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Enabling digital transformation through international standards



Practical guidance for policymakers and stakeholders in developing and emerging economies

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Foreword from the Foreign, Commonwealth and Development Office (FCDO)

Digital technologies are transforming economies and societies at unprecedented speed, creating new opportunities for economic growth, innovation, public service delivery, social inclusion and environmental sustainability. However, the emergence of AI and other advanced digital technologies also risks widening and deepening the 'digital divide', unless developing and emerging countries are equipped with the digital capability and governance frameworks needed to participate safely and effectively in a changing digital world.

FCDO works hand in hand with partner countries to promote a more inclusive, responsible and sustainable digital transformation, as set out in the FCDO's *Digital Development Strategy 2024-2030*. This recognizes that digital transformation is not just about deploying technology or investing in infrastructure. It is also about building trust, managing risk, strengthening institutions, promoting inclusion and ensuring that digital innovation delivers benefits for all.

International standards play a vital role in achieving these digital development objectives. They provide globally recognized frameworks that promote security, interoperability, transparency, resilience and accountability across digital ecosystems. Standards help governments, businesses and citizens navigate rapid technological change with confidence. They enable innovation while reducing risk, facilitate cross-border trade and investment, and support the development of trusted digital infrastructure and solutions.

Through the UK Digital Access Programme, FCDO has worked since 2019 with partner countries in Africa, Asia and Latin America to catalyze digital foundations such as last-mile connectivity, digital skills, accessible digital services and online safety – thereby expanding opportunities for digital inclusion, building more trusted and resilient digital ecosystems and charting pathways for enhanced economic growth and social development.

A key element of this work is FCDO's long-standing partnership with the British Standards Institution (BSI), the UK's National Standards Body (NSB) and a globally respected leader in standards development, capacity building and knowledge sharing. Together, FCDO and BSI have demonstrated how standards can serve as practical tools for digital transformation, helping policymakers, institutions and businesses translate digital ambitions into effective and sustainable outcomes.

Continued on next page →



The Standards-led Digitalization Toolkit highlighted in this publication was designed through an innovative, co-created FCDO-BSI project, as part of the UK Digital Access Programme. It combines international good practice with local ownership and practical adoption, supporting partner countries to strengthen digital trust and institutional resilience.

Through implementation in Brazil, Indonesia, Kenya, Nigeria, South Africa and Vietnam, this project has demonstrated how standards can enable essential components of digital transformation, e.g. improved cybersecurity, data protection, digital identity, interoperability, cloud services and responsible AI governance. The Standards-led Digitalization Toolkit's process showed that successful digital transformation requires collaboration across government, industry, standards bodies, regulators, academia, and civil society. It also demonstrates the importance of investing in national quality infrastructure, standards adoption, skills development and institutional capacity as key factors in digital transformation.

Digital development benefits from the use of international standards developed through organizations such as the International Organization for Standardization (ISO), International Electrotechnical Commission (IEC), and International Telecommunication Union (ITU).

These standards provide trusted, consensus-based solutions that can be adapted to local needs while maintaining global interoperability. As digital technologies continue to evolve, international cooperation becomes increasingly important. Shared standards provide a common language that helps countries work together to address global challenges and seize emerging opportunities.

In this dynamic context, this guidance document offers practical insights for policymakers in emerging economies, as well as regulators, NSBs, digital development practitioners, and other key stakeholders seeking to build secure, inclusive, and trusted digital ecosystems.

We hope that the learnings and experiences presented here will inspire further multi-stakeholder collaboration and encourage wider adoption of standards-based approaches to digital transformation.

By working together, we can help ensure that digital transformation remains inclusive, responsible, and sustainable, enabling all countries and communities to participate confidently in the digital economy of the future.

FCDO is proud of the impact that the UK Digital Access Programme is delivering across the world through its partnership with developing and emerging countries, and with local and international organizations. Together, we are building the trusted digital foundations needed for sustainable and inclusive economic and social development. Within this broader programme, the collaboration with BSI on the Standards-led Digitalization Toolkit stands out for its innovative and practical approach. We recommend this publication to policymakers, practitioners, and all those seeking to harness digital technologies for inclusive growth and lasting development.



Alessandra Lustrati
Head of Digital Development, FCDO

Foreword from the British Standards Institution (BSI)

As digital transformation accelerates across sectors, it is creating significant opportunities to deliver tangible benefits, from better healthcare outcomes and more accessible government services to greater economic resilience and inclusion. However, digitalization introduces greater complexity, exposing gaps in governance and increasing risks related to cybersecurity, data management and system interoperability. At the same time, disparities in capability and infrastructure continue to widen the digital divide.

In this context, the role of international standards, shaped in IEC, ISO and ITU by national delegations from developed and developing countries, is central.

International standards provide agreed frameworks and practical tools that support the design, implementation and operation of digital systems. They help inform policy and translate policy objectives into consistent and implementable approaches, enabling organizations and governments to manage risk, improve interoperability and support effective governance. In doing so, they contribute directly to building the trust that underpins successful digital transformation.



This guidance has been developed in partnership between the FCDO's UK Digital Access Programme and BSI and draws on experience from delivering the Standards-led Digitalization Toolkit across a number of emerging economies. The work reflects a broader approach to digital development, recognising that technology deployment needs to be supported by institutional capacity, coherent policy frameworks and effective quality infrastructure.

This guidance is intended as a practical resource for a wide range of stakeholders involved in digital transformation, including policymakers, regulators, NSBs, private sector organizations, development partners and academia. It aims to support more informed decision-making by providing insight into how standards can be identified, prioritized and applied in different contexts, and how they can be integrated with wider policy instruments.

Continued on next page →

A key message in this guidance is the versatility of standards for digital transformation. Some standards address the specific requirements of particular sectors, such as healthcare, financial services or energy, while others are cross-cutting, providing common foundations that apply across sectors. Areas such as information security, data governance, digital identity, artificial intelligence and interoperability are relevant in almost all digital environments. Understanding how these different types of standards relate to one another is essential for developing coherent and resilient digital ecosystems.

This highlights the importance of taking an ecosystem view of digital transformation. Effective digital systems depend not only on technology, but also on the alignment of policies, institutions, market structures and skills. Standards play an important role within this ecosystem by providing a link between voluntary good practice and regulatory frameworks, supporting effective and proportionate governance.

Experience from applying standards-based approaches in diverse national contexts demonstrates how they can strengthen national digital environments. Activities such as policy support, institutional capacity building and knowledge sharing have helped to embed standards within digital strategies and improve awareness of their role in managing risk and enabling innovation.

Ultimately, trust remains a critical factor in digital transformation. Confidence in the security, reliability and integrity of digital systems is essential for their adoption and use. International standards contribute to that trust by providing transparency, consistency and assurance.

I encourage all those involved in digital development, particularly policymakers in developing and emerging economies, to engage with this guidance, to make use of relevant standards, and to recognize their central role in supporting inclusive, responsible and sustainable digital transformation.



Scott Steedman, CBE
Director-General, Standards, BSI





Executive summary

Digital technologies are creating new opportunities for economic growth, service delivery and participation in the global economy. At the same time, they introduce increasing complexity and risk, particularly in relation to cybersecurity, data governance, interoperability and institutional capability.

For policymakers in developing and emerging economies, the challenge is not only to adopt digital technologies, but to ensure they are implemented in a coherent and sustainable manner, aligned with national development priorities.

This guidance sets out how international standards can support these digital transformation objectives by providing established frameworks and internationally recognized good practice to guide adoption.

Drawing on country-level experience, it shows how standards can be used to address practical policy challenges, including improving coordination across institutions, promoting more consistent system design, and supporting alignment between policy objectives and implementation.

It is informed by implementation of standards-based approaches across multiple regions, and highlights how these have been used in practice to:

- ✓ improve the consistency and reliability of digital systems;
- ✓ support alignment between policy objectives and implementation;
- ✓ strengthen coordination between government, regulators and National Standards Bodies (NSBs); and
- ✓ provide common reference points for engagement with international partners and markets.

This guidance also emphasizes the importance of embedding standards within a wider institutional and regulatory context. This includes their use within public policy instruments such as procurement, sector regulation and capacity-building programmes, as well as the role of supporting quality infrastructure, including accreditation and conformity assessment. To support practical application, it provides a structured approach for policymakers, covering:

- ✓ assessing national readiness and identifying priority areas;
- ✓ integrating relevant standards into policy and regulatory frameworks;
- ✓ building capacity and quality infrastructure; and
- ✓ implementing, monitoring and refining initiatives over time.

This guidance is intended as a practical reference that can be adapted to different national contexts, supporting policymakers in translating strategic ambition into more consistent and effective implementation.

Indicative priority actions for policymakers (first 12–24 months)

To translate ambition into early results, policymakers may wish to prioritize a small number of actions to support their digital transformation strategies:

1 **Consider establishing a cross-government approach to the use of standards.**

- Strengthen coordination between relevant ministries, regulators and the NSB.
- Identify priority areas where standards can support existing digitalization policy objectives.

2 **Consider prioritizing a limited set of cross-cutting standards for adoption.**

- Focus initially on foundational areas such as information security, data governance, and interoperability.
- Use these to improve consistency across systems and sectors.

3 **Consider integrating standards into digitalization policy and delivery mechanisms.**

- Reference standards in procurement, regulation and programme design.
- Support implementation through capacity-building and guidance.



1.

Digital transformation: Opportunities and risks

1. Digital transformation: Opportunities and risks ›

2. The role of standards in digital transformation ›

3. Sector applications: agriculture, e-commerce, education, energy, healthcare ›

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Overview

> Now comes the second machine age. Computers and other digital advances are doing for mental power – the ability to use our brains to understand and shape our environments – what the steam engine and its descendants did for muscle power.
>
> Brynjolfsson, E., and McAfee, A.
> The Second Machine Age, W. W. Norton & Company, 2014

> As generative AI continues to evolve, we're witnessing a shift in how humans relate to machines—not just as tools, but as partners in learning, healing, and growth.
>
> Zao-Sanders, M. How people are really using AI in 2025,
> Harvard Business Review, 2025

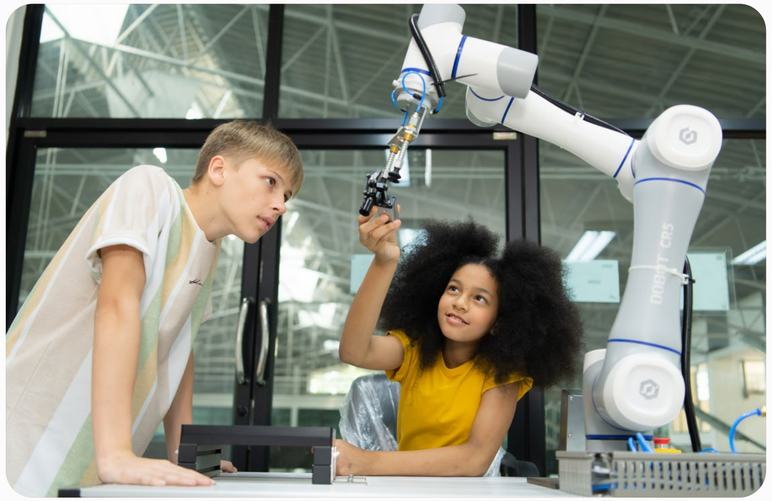
We are living through a period of unprecedented growth in digital transformation. Emerging technologies are reshaping how organizations and individuals interact with digital systems, creating new efficiencies, capabilities, and cross-sectoral economic opportunities.

