 | Strengthening Collaborative Data Ecosystems | Interconnected digitized cities |
| 8 | Building Digital Skills and Continuous Learning | No correspondence |
| 9 | Advancing Industrial Policies for the Digital Economy | Regulation for Green Transformation |
| 10 | Accelerating Breakthrough Scientific Discoverie | Sustainable Agri-tech |
| 11 | Strengthening Digitalization of Financial Services | Blockchain-based Transparent Governments |
| 12 | Evolving Digital Cultures, Social Connections, and Behaviors | No correspondence |
| 13 | Embracing Immersive Hybrid Experiences | Amplified Gaming |
| 14 | Preparing for the Quantum Era | The Future of Defense |
| 15 | Deploying Autonomous Systems at Scale | Gen AI for Cutting-Edge Software Development |
| 16 | Ensuring a Digitally Safe and Inclusive World | No correspondence |
| 17 | Utilizing New Types of Data | No correspondence |
| 18 | Governing Superintelligent AI | No correspondence |

## Prompts used for 'Asking AI' boxes

The following prompts were used for the Asking AI boxes throughout the text.
For current trends the following prompt was used:

**Digital Economy definition:** The economic activity reliant on, significantly enhanced, or enabled by digital technologies and their applications. This includes activities that increase human well-being or lead to social or environmental benefits.

**Trend definition:** In the context of this report, a digital economy trend results from the emergence/deployment of a digital technology or platform that supports or accelerates innovation, access to information and services, and connecting individuals, communities, and markets. A digital economy trend offers measurable, positive financial, social, and/or environmental benefits.

*Trend analysis from the DET report for each current trend. This was updated for each trend.*

**Q1a. At a global level, growth of the Digital Economy was 6% in 2023, what do you expect it to be in 2025? (Group 2 & 3)**

Below 6%
About 6%
About 7-8%
About 9-10%
Above 10%

**Q2. How would you assess the economic impact of these current digital trends in the next 12-18 months, at the global level (Group 1, 2 & 3) RANDOMIZE OPTIONS**

7: Very positive impact
6: Positive impact
5: Somewhat positive impact
4: No impact
3: Somewhat negative impact
2: Negative impact
1: Very negative impact
I don't know

**Q3. How would you assess the social impact of these current digital trends in the next 12-18 months at the global level.**

7: Very positive impact
6: Positive impact
5: Somewhat positive impact
4: No impact
3: Somewhat negative impact
2: Negative impact
1: Very negative impact
I don't know

**Q.4 How would you assess the environmental impact of these current digital trends in the next 12-18 months at the global level.**

7: Very positive impact
6: Positive impact
5: Somewhat positive impact
4: No impact
3: Somewhat negative impact
2: Negative impact
1: Very negative impact
I don't know

Based on the information provided in this message, I want you to answer Q.1 to Q.4 from your perspective. Provide a score on the 1-7 scale (defined as above) for each of the relevant questions (Q.2-Q.4). Alongside, provide a one-two sentence explanation for your scoring for each of the questions separately.

For emerging trends, the following prompt was used:
Act as a global expert on the digital economy. What are the potential *near-term benefits, challenges, and considerations for the trend of [insert trend]. Please respond in three bullet points.*

# Glossary

**API (Application Programming Interface):** A set of protocols, tools, and definitions that allow different software applications to communicate with each other, enabling the integration of functionalities and data across systems.

**Algorithm:** A set of programmed instructions used to process data, automate tasks, optimize processes, and drive decision-making in applications such as AI, data analysis, and digital services.

**Artificial intelligence:** The simulation on machines of human intelligence processes such as learning (acquiring information and rules for using it), reasoning (using rules to reach approximate or definite conclusions), and self-correction.

**AR (Augmented Reality):** A technology that overlays digital content, such as images, sounds, or information, on to the physical world in real-time through devices like smartphones, tablets, or AR glasses.

**Avatars:** Digital representations of users or characters in virtual environments, often used in gaming, social media, and virtual worlds to enable interaction and self-expression in the digital world.

**Big data:** Large, complex datasets that are too vast or fast-moving for traditional data processing tools to handle, often analyzed to uncover patterns, trends, and insights for decision-making in various industries.

**Blockchain:** A decentralized, distributed ledger technology that securely records transactions across multiple computers, ensuring transparency, immutability, and trust without the need for a central authority.

**Cloud computing:** The delivery of computing services, including storage, processing, and software, over the internet, allowing users to access and manage data and applications remotely without the need for on-site infrastructure.