After early digitalization initiatives in the 1990s, the rate of transformation accelerated in the 2010s, when mainstream cloud computing and mobile internet allowed digital technologies to permeate everyday consumer habits, finance, government and corporate operations.

The current exponential growth was spurred on by the COVID-19 pandemic in the early 2020s, when emerging technologies such as AI, cloud computing, big data analytics, Internet of Things (IoT), digital ledger technology (blockchain) and advanced connectivity began to impact how public and private organizations operate and how services are delivered.

Governments and businesses alike are now investing heavily in digital infrastructure and AI-enabled innovation to improve efficiency, productivity, competitiveness and service delivery.

At the same time, digital transformation is increasingly providing new and innovative opportunities in critical sectors, including healthcare, education, finance, manufacturing, agriculture, and public administration.



Opportunities for digital transformation

The integration of digital technologies across sectors is fundamentally redefining how economies and societies function. From AI-driven finance and data-enabled supply chains to citizen-focused public services, these tools are creating new efficiencies, transparency and pathways for innovation.

Governments, businesses and individuals are realizing tangible benefits through lower transaction costs, streamlined operations and broader access to essential services. Throughout the world, sustained investment and policy momentum are accelerating this transformation, positioning digitalization as a cornerstone of sustainable growth and competitiveness. Policymakers should also take into account multiple interaction layers (e.g. G2G, G2B) and the opportunities digital transformation presents at each one of them (see Table 1).

Different economic sectors have embraced digital technologies with varying levels of adoption, but all have reported significant benefits, with the potential for further growth (see Section 3).

Table 1 – Interactions and opportunities

Layers of interaction	Opportunities
Government-to-government (G2G)	Supports implementation of international agreements and commitments such as the UN 2030 Sustainable Development Goals (SDGs), as well as transparency and accountability in demonstrating progress against the relevant targets.
Government-to-business (G2B) and government-to-citizen (G2C)	Enables seamless and efficient service delivery through digital platforms across society.
Business-to-business (B2B)	Enhances supply chain efficiency via electronic tendering, shared data platforms and digital conformity documentation.
Business-to-consumer (B2C)	Improves customer experience and business transparency in product and service conformity and environmental, social and governance (ESG) considerations.
Consumer-to-consumer (C2C)	Facilitates peer-to-peer digital transactions, including financial and commercial exchanges through online platforms.

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Risks of digital transformation

With opportunity comes risk. As digital transformation expands from sectors such as financial services and agriculture to healthcare, education and public administration, it introduces a widening spectrum of challenges. These include risks related to cybersecurity, online safety, data protection, interoperability, and the resilience of increasingly interconnected systems.

Where digital initiatives are implemented without adequate governance, safeguards, and coordination, costs can escalate and become unsustainable. As technological boundaries extend through cloud adoption and hyper-connectivity, systemic vulnerabilities are amplified, increasing exposure to cyber incidents and data breaches. The average global cost of a data breach has reached US$4.88 million, as detailed in IBM's *Cost of a Data Breach Report* (2025), underscoring the financial and operational consequences of weak protection.

Digital transformation also carries broader societal and environmental implications. Expanding digital infrastructure and data usage can increase energy demand and environmental pressures if not managed responsibly. At the same time, unequal access to digital technologies, skills and infrastructure risks deepening existing inequalities, leaving some individuals, businesses and communities behind.

Alongside these challenges, public trust remains a critical constraint. While adoption of digital technologies, including AI, continues to accelerate, KPMG's Trust, attitudes and use of artificial intelligence: A global study (2025) found that more than half of individuals report concerns about trusting such systems. This trust deficit is not simply a matter of perception; if left unaddressed, it may limit uptake and hinder the realization of the full benefits of digital transformation.

Addressing these risks – including those related to security, safety, sustainability and inclusion – is therefore essential to ensuring that digital transformation delivers equitable, resilient and trusted outcomes for all.

> "Digital trust isn't just a technological challenge, it's a human necessity. Without it, innovation falters, collaboration collapses and our world becomes more fragmented.
>
> World Economic Forum, Davos, 2025

The recent United Nations Convention Against Cybercrime is a landmark global treaty adopted by the UN General Assembly in December 2024 to combat transnational cybercrime. It establishes common legal standards for criminalizing offences such as cyber-fraud, ransomware and child sexual exploitation, while facilitating international cooperation via a series of global standards for electronic evidence sharing and cross-border investigations.



Digital divide

Despite the overall exponential growth of digital transformation, significant digital divides continue to exist both between countries and within societies. These are driven by unequal access to connectivity, digital skills, trusted services and locally relevant digital content, all of which are critical to meaningful participation and inclusion.



At the international level, major disparities remain between high-income and low-income economies in aspects such as broadband access, cloud infrastructure, cybersecurity capability, digital services and adoption of emerging technologies, including AI.

Digital inequalities also exist within countries. Underserved communities, local small businesses, and marginalized groups (e.g. women, people living with disabilities) often have limited access to digital technologies and services, and lower digital literacy. Without targeted action, digital transformation risks reinforcing existing economic and social inequalities.

The digital divide is also evolving into an increasingly significant AI divide, where entire countries are being left behind due to lack of AI-related infrastructure and capabilities. While advanced economies and large technology companies are rapidly integrating AI into business operations, research, and public services, (e.g. healthcare and education), many developing and emerging countries and disadvantaged populations lack the digital infrastructure, computing power, data resources and specialist expertise needed to participate meaningfully in the AI economy.

The “AI divide”

AI development is highly concentrated. Just 100 companies funded 40% of research and development (R&D) in 2022. None of them are based in emerging markets, except China. The USA and China account for around one third of AI publications and 60% of AI patents.

This imbalance is also seen in AI infrastructure, which needs more than electricity and the internet. It requires computing power, servers and data centres.

The USA holds one-third of the top 500 supercomputers and over half the overall computational performance. Most supercomputers and data centres are in developed countries.

Skills are also key – from data literacy to expert-level AI knowledge. But these skills are unevenly distributed.

Technology and Innovation Report: Inclusive Artifcial Intelligence for Development, UNCTAD, 2025



Digital strategies and standards

International recognition of standards in digital transformation

While the rapid pace of digital transformation presents significant opportunities for economic growth, innovation and improved public services, it also introduces systemic risks, including cybersecurity threats, fragmentation of digital systems and the persistence of a global digital divide, now amplified by the gaps in AI capability.

In response, governments and international organizations are increasingly adopting holistic digital and digital development strategies designed to maximize the benefits of digitalization while mitigating its risks and ensuring no one is left behind.

A consistent feature of these strategies is the recognition that well-functioning digital ecosystems depend on common frameworks, trust mechanisms and interoperability. Standards are increasingly recognized as an important component of effective digital strategies, providing the underpinning architecture that enables secure, scalable and inclusive digital transformation.

Standards support digital transformation—and are themselves becoming digital, with the increasing use of digitally optimized formats designed to enhance their accessibility, usability and impact, particularly in contexts where institutional capacity is constrained.

Standards in emerging and developing economies

The importance of standards is equally, if not more, pronounced in emerging economies and developing countries.

The FCDO's Digital Development Strategy 2024-2030 highlighted the importance of standards in the promotion of inclusive, responsible, and sustainable digital transformation of partner countries in the Global South.

The Organization for Economic Cooperation and Development (OECD) emphasizes that governments must adopt strategic approaches to digital transformation to ensure inclusive and sustainable outcomes, with common frameworks and governance mechanisms, such as standards, forming part of the foundational enablers of effective digital economies.

The World Bank similarly underscores that a widening digital divide persists, with many low and middle-income countries lagging in digital adoption and capacity. In this context, coherent digital frameworks play an important role in supporting the development of digital public infrastructure and enabling firms, particularly smaller enterprises, to participate in digital markets, highlighting the need for interoperable and trusted systems.

From an industrial development perspective, the United Nations Industrial Development Organization (UNIDO) finds that standards play a pivotal role in supporting digital transformation by promoting interoperability, ensuring minimum levels of quality and safety, and facilitating the diffusion of new technologies. Harmonized standards are identified as key to enabling countries to integrate into global value chains and to ensure that digital transformation contributes to broader sustainable development objectives.

- There is growing recognition that a standards-led approach is critical to developing and operationalizing digital strategies in a structured and inclusive way. Further detail on standards and how they enable digital development is provided in Section 2 followed by sector examples provided for illustration in Section 3.
- As part of a dedicated project with FCDO, under the UK Digital Access Programme, BSI has developed a Standards-led Digitalization Toolkit to support developing and emerging economies in designing and implementing secure, interoperable digital strategies. The Standards-led Digitalization Toolkit has been piloted in partnership with the UK Government, as highlighted in the FCDO's Digital Development Strategy 2024-2030. Key features of the Standards-led Digitalization Toolkit and its impact, demonstrating how standards can be applied in practice to strengthen digital ecosystems, are provided in Section 4.

2.

The role of standards in digital transformation

1. Digital transformation: opportunities and risks ›

2. The role of standards in digital transformation ›

3. Sector applications: agriculture, e-commerce, education, energy, healthcare ›

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International standards: development, participation and roles

International standards provide globally agreed frameworks including rules, specifications and recommended practices to support interoperability, quality, safety and trust across systems, services and markets.

They are developed through consensus-based processes involving NSBs, industry experts, governments and regulators, academia and civil society.

At the international level, this work is coordinated by recognized standards development organizations (SDOs), including the International Organization for Standardization (ISO), the International Electrotechnical Commission (IEC) and the International Telecommunication Union (ITU), which bring together national members to develop globally applicable standards. These organizations collectively represent over 170 national members worldwide, with a majority of them representing emerging and developing economies. However, the participation of these countries in technical committees and influence in standards development can vary, reflecting differences in capacity, resources, and technical expertise.

Complementary roles of key SDOs in digital transformation

ITU –

Develops global standards and frameworks for telecommunications, connectivity, spectrum management, and digital infrastructure, enabling interoperable communication networks.

ISO –

Develops standards for governance, management systems, data, security, quality, risk, conformity assessment and organizational processes that build trust and effective digital transformation across sectors.

IEC –

Develops standards for electrical, electronic, and digital technologies, including smart systems, industrial automation, cybersecurity, semiconductors, and emerging technologies that underpin the digital economy.

Together, the above standards underpin the development of trusted, secure and interoperable digital ecosystems. ITU connects the world, IEC standardizes the technology, and ISO standardizes the organizations and processes that use it.

From international standards to national implementation

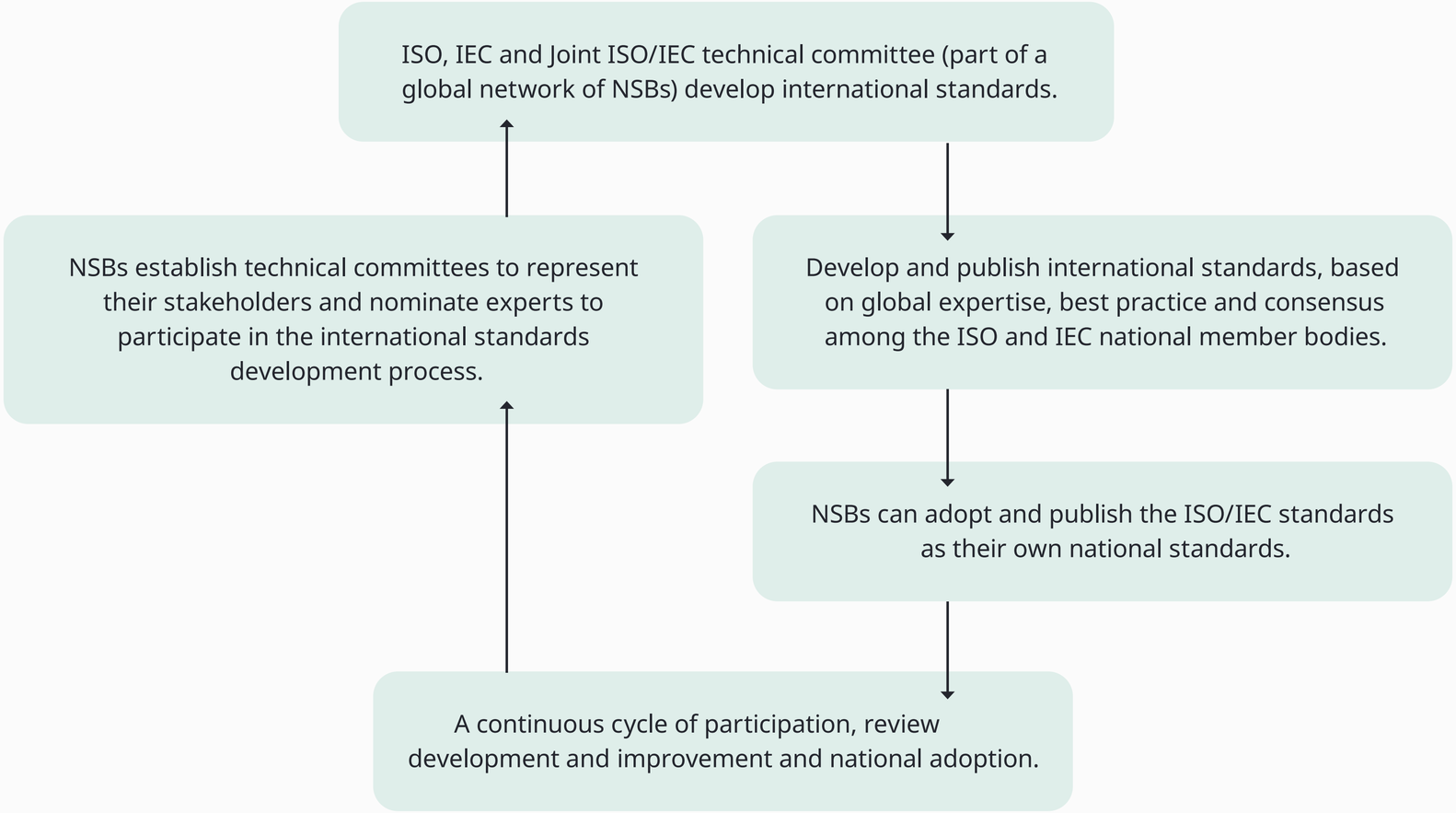
International standards achieve impact through national adoption and implementation. Countries engage with this process from different starting points, reflecting varying levels of technical capacity, institutional maturity and awareness of standards systems, including roles as both standards users (‘takers’) and active contributors (‘makers’).

NSBs play a central role in shaping international standards. By representing national priorities and, where appropriate, contributing existing national practices and standards that can inform the development of international standards, while also enabling countries to benefit from globally agreed frameworks translated into practical tools for application across sectors and institutions.

These standards are developed through consensus-based processes involving experts nominated by NSBs, ensuring that diverse perspectives are reflected in globally agreed frameworks. They are subsequently adopted and published at national level, enabling their application across policy, regulation and industry.

Standards are regularly reviewed and updated as part of this system, ensuring they remain relevant in the context of evolving technologies and policy needs (see Figure 1 for an overview of the process).

Figure 1 – Development and implementation process for ISO and IEC standards





Types of international standards

International standards encompass a range of types – including product and technical specifications, testing methods, terminology standards and management system standards – each supporting interoperability, quality and safety across sectors.

Management system standards developed by ISO and IEC are of particular relevance to policymakers involved in driving digital transformation. They provide widely adopted, cross-sector frameworks that can help strengthen trust in digital and AI systems. Applicable to both public and private organizations, these standards support consistent approaches to governance, risk management and compliance, and can be independently certified to provide assurance.

These standards share a common high-level structure (see Table 2), enabling integrated management across areas such as quality, cybersecurity and AI governance. By translating globally agreed principles into organization-level practices, they support implementation, performance and continual improvement across sectors (see Table 3 for examples of standards).

For policymakers, promoting the role of standards provides a practical foundation to align regulatory requirements, promote interoperability and scale trusted digital transformation without duplicating effort, representing a key mechanism for delivering measurable outcomes in practice.

Table 2 – Structure of management system standards

Core element	Purpose and relevance	Typical objectives
Context of the organization	Understanding internal and external issues, stakeholders and strategic direction.	Align management systems with organizational priorities and risks.
Leadership	Establishing governance, accountability and organizational commitment.	Ensure top management engagement and promote trust and culture.
Planning	Risk-based thinking, opportunities, objectives and action planning.	Manage uncertainty and improve resilience and performance.
Support	Resources, competence, awareness, communication and documented information.	Ensure people, skills and information support effective implementation.
Operation	Operational controls, processes and implementation activities.	Deliver consistent, reliable and controlled outcomes.
Performance evaluation	Monitoring, measurement, internal audit and management review.	Assess effectiveness and support evidence-based decision-making.
Improvement	Corrective action, nonconformity management and continual improvement.	Strengthen performance, learning and long-term organizational trust.

Table 3 – Examples of management system standards relevant to digital transformation

Standard	Main topic	Core content and focus	How it supports trust
ISO 9001	Quality management	Process management, customer focus, continual improvement.	Confidence in consistent quality of products and services.
ISO/IEC 20000-1	IT service management	IT service delivery and operational performance.	Reliable and consistent digital services.
ISO 22301	Business continuity	Resilience and recovery planning.	Confidence in continuity during disruptions.
ISO/IEC 27001	Information security	Cybersecurity controls, risk assessment, governance.	Protection of information and digital trust.
ISO/IEC 27701	Privacy management	Personal data governance and privacy controls.	Trust in responsible data handling.
ISO 37301	Compliance management	Legal and regulatory compliance systems.	Confidence in regulatory compliance.
ISO/IEC 42001	AI management	AI governance, transparency, accountability.	Trustworthy and responsible AI deployment.

NOTE: National versions of most international standards referred to in this guidance are available from ISO members or IEC national committees.

How standards support public policy

Voluntary standards are powerful tools that policymakers in just about any sector can use, in addition to or in conjunction with laws and regulations, to implement and achieve their policy objectives.

Many people think about standards being used to support public policy by being referred to or incorporated into technical regulations. This is indeed one of the main ways that standards are used by policymakers, but it is not the only one, voluntary standards can also support policy actions beyond legislation; for example, as a basis for defining funding priorities, incentive schemes, awareness campaigns, public procurement policies and other policy measures.

In practice, standards support a range of regulatory approaches. These include:

- ✓ co-regulation, where government sets outcomes and industry uses standards to demonstrate compliance;
- ✓ voluntary or industry-led adoption of standards to support self-regulation; and
- ✓ 'earned recognition' approaches, where use of recognised standards can reduce regulatory burden.

These approaches can help policymakers achieve outcomes efficiently, particularly where regulatory capacity is limited.

In international business (both digital or otherwise), standards provide a common language to harmonize understanding and avoid unnecessary differences in requirements between countries, ultimately reducing costs and facilitating trade.

There are important parallels between good policy-making practice and the principles of good standardization practice. These principles include openness, transparency, effectiveness, global relevance, consensus and input from expert opinion.

The World Trade Organization's (WTO) Technical Barriers to Trade Agreement ('the TBT Agreement') aims to ensure that technical regulations, standards and conformity assessment procedures are non-discriminatory and do not create unnecessary obstacles to trade. The TBT Agreement strongly encourages members to base their measures on international standards to facilitate trade. This has in turn led to the increased use and referencing of international standards as part of good regulatory practice and good public governance.

- ✓ Standards are voluntary in nature.
- ✓ Technical regulations are mandatory.
- ✓ Standards can be 'made mandatory' by being incorporated into or referred to by technical regulations.

Agreement on technical barriers to trade, WTO, 1995

For further details on how international standards can support public policy, see the ISO website.

Policymakers are strongly encouraged to engage with their NSB. Find contact details through ISO's member directory.

Standards at the heart of quality infrastructure

National quality infrastructure (NQI) is key to providing trust, with standards playing a vital role in the NQI ecosystem. A typical NQI framework incorporates standardization, metrology, conformity assessment (including testing, inspection, certification and verification and validation services), accreditation and market surveillance.

A robust quality infrastructure is essential for effective governance and regulation, international trade and economic development. In the digital age, where technology-driven services and products are increasingly dominant, a robust quality infrastructure also plays a critical role in establishing trust between providers and users of digital tools and platforms.

Conformity assessment ensures that digital products, systems and services meet defined standards of performance, security and interoperability. This process helps to build digital trust by providing independent verification that technologies function as intended and safeguard user data and privacy. For instance, certified information security management systems (ISMS), cybersecurity protocols or compliance with international data protection standards can reassure consumers and partners that digital services are reliable and secure. In essence, conformity assessment not only supports innovation and market access but also fosters confidence in digital ecosystems by reducing risks and promoting accountability.

- ✓ Technology standards – part of global quality infrastructure – are enablers of interoperability and secure cross-border data flows, alongside regulatory and institutional frameworks; without interoperable standards, global digital payment systems, cloud networks, and mobile communications would not function effectively.
  Standards for Development, World Bank Group, 2025.
- ✓ Recognizing that physical resilience requires digital trust, Principle 4 of the Quality Infrastructure Investment (QII) Principles now explicitly mandates embedding cybersecurity and data privacy directly into the design of critical infrastructure and utilities
  Quality Infrastructure Investment Partnership: 2025 Annual Report, World Bank Group, 2025

Strategic value of international standards

1 Security and regulatory compliance

One of the most critical challenges for digitalization is building and maintaining trust among citizens, consumers and other users. Trust is frequently undermined by high-profile data breaches, opaque algorithmic biases and unethical surveillance. International standards play a pivotal role in building digital trust by addressing security, privacy, transparency, accountability and reliability. Voluntary standards can be important tools in policy-making and can either be used to support regulation or to provide alternatives.

See Security, privacy and compliance

2 Shifting to risk-based resilience

As international good practice tends to move away from heavy government regulation to more proportionate approaches, such as self-regulation, outcome-based regulation and market surveillance, standards can be useful tools to meet policy objectives.

Risk-based approaches lead to more resilient organizations, enhancing their ability to respond to and recover from adverse events. This enables organizations to transition digital governance from reacting to issues into a proactive business asset.

See Innovation and business resilience

3 Frameworks for global trade

Interoperability is essential for digital transformation, especially in environments that rely on the integration of diverse systems, applications, devices and platforms. A lack of interoperability can result in data silos, inefficiencies, vendor lock-in and difficulties in scaling solutions. International standards provide shared norms and governance frameworks that make processes and services recognizable and compatible across markets. This foundation is important as digitalization transforms both the nature of trade and the way it is conducted.

See Interoperability and cross-border trade

Security, privacy and compliance

Information security and data privacy

The main international standards relevant to an organization's digitalization are those developed by the ISO and IEC Joint Technical Committee (JTC 1).