**Cryptography:** The practice of securing communication and data through techniques such as encryption and decryption, ensuring privacy, integrity, and authentication in digital transactions and information exchanges.

**Data fabric:** An integrated data architecture that unifies disparate data sources through technologies like metadata management and data virtualization. It enables seamless access, governance, and delivery of real-time data across environments for both operational and analytical use cases.

**Digital public infrastructure (DPI):** DPI encompasses foundational digital systems that enable societal participation by providing secure platforms for digital identity verification, payments, and data sharing. These systems are designed to be inclusive, interoperable, and publicly accountable.

**Digital Twin:** A virtual replica of a physical object, system, or process that simulates its real-world counterpart in real-time, enabling monitoring, analysis, and optimization through data-driven insights.

**Edge AI:** The deployment of AI algorithms and data processing on local devices near the source of data generation (the 'edge' of the network). This approach reduces latency and enhances privacy by processing data locally rather than in centralized cloud systems.

**Edge computing:** A decentralized computing model that processes data closer to its source, such as on devices or local servers, to reduce latency, enhance speed, and improve efficiency in real-time applications.

**Federated learning:** A machine learning approach that trains models across multiple decentralized devices or servers while keeping the data localized. This ensures privacy and reduces reliance on centralized data storage.

**Gamification:** The integration of game-like elements, such as points, rewards, and challenges, into non-game contexts to engage users, encourage desired behaviors, and enhance user experiences in digital platforms and services.

**Generative AI:** AI systems capable of creating new content such as text, images, audio, or code by learning patterns from existing data and generating outputs that mimic human creativity.

**Homomorphic encryption:** A form of encryption that allows computations to be performed directly on encrypted data without requiring decryption.

**IoT (Internet of Things):** A network of interconnected devices embedded with sensors and software that communicate and exchange data over the internet, enabling automation, monitoring, and enhanced decision-making in various industrial contexts.

**Latency:** The time delay between a user's action or data request and the system's response, often measured in milliseconds, crucial in evaluating the performance of networks, applications, and devices.

**LLM (large language model):** A type of deep-learning AI model trained on extensive datasets to generate coherent, human-like outputs based on input prompts.

**Low-code/no-code:** Software development environments that enable individuals with minimal coding knowledge to create applications, for example by providing a graphical user interface with drag-and-drop components.

**Machine learning:** A subset of AI that enables systems to learn and improve from data without explicit programming, by identifying patterns and making predictions or decisions.

**Metadata:** Data that provides information about other data, such as its origin, format, structure, and context, helping to organize, manage, and retrieve

information more efficiently.

**Multi-modal AI application:** An AI system that integrates and processes multiple types of data, such as text, images, audio, and video, to perform complex tasks and provide richer, more context-aware outputs.

**Open-source:** A development model where software, code, or resources are made freely available to the public, allowing anyone to view, use, modify, and distribute them under an open license.

**Quantum computing:** A revolutionary computing technology that leverages the principles of quantum mechanics to process information in ways that traditional computers cannot, enabling faster and more efficient solutions for complex problems like cryptography, optimization, and simulations.

**Red-teaming:** A cybersecurity practice where a group of ethical hackers, known as a 'red team', simulates real-world attacks to identify vulnerabilities, test defenses, and improve the security of systems, applications, or organizations.

**Sandboxes:** Controlled, isolated environments used for testing and experimenting with new software, technologies, regulatory requirements, or applications without affecting existing systems or data integrity.

**Synthetic data:** Artificially generated data created using algorithms or simulations to mimic real-world data, used for training machine learning models, testing systems, and preserving privacy.

**Synthetic media:** Digital content created or altered using artificial intelligence and machine learning technologies, including deepfakes, AI-generated text, images, and videos, often used for entertainment, marketing, or misinformation purposes.

**Spatial computing:** The integration of physical and digital worlds through technologies like augmented reality (AR), virtual reality (VR), and spatial sensors, allowing for the interaction, visualization, and manipulation of data in three-dimensional space.

**Spatial simulations:** Virtual models that replicate real-world environments or scenarios in three-dimensional space, enabling users to interact with and analyze geographic, architectural, or operational data for decision-making, planning, and optimization in the digital economy.

**VR (virtual reality):** A technology that creates a fully immersive digital environment, often experienced through a headset, allowing users to interact with and explore simulated worlds in a way that feels real.

**XR (extended reality):** An umbrella term that encompasses immersive technologies such as virtual reality (VR), augmented reality (AR), and mixed reality (MR), blending physical and digital environments for exploring simulated worlds and interactive experiences.

# Notes

## Executive summary & introduction

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