ISO/IEC 27001 provides a comprehensive framework for managing information and cybersecurity risks, including organizational, physical and technical mitigation measures. Its 'companion' standard, ISO/IEC 27002, provides detailed guidance on the implementation of these controls. Together, these standards are the core building blocks for all other digitally related standards and their implementation.

Additionally, ISO/IEC 27701 helps to build trust in data privacy by enabling organizations to comply with data protection and privacy frameworks through the implementation of privacy information management systems (PIMS).

Digital identity management, covered under standards such as the ISO/IEC 24760 series, supports information security and data privacy by enabling reliable identification, secure authentication and controlled access to digital systems and personal data.

Regulatory compliance and ethical behavior

Digital transformation often spans multiple jurisdictions and sectors, each with its own complex web of regulatory requirements. Compliance is not only a legal obligation but a fundamental necessity for protecting reputation and ensuring operational legitimacy. Ensuring compliance becomes more difficult as digital ecosystems grow more interconnected.

In this environment, standards help harmonize practices and simplify compliance efforts. ISO 37301 helps any organization to establish a compliance management system. It defines processes and responsibilities that enable an organization to fulfil its compliance obligations and embed a culture of ethics and legal adherence. Because regulatory environments are dynamic, these and other international standards support not only present compliance but also future readiness.

Key standards for safe and secure digital transformation

- **ISO/IEC 27001**, Information security, cybersecurity and privacy protection – Information security management systems – Requirements.
- **ISO/IEC 27002**, Information security, cybersecurity and privacy protection – Information security controls.
- **ISO/IEC 27036 (all parts)**, Cybersecurity – Supplier relationships.
- **ISO/IEC 27701**, Information security, cybersecurity and privacy protection – Privacy information management systems – Requirements and guidance.
- **ISO/IEC 29100**, Information technology – Security techniques – Privacy framework.
- **ISO/IEC 24760 (all parts)**, Information technology – Security techniques – A framework for identity management.
- **ISO 37301**, Compliance management systems – Requirements with guidance for use.

Innovation and business resilience

Innovation

Innovation is a driver of digital transformation, but it must be balanced with structure and governance to ensure that new technologies are beneficial, ethical and sustainable. Standards can provide an adaptive alternative to regulations that allows for regular recalibration as more evidence becomes available.

The ISO 56000 series on innovation management provides a global reference for the systematic management of innovation, while IT governance standards such as ISO/IEC 38500 ensure that innovation aligns with a broader organizational strategy. These standards help prevent innovation efforts from becoming siloed from or misaligned with business needs.

Emerging technologies like AI, blockchain and IoT pose both opportunities and risks. ISO/IEC 42001, the AI management system standard, ensures responsible development and deployment of AI solutions.

Standards can reduce the burden on governments and policymakers by helping to tailor governance initiatives to the properties of an innovative product or service, rather than aiming for a one-size-fits-all approach.

Business continuity and risk management

In the digital age, business continuity planning has to go beyond traditional disaster recovery and encompass cyber threats, IT system failures, data breaches and supply chain disruptions. Ensuring business continuity requires anticipating these risks and implementing strategies that allow for rapid response and recovery.

ISO 22301 provides a comprehensive framework for business continuity management systems, helping organizations to identify potential threats and their impacts, develop response strategies and test recovery plans.

Risk management is also central to continuity planning. ISO 31000 offers principles and guidelines for integrating risk management into all aspects of an organization.

The ISO/IEC 27035 series of standards provides a structured approach to incident response, enabling organizations to detect, report, assess and effectively recover from information security events.

Extending these approaches to areas such as supply chain resilience and secure cloud environments can further strengthen continuity planning, ensuring that organizations remain robust and adaptable in increasingly complex and interconnected digital ecosystems.

Key standards for digital innovation and business resilience

- **ISO 56000**, Innovation management – Fundamentals and vocabulary.
- **ISO 56001**, Innovation management system – Requirements.
- **ISO 56002**, Innovation management system – Guidance.
- **ISO/IEC 38500**, Information technology – Governance of IT for the organization.
- **ISO/IEC 42001**, Information technology – Artificial intelligence – Management system.
- **ISO 22301**, Security and resilience – Business continuity management systems – Requirements.
- **ISO/IEC 27031**, Cybersecurity – Information and communication technology readiness for business continuity.
- **ISO/IEC 27035** (all parts), Information technology – Information security incident management.
- **ISO 31000**, Risk management – Guidelines.

Interoperability and cross-border trade

Interoperability

Seamless integration is the engine of the digital transition. When applications, devices and platforms fail to communicate natively, organizations hit an immediate operational ceiling. There are several dimensions to interoperability: technical, semantic, organizational and legal.

- ✓ Technical interoperability ensures systems can connect and communicate through shared protocols and formats.
- ✓ Semantic interoperability ensures the meaning of exchanged information is preserved and understood consistently.
- ✓ Organizational and legal interoperability ensure alignment in processes and compliance frameworks.

Standards are central to achieving all these. Facilitating interoperability through these standards reduces development time, supports innovation through modular and scalable system design and promotes inclusive digital ecosystems.

Cross-border trade

International trade relies on trusted, interoperable and transparent systems. As supply chains become more global and digitalization accelerates the movement of goods, data and services, international standards play an increasingly important role. Trade in services, particularly digitally delivered services such as cloud computing, financial technologies and digital communications, has grown rapidly, driving a surge in cross-border data flows and increasing the need for interoperable systems.

ISO and IEC standards provide shared technical and digital frameworks that make products, processes and services recognizable and compatible across markets. This foundation is especially important as digitalization transforms both the nature of trade and the way it is conducted.

In parallel, the United Nations Centre for Trade Facilitation and Electronic Business (UN/CEFACT) develops standards and recommendations that streamline and harmonise the exchange of trade information.

SMART standards

IEC and ISO are advancing the SMART standards initiative, transforming traditional standards into structured, machine-readable formats. This represents an important evolution in the standards system: enabling digital systems to interpret and apply standards automatically, supporting more efficient compliance, streamlined regulation and improved interoperability.

For policymakers, this marks a shift: standards are becoming part of the digital infrastructure, enabling more automated, scalable and data-driven implementation and cross-border trade. Strengthening awareness and investment in digitally enhanced capabilities, particularly in developing and emerging economies, can help reduce implementation burdens, improve regulatory effectiveness and increase their impact in the global digital economy.



Key standards for digital interoperability and cross-border trade

- **ISO/IEC 19941**, **Information technology – Cloud computing – Interoperability and portability**, defines cloud computing interoperability and portability, helping users move workloads across platforms without being tied to a single vendor.
- **ISO/IEC 30182**, **Smart city concept model – Guidance for establishing a model for data interoperability**, provides a conceptual model that standardizes data representation and exchange across various services and infrastructures.
- **ISO/IEC 21823 (all parts)**, **Internet of things (IoT) – Interoperability for IoT systems**, supports semantic interoperability by providing a common understanding across domains and disciplines.
- **ISO 9735-10**, **Electronic data interchange for administration, commerce and transport**, developed jointly with UN/CEFACT, forms part of the EDIFACT messaging standard widely used in customs, transport and supply chain documentation.
- **UN/CEFACT Core Component Library (CCL) and UN/CEFACT/2010/IT008, Recommendation 34:** Data simplification and standardization for international trade, support interoperable digital trade documents and reduce administrative burdens, helping governments and businesses exchange information more efficiently.

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3.

Sector applications: Agriculture, e-commerce, education, energy, healthcare

1. Digital transformation: opportunities and risks ›

2. The role of standards in digital transformation ›

3. Sector applications: Agriculture, e-commerce, education, energy, healthcare ›

4. Standards-led Digitalization Toolkit: insights from implementation ›

5. Building digital trust: a playbook for policymakers ›



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Enabling sectoral digital transformation through international standards

To deliver meaningful impact, digital transformation needs to be grounded in the real economy. Experience from digital transformation initiatives highlights strong and sustained demand for standards-based approaches in a number of priority sectors, including agriculture, e-commerce, education, energy and healthcare. For developing and emerging economies in particular, focusing on these foundational sectors is essential to advancing sustainable development and inclusive growth.

However, broad national digital policies alone are insufficient to ensure effective implementation. A generic data governance framework may neither adequately address the security requirements of digital health services (such as telemedicine) nor ensure interoperability across smart irrigation systems.

International standards support the application of high-level policy objectives in practice by translating global principles into sector-specific approaches. In doing so, they can help industries scale innovation, reduce technical fragmentation and manage systemic risks more effectively.

The sector examples provided in Table 4 and throughout this section illustrate how targeted use of standards can address sector needs and support resilient, inclusive and future-ready economies.

Table 4 – Examples of standards applications in sectoral digital transformation

Sector	Standards application and impact
Agriculture	Integration of precision farming technologies through shared IoT and data standards enables farmers to share, analyze and use real-time information that improves crop management, resource efficiency and yields (see Digital transformation in agriculture for more information).
E-commerce	Secure transaction and privacy standards protect consumer data, strengthen cybersecurity and harmonize digital trade across borders, which promotes global business trust (see Digital transformation in e-commerce for more information).
Education	Digital learning platforms benefit from standards that ensure interoperability across tools, safeguard learner data and enhance accessibility and inclusion (see Digital transformation in education for more information).
Energy	Standards support the integration of renewable energy sources, smart grids and advanced metering systems, driving efficiency, reliability and sustainability in power networks (see Digital transformation in energy for more information).
Healthcare	Standards for electronic health records, telemedicine and medical devices improve patient safety, ensure secure data exchange and enhance care coordination across systems (see Digital transformation in healthcare for more information).

Digital transformation in agriculture

Digitalization is rapidly reshaping agriculture, delivering innovative solutions to long-standing challenges in productivity, sustainability and food security. Technologies such as IoT, AI, geographic information systems (GIS), blockchain and big data analytics (see Table 5) are transforming how farmers plan, produce and manage resources. Although agriculture remains comparatively less digitized than other sectors, the adoption of international standards can enhance data interoperability, trust and equitable access to emerging technologies.

Table 5 – Digitalization in agriculture

Focus area	Key insight and impact
Precision agriculture	Use of GPS, satellite imagery, IoT sensors and drones to monitor field variability and optimize inputs such as water, fertilizer and pesticides, reducing waste and boosting yields.
Remote sensing and GIS	Aerial and satellite data, combined with GIS, deliver insights into crop health, land use and climate patterns, supporting better planning and disaster preparedness.
Farm management information systems (FMIS)	Centralized software platforms integrate data on planting, inventory, labour and finances, helping farmers plan operations, optimize resources and improve productivity.
Supply chain transparency	Blockchain and digital ledgers track agricultural goods from across the food supply chain, improving traceability, food-safety compliance and consumer trust.
AI and machine learning	AI-powered analytics forecast yields, detect pests and automate grading or processing, helping optimize crop output and reduce losses.
Smart irrigation systems	IoT-enabled irrigation adjusts water distribution based on soil moisture and weather forecasts, cutting agricultural water use by 20% to 60% in arid regions.
Digital marketplaces and mobile advisory	Apps and platforms connect farmers to markets, provide weather and agronomic advice and reduce reliance on intermediaries, increasing profitability and resilience.

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Standardization in agriculture

- ISO/TC 347 is a dedicated committee for data-driven agri-food systems.
- Some standards under ISO/TC 211 help manage geospatial data collected by drones and sensors in farming.
- ISO/TC 23/SC 19 is a technical committee that focuses on agricultural electronics and includes work on sensors, automation, and communication systems.

Examples include the following.

- ISO 5231, Extended farm management information systems data interface (EFDI) – Concept and guidelines.
- ISO 6881, Radio-frequency identification of animals.
- ISO 10975, Agricultural machinery and tractors – Auto-guidance systems for operator-controlled tractors and self-propelled machines.



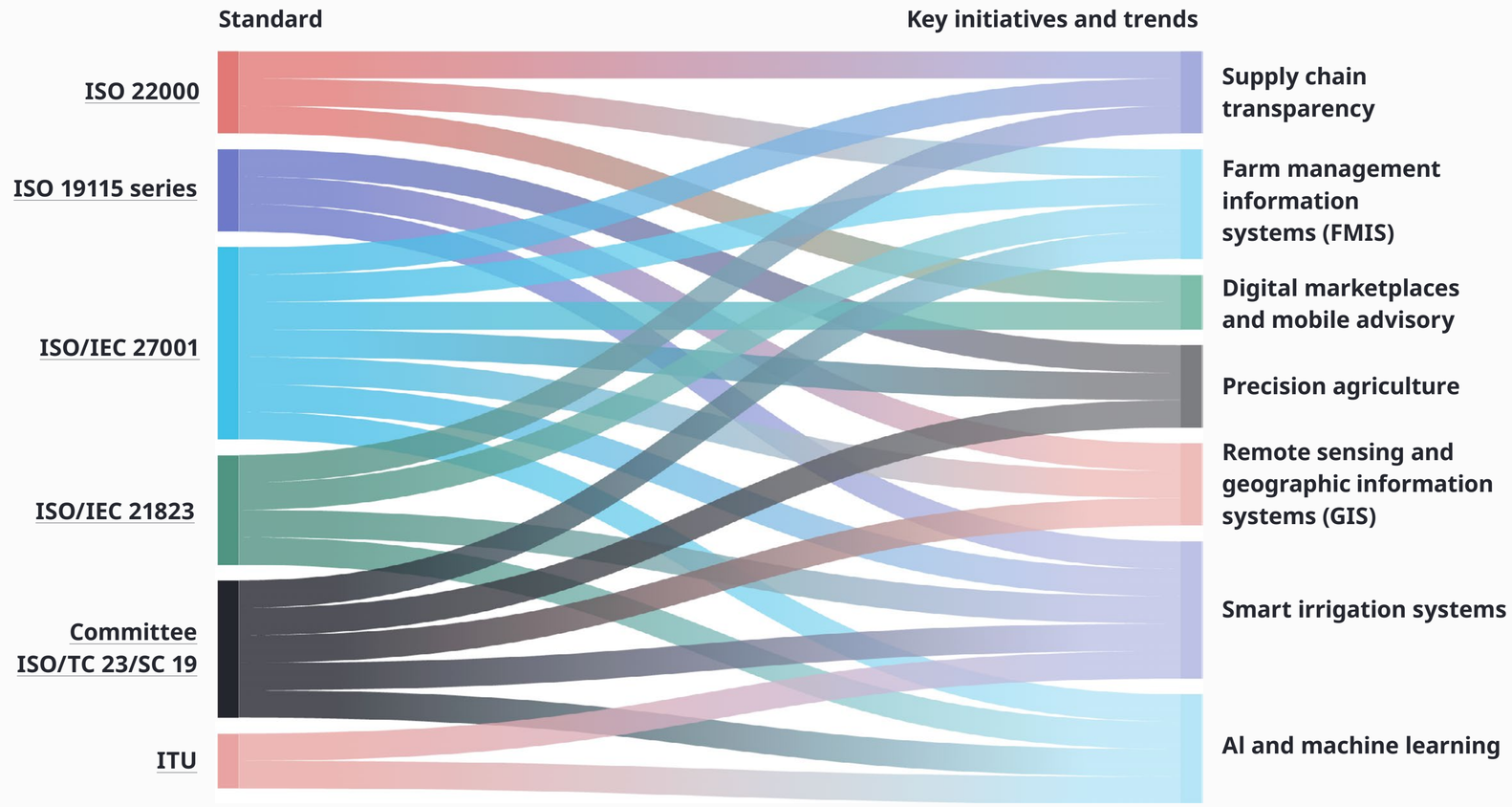
Standards support digitalization initiatives in agriculture

As agriculture becomes increasingly data-driven, standards play an important role in ensuring productivity, resilience, food safety and international market access across global agri-food value chains. Figure 2 provides some examples of international standards that are relevant to digitalization within the agriculture sector.

Policy relevance:

Standards can support more consistent approaches to data sharing and traceability across agricultural value chains, which in turn can contribute to improved productivity, market access and resilience.

Figure 2 – Standards in the digital transformation of agriculture



NOTE: An interactive version of Figure 2 is available here.

Digital transformation in e-commerce

Digitalization has revolutionized e-commerce, transforming how goods and services are bought, sold and delivered. This shift extends beyond online sales to include digital payments, logistics optimization, marketing automation and cross-border trade (see Table 6). As e-commerce continues to expand, international standards play a critical role in ensuring safe, interoperable and trustworthy digital marketplaces that foster innovation and consumer confidence.

Table 6 – Digitalization in e-commerce

Focus area	Description and impact
Mobile commerce (m-commerce)	Smartphones are now the primary shopping tool for large populations. Businesses optimize for mobile experiences with app-based stores, digital wallets and location-based services to enhance convenience and conversion rates.
AI and personalization	AI personalizes recommendations, predictive analytics and dynamic pricing. Chatbots and virtual assistants improve customer service, while AI-driven insights reduce returns and enhance engagement.
Omnichannel retail	Integration of physical and digital channels creates seamless customer journeys. Unified commerce platforms enable real-time inventory tracking and consistent experiences across stores, websites and social media.
Blockchain and smart contracts	Blockchain improves transparency and trust in supply chains, verifying product authenticity and securing cross-border transactions through automated smart contracts.
Digital payments and fintech integration	Digital wallets, cryptocurrencies, and ‘buy now pay later’ (BNPL) options streamline payments, making transactions faster, more secure and accessible to diverse markets.
Cloud-based e-commerce platforms	Cloud infrastructure supports scalable, global operations, offering data analytics, flexible storage and rapid deployment through platforms.
Augmented reality (AR) and virtual reality (VR)	Immersive technologies enable customers to visualize products, such as testing furniture in their space or virtually trying on clothing, enhancing purchase confidence and reducing returns.
Cross-border e-commerce	Digital platforms simplify international trade with automated customs, currency management and multilingual support, expanding global market access for small and medium-sized enterprises (SMEs).

Standardization and e-commerce

E-commerce benefits from some of the most mature international technology standards, ensuring trust and interoperability across global markets.

Technical committees

- **ISO/TC 321**, Transaction assurance in e-commerce, enhances trust, transparency, and security in online transactions.
- **ISO/TC 352**, Digital marketing, standardizes terminology and ethical practices for trustworthy online commerce.

Relevant standards

- **ISO 32111**, Transaction assurance in e-commerce – Principles and framework, defines core principles for safe and accountable digital transactions.
- **ISO 32122**, Transaction assurance in e-commerce – Guidance for offering online dispute resolution services, guides transparent resolution of digital consumer disputes.

Together, these standards strengthen consumer confidence and foster a secure and interoperable e-commerce ecosystem.



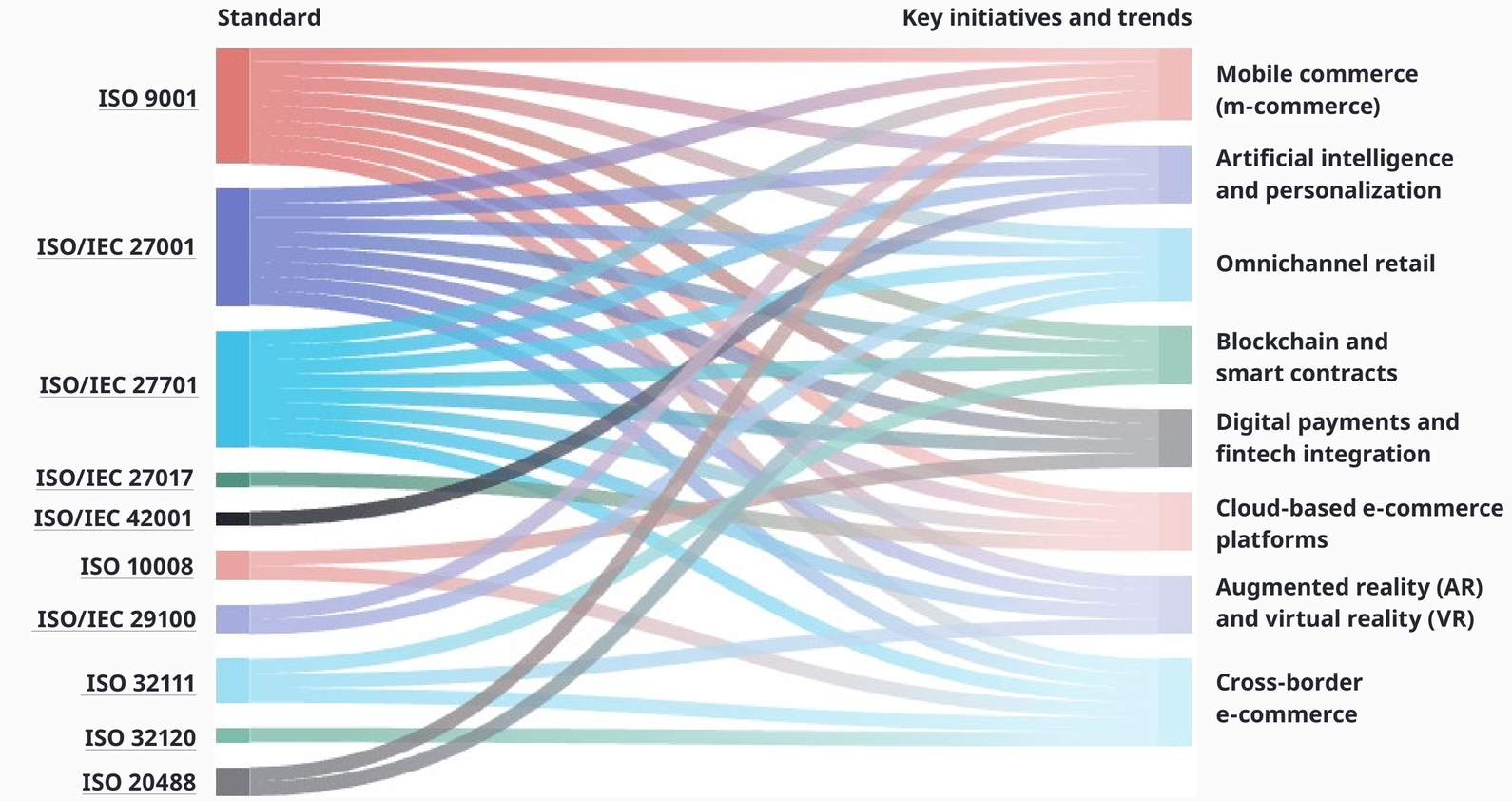
Standards support digitalization initiatives in e-commerce

International standards help businesses and consumers operate with greater confidence by improving transparency, security and compatibility across digital platforms and services. As e-commerce continues to expand globally, standards are becoming increasingly important in supporting innovation, building consumer trust and facilitating international trade. Figure 3 provides selected examples of international standards that are relevant to digitalization in the e-commerce sector.

Policy relevance:

Alignment with international standards can help support interoperability in digital trade systems, facilitating cross-border transactions and reducing barriers to participation.

Figure 3 – Standards in e-commerce



NOTE: An interactive version of Figure 3 is available here.

Digital transformation in education

Digital transformation is reshaping education globally, enabling remote and hybrid learning, personalized pathways and learner-centric platforms. Technologies such as AI, IoT, virtual reality (VR), augmented reality (AR), and digital credentials are redefining how students engage, how educators teach and how institutions operate (see Table 7). While the promise is significant, challenges remain around infrastructure, interoperability, data fairness and consistency of standards.

Table 7 – Digitalization in education

Focus area	Description and impact
Online learning platforms and virtual classrooms	Tools that enable hybrid learning, assessments and collaboration, expanding access to quality education.
Learning management systems (LMS)	Platforms that centralize curriculum delivery, grading and analytics, helping educators monitor engagement and improve learning outcomes.
AI in education	AI personalizes learning, automates grading and supports adaptive tutoring, tailoring content to each learner's needs and performance.
Massive open online courses (MOOCs)	MOOCs help democratize education by offering low-cost global access to higher learning and certification.
Digital assessment tools	AI-enabled testing, e-portfolios and online quizzes provide instant feedback, reduce manual marking and enhance learner tracking.
VR/AR	Immersive simulations and virtual labs deliver experiential learning in fields like medicine, engineering and history.
Open educational resources (OER)	Freely licensed materials promote inclusivity and knowledge sharing, especially in underserved regions.
Digital credentials and blockchain verification	Blockchain-based badges and certificates ensure secure, verifiable recognition of skills and lifelong learning achievements.

Standardization and education

ISO’s work on education and digital transformation is led by the following technical committees.

- **ISO/IEC JTC 1/SC 36**, Information technology for learning, education and training, focuses on standards using information technologies for learning, education and training to support individuals, groups, or organizations, and to enable interoperability and reusability of resources and tools.
- **ISO/TC 232**, Education and learning services, focuses on standards for the education and learning sector, including terminology, assessment and ethical conduct.

Relevant standards include the following.

- **ISO/IEC 24751**, Accessibility standards in ICT for learning, education, and training.
- **ISO/IEC 40180**, Quality standards for e-learning, education, and training.



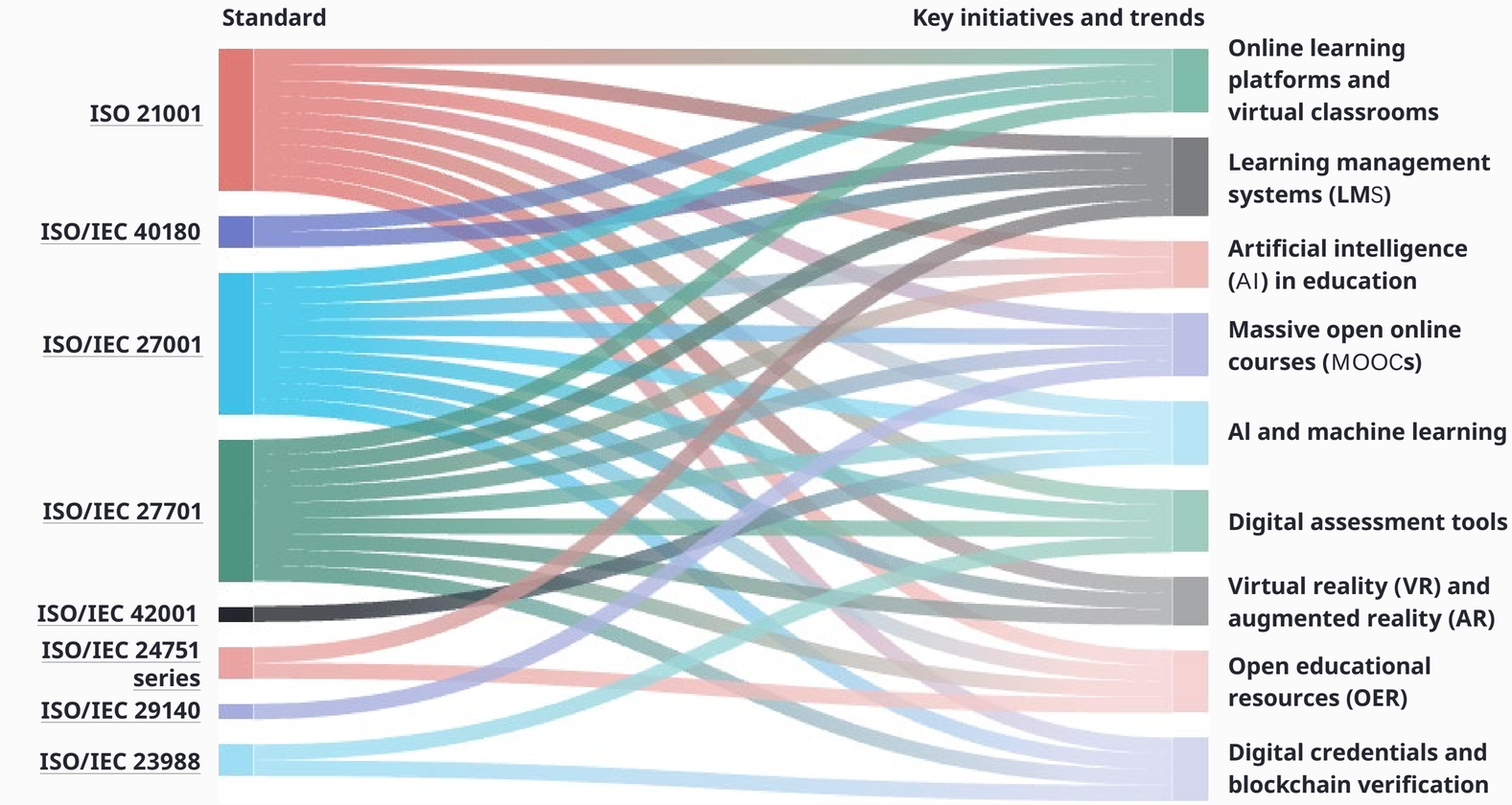
Standards support digitalization initiatives in education

International standards support ethical use of AI, robust information security, data protection and inclusive access to education technologies. By providing internationally recognized frameworks and best practices, standards enable educational institutions and governments to implement secure, reliable and learner-centered digital education systems. Figure 4 provides selected examples of international standards that are relevant to digitalization in the education sector.

Policy relevance:

Standards can be used to support compatibility across digital learning systems, enhance content quality and contribute to more consistent approaches to access and delivery.

Figure 4 – Standards in education



NOTE: An interactive version of Figure 4 is available here.

Digital transformation in energy

As countries work to decarbonize and expand energy access, digital technologies such as smart grids, AI-driven analytics, IoT sensors and decentralized energy platforms are enhancing efficiency, flexibility and transparency across the sector (see Table 8). However, as digital systems become integral to critical energy infrastructure, they introduce new cybersecurity, interoperability and governance challenges, underscoring the importance of international standards in ensuring a secure, resilient and trusted clean-energy ecosystem.

Table 8 – Digitalization in energy

Focus area	Description and impact
Smart grids	Integrate IoT sensors, digital meters and real-time communication to manage electricity flows dynamically. Support renewable integration, enable demand-response and reduce energy waste.
Advanced metering infrastructure (AMI)	Smart meters collect real-time consumption data, allowing consumers to manage energy use and utilities to apply dynamic pricing. Forms the basis for smart homes and prosumer energy models.
Energy management systems (EMS)	AI- and data-driven platforms that monitor, control and optimize energy use across buildings, industries and grids enhance efficiency and lower operational costs.
Digital twins	Virtual replicas of energy assets simulate performance, predict maintenance needs and extend equipment lifespans, improving reliability and productivity.
Decentralized energy and blockchain	Blockchain enables peer-to-peer (P2P) energy trading and local market exchanges, promoting grid decentralization and democratized access to clean energy.
AI and predictive analytics	AI forecasts renewable generation based on weather and consumption data and supports predictive maintenance for solar and wind assets, reducing downtime and costs.
Electric vehicles (EVs) and smart charging	Smart charging systems optimize EV charging times using grid and renewable availability data; vehicle-to-grid (V2G) technology enables EVs to store and supply energy.
Remote monitoring and control	Cloud-based supervisory control and data acquisition (SCADA) and sensor systems enable remote supervision of renewable installations—especially useful for offshore or remote energy sites.

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Standardization and energy

International standardization efforts in the energy sector are well established, focusing on enhancing energy efficiency, integrating digital technologies and supporting the global transition to low-carbon systems.

The following committees and initiatives are driving this work.

- **ISO/TC 301**, Energy management and energy savings, focuses on standards for energy management systems and energy performance improvement, supporting the transition to sustainable energy.
- **IEC/TC 57**, Power systems management and associated information exchange, focuses on standards for smart grid architecture and remote monitoring control.

While **ISO 50001**, Energy management systems – Requirements with guidance for use, provides a practical way to improve energy use, IEC/TR 63097, Smart grid standardization roadmap, provides standards users with guidelines to select the most appropriate set of standards and specifications based on smart energy use cases.



Standards support digitalization initiatives in energy

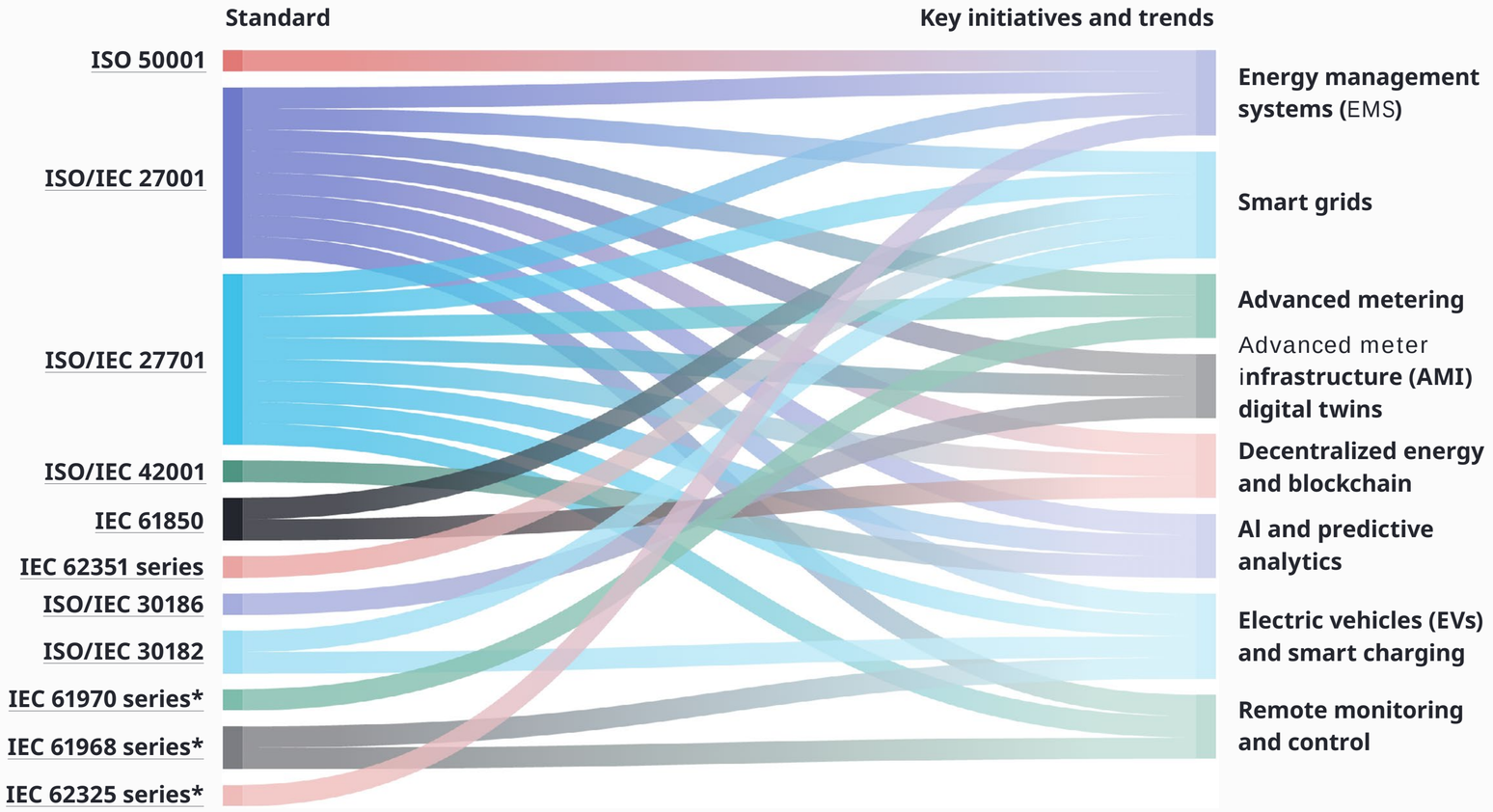
International standards support the integration of renewable energy sources into national power grids, alongside the secure operation of critical energy infrastructure. As countries accelerate the transition to low-carbon energy systems, standards play a vital role in ensuring trusted, efficient and sustainable energy ecosystems. Figure 5 provides examples of international standards that are relevant to digitalization in the energy sector.

Policy relevance:

Standards can support more consistent management of digital energy systems, including the integration of renewable sources and the secure handling of operational data.

* These standards form the basis of a Common Information Model (CIM) that network companies in some countries and regions are required to adopt to improve the consistency, accessibility, and usability of network data. They define how different assets in the energy sector - from substations to inverters on wind turbines - are operated and how information is exchanged between energy stakeholders on these assets.

Figure 5 – Standards in energy



NOTE: An interactive version of Figure 5 is available here.

Digital transformation in healthcare

Digitalization is transforming healthcare worldwide, reshaping how medical services are delivered, accessed and managed. Digital solutions, including telemedicine, mobile health (mHealth), wearable devices, blockchain, electronic health records (EHRs), and AI-enabled diagnostics, are driving more efficient, patient-centered and data-driven care (see Table 9).

While these innovations improve outcomes, expand access and optimize costs, they also raise important challenges related to privacy, interoperability, ethics and equity. Aligning with international standards is key to ensuring that digital health solutions are safe, trustworthy and inclusive.

Table 9 – Digitalization in healthcare

Focus area	Description and impact
EHRs	Provide real-time access to patient data, improving diagnostic accuracy, reducing errors and enabling coordinated care across providers.
Telemedicine and telehealth	Enable remote consultations and monitoring through secure digital platforms, improving access to healthcare, particularly in rural and underserved regions.
mHealth applications	Support self-management of conditions such as diabetes, pregnancy and mental health via monitoring, reminders and personalized health insights.
AI and machine learning	Power predictive analytics, diagnostic imaging, and personalized treatment plans. AI assists clinicians in detecting diseases earlier and improving clinical decision-making.
Wearable health devices	Track vital signs such as heart rate, oxygen levels and glucose in real time, empowering patients and improving preventive care.
Robotics and automation	Enhance surgical precision, rehabilitation and hospital efficiency by automating repetitive or high-risk tasks, reducing errors and improving outcomes.
Blockchain for health data management	Offers secure, decentralized data storage and consent management, ensuring data integrity and reducing fraud.
Health information exchange (HIE) systems	Facilitate secure data sharing across healthcare organizations, supporting continuity of care and rapid response in emergencies.

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Standardization and healthcare

ISO's work on AI and smart technologies in healthcare is led by the following committees.

- **ISO/TC 215**, Health informatics, creates standards for the secure, interoperable and ethical use of digital health data and technologies.
- **ISO 27799**, Health informatics — information security controls in health, provides information security controls and implementation guidance for health organizations.

Complementing this, **BS 30440**, Validation framework for the use of artificial intelligence (AI) within healthcare – Specification, offers an auditable framework for validating AI in healthcare, addressing clinical performance, safety, integration and ethical oversight.



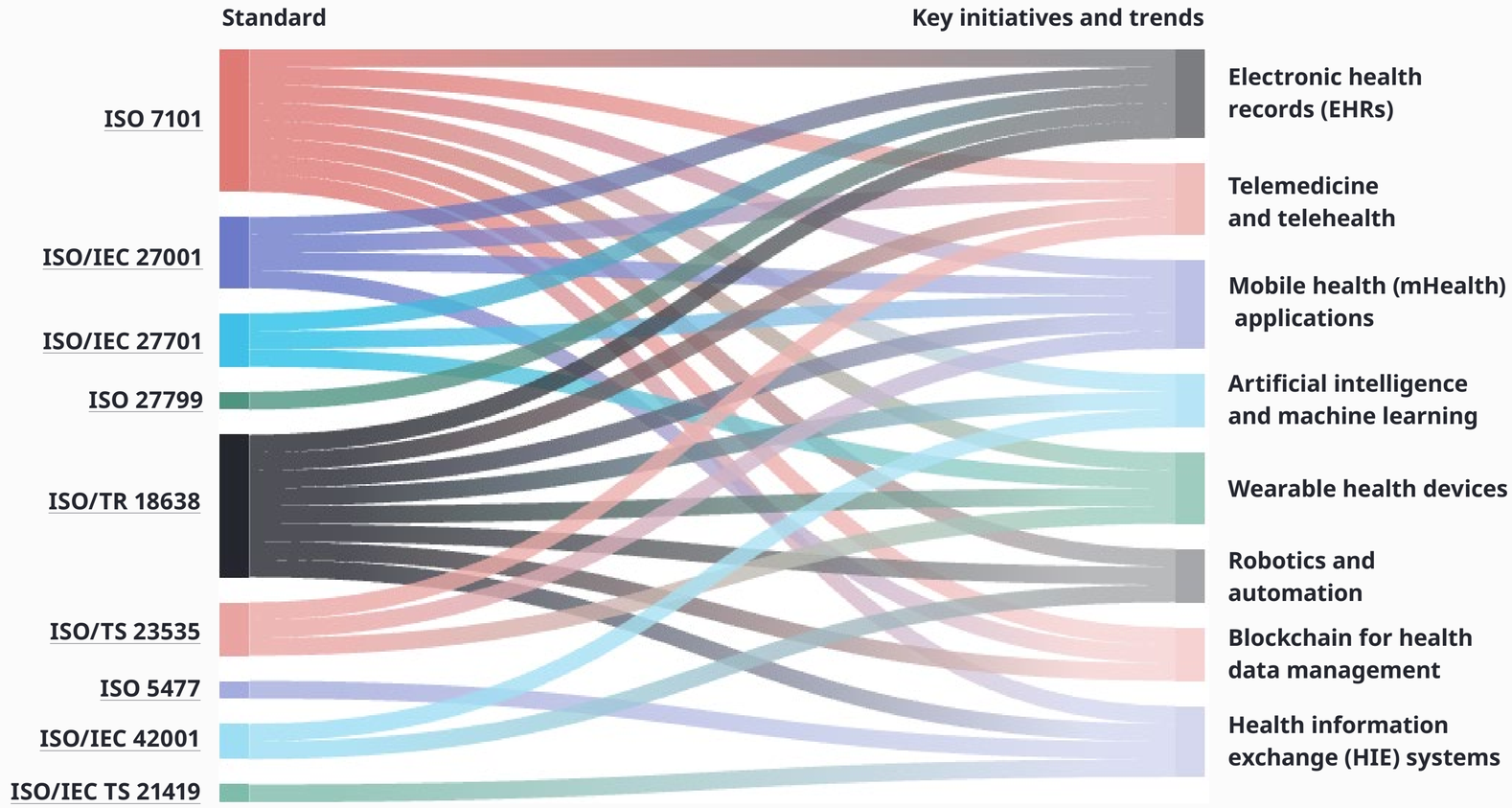
Standards support digitalization initiatives in healthcare

International standards ensure that digital health solutions are reliable, interoperable and capable of protecting sensitive patient data. As healthcare systems become increasingly connected and data-driven, standards play an essential role in building trust, improving efficiency and supporting high-quality patient-centered care. Figure 6 provides examples of international standards that are relevant to digitalization in the healthcare sector.

Policy relevance:

The use of internationally recognized standards can help strengthen safe data exchange, support interoperability between systems and enable more coordinated delivery of digital health services.

Figure 6 - Standards in Healthcare



NOTE: An interactive version of Figure 6 is available here.

Summary: Digital transformation and supporting standards in sectors

Across sectors, a consistent pattern emerges in the role of international standards in digital transformation. They provide common frameworks that support interoperability, enable more effective data exchange, and help align systems, processes and institutions. In doing so, they contribute to more secure, transparent and consistent approaches to digitalization.

While sector-specific applications vary, many rely on a shared set of cross-cutting standards - particularly in areas such as information security, data governance and system integration. These provide a common foundation that supports coordination across systems and sectors, while enabling more targeted and context-specific implementation.

Taken together, this highlights the importance of considering both cross-cutting and sector-specific standards. Cross-cutting standards provide the underlying frameworks that support digital transformation across multiple domains, while sector-specific standards address particular operational and technical requirements. This distinction is especially relevant in developing and emerging economies, where a structured and phased approach can help align priorities, strengthen institutional capacity and support implementation over time.

Table 10 offers a comparative overview of how digitalization is transforming each sector and highlights the key standards and committees supporting these positive changes.





Table 10 – Digital transformation and supporting standards and committees by sector

Sector	Transformation focus	How standards support digitalization
Agriculture	Smart farming, precision agriculture and data-driven resource management are improving productivity and sustainability.	Standards for IoT, data sharing and interoperability (e.g. standards developed by ISO/TC 347 and ISO/TC 211) support the integration of farming technologies and improve traceability and efficiency.
E-commerce	Digital marketing, blockchain and FinTech are redefining global trade and consumer engagement.	Mature frameworks from ISO/TC 321 and ISO/TC 352 strengthen online trust, transaction security and digital marketing integrity.
Education	Digital learning platforms, AI-driven personalization and secure credentials are transforming access to education.	Standards under ISO/IEC JTC 1/SC 36 and ISO/TC 232 support the interoperability and reusability of learning resources, education technologies, and training tools.
Energy	Smart grids, energy analytics and digital twins are optimizing generation, storage and distribution.	Standards for energy management systems and smart-grid standards and roadmaps improve energy efficiency and support a more resilient, clean-energy future.
Healthcare	AI, telemedicine and wearable devices are enabling connected, preventive and personalized healthcare.	Standards such as ISO 27799, Health informatics – Information security controls in health based on ISO/IEC 27002, and BS 30440, Validation framework for the use of artificial intelligence (AI) within healthcare – Specification, strengthen security controls, privacy, and interoperability.

4.

Standards-led Digitalization Toolkit: Insights from implementation

1. Digital transformation: opportunities and risks ›

2. The role of standards in digital transformation ›

3. Sector applications: agriculture, e-commerce, education, energy, healthcare ›

4. Standards-led Digitalization Toolkit: Insights from implementation ›

5. Building digital trust: a playbook for policymakers ›



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Standards-led Digitalization Toolkit: Collaboration with partner countries

For policymakers navigating the rapid evolution of digital and AI technologies, building trust, ensuring interoperability and enabling effective implementation are high priorities. In this context, practical, structured approaches are needed to translate policy ambition into delivery.

The growing importance of emerging technologies, and the corresponding need for digital trust, led BSI to partner with FCDO's UK Digital Access Programme and develop the Standards-led Digitalization Toolkit, which was first piloted in Kenya and Indonesia as a project under the UK Digital Access Programme.

While initially focused on facilitating digital trade, the pilot revealed a broader imperative to build capacity among policymakers and regulators across sectors. It highlighted the need to demonstrate not only the value of international standards, but also the supporting quality infrastructure required to operationalize them, including robust conformity assessment. This shift underscored the foundational role of standards and NSBs in building trust and confidence in digital transformation processes.

Since its inception, the Standards-led Digitalization Toolkit has evolved and has now been successfully deployed across six partner countries, in collaboration with government agencies and their respective National Standards Bodies. It provides policymakers with a practical framework to support the design and implementation of trusted, standards-led digital strategies.

Implemented in:


Brazil


Kenya


South Africa


Indonesia


Nigeria


Vietnam

Collaboration partners

BSN BADAN STANDARDISASI NASIONAL

gov.br

SABS

ICT Authority

NITDA

communications & digital technologies
Department: Communications & Digital Technologies
REPUBLIC OF SOUTH AFRICA

KEBS
Kenya Bureau of Standards

KOMDIGI
Kementerian Komunikasi dan Digital
Republik Indonesia

STANDARDS ORGANISATION OF NIGERIA
son

BỘ THÔNG TIN VÀ TRUYỀN THÔNG
MINISTRY OF INFORMATION AND COMMUNICATIONS

CHẤT LƯỢNG TẠO THỊNH VƯỢNG
PROSPERITY THROUGH QUALITY



Development of the Standards-led Digitalization Toolkit

The internationally recognized quality management system standard, ISO 9001, forms the fundamental basis for the five focus areas of the Standards-led Digitalization Toolkit (see Figure 7). These include:

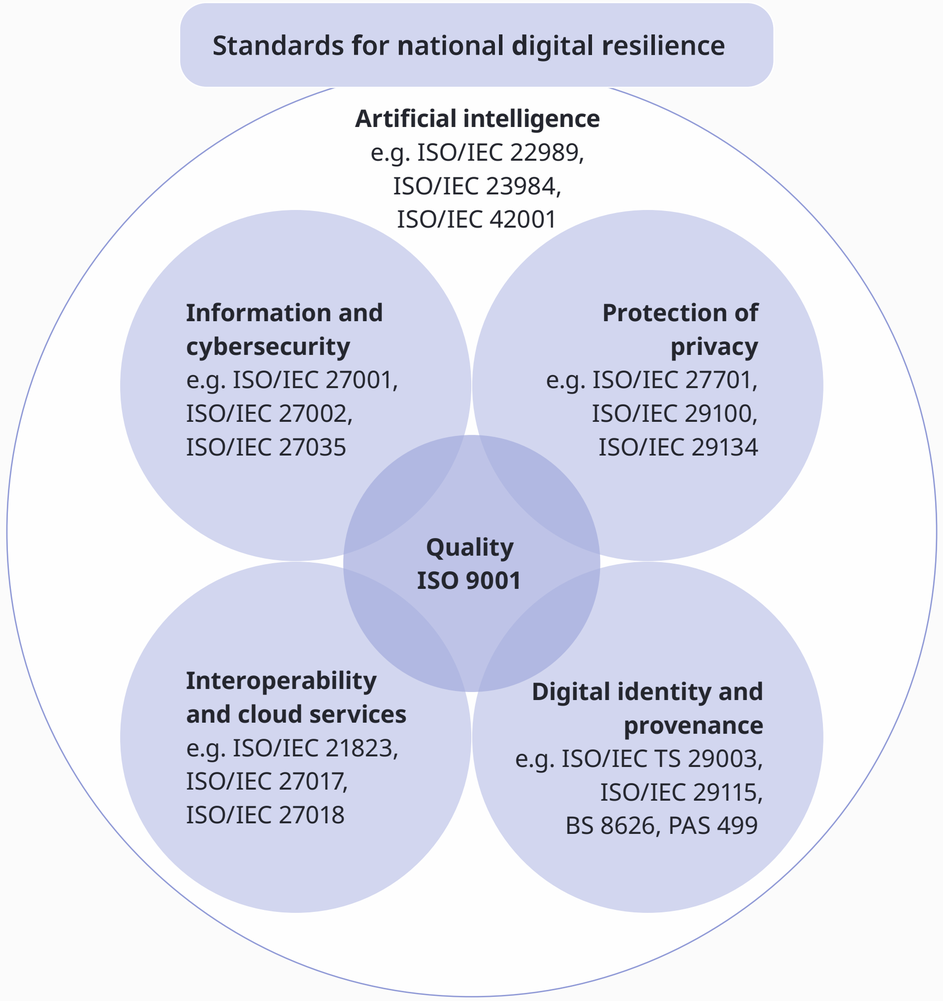
- ✓ information and cyber security;
- ✓ protection of privacy;
- ✓ digital identity and provenance;
- ✓ interoperability and cloud services; and
- ✓ AI.

While early iterations of the Standards-led Digitalization Toolkit focused on the first four areas, an additional e-learning module on AI was integrated following the publication of ISO/IEC 42001 in late 2023.

These five areas form the basis for subsequent deployment of the Standards-led Digitalization Toolkit. Delivered via a series of workshops and training modules, the project is designed to achieve short-, medium-, and long-term outcomes that contribute to building digital trust and encouraging the use of international standards. Ultimately, these outcomes are intended to support broader efforts to bridge the digital divides in developing and emerging economies.

The resulting impact is the strengthening of national enabling environments that establish the foundation for increased and more inclusive digital access, which over time will drive the social and economic development of underserved populations.

Figure 7 – Five focus areas of the Standards-led Digitalization Toolkit

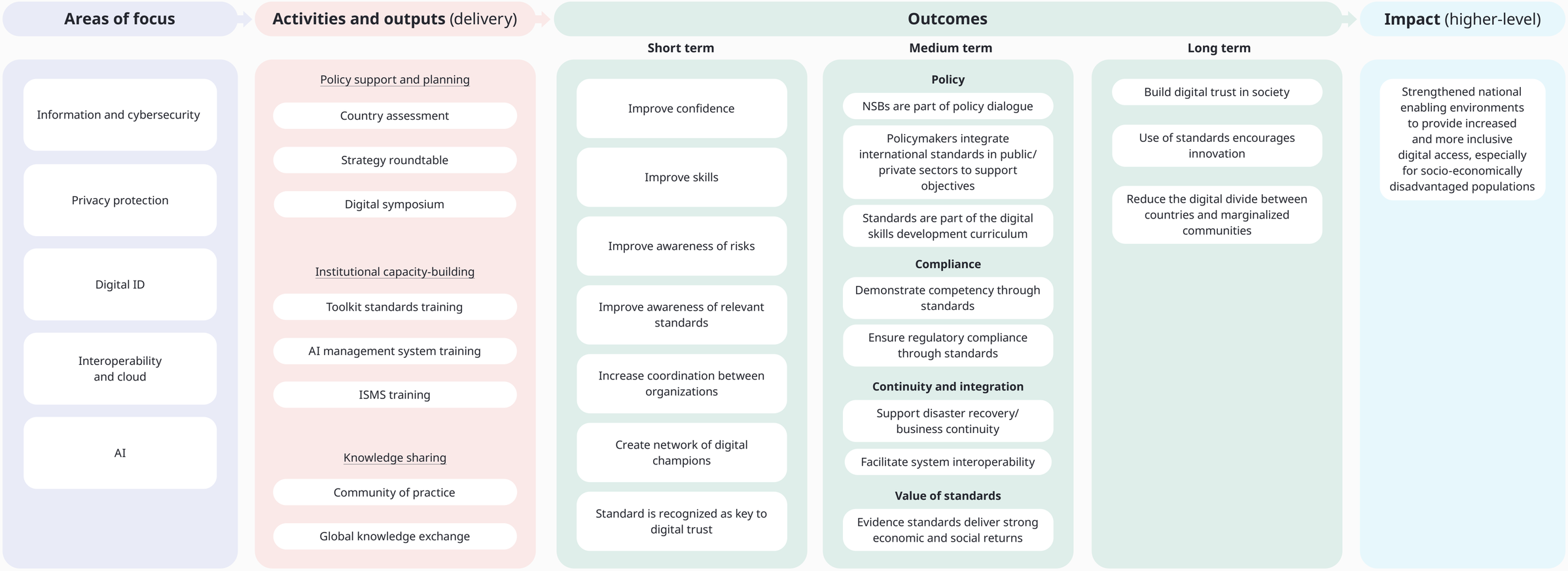




Standards-led Digitalization Toolkit: From delivery to impact

Examples of the practical application of the Standards-led Digitalization Toolkit are outlined in Figure 8, with more detail given in the four case studies later in this section.

Figure 8 – Application of the Standards-led Digitalization Toolkit



Policy support and planning for standards-led digitalization

The Standards-led Digitalization Toolkit aims to strengthen national digitalization policy frameworks by embedding the use of international standards as strategic tools for digital development.

The toolkit focuses on:

- ✓ assessing a country's key digital challenges and opportunities;
- ✓ identifying where standards can deliver measurable policy outcomes; and
- ✓ raising policymakers' awareness of the role of standards in driving innovation, managing risks and supporting inclusive growth.

> "The event opened my mind that building digital transformation requires collaboration between security, interoperability and digital identity. International standards can be used as the core guidance to reduce existing risks.
>
> Delegate, Digital Symposium in Indonesia, 2023

Key activities include the following

1. **Country assessment:** Provides an overview of the country's digitalization strategies and initiatives, identify key stakeholders and evaluate the extent to which international standards are currently applied.
2. **Strategy roundtable:** Convenes senior policymakers from across the digital ecosystem to build early stakeholder commitment and a shared understanding of how international standards can enable digital transformation and digital trade.
3. **Digital symposium:** Features a targeted workshop and panel discussion on how standards operate in cyberattack and ransomware scenarios. Participants will collaboratively draft actionable recommendations to present to senior policymakers, securing consensus on strategic next steps.



Institutional capacity-building for standards-led digitalization

The Standards-led Digitalization Toolkit aims to enhance the ability of key national institutions to lead and sustain digital transformation.

It focuses on:

- ✓ developing the knowledge, skills and technical expertise required to apply relevant international standards effectively;
- ✓ strengthening organizational resilience and adaptability in response to emerging challenges; and
- ✓ ensuring the long-term sustainability of institutional capacity to support national digital development objectives.



Key activities include the following

1. **Standards-led Digitalization Toolkit training:** a training in four thematic areas (information security, data privacy, digital ID and interoperability) to deepen understanding of how international standards can enhance trust.

2. **Information security management system (ISMS) training:** ISO/IEC 27001 lead auditor course, focused on the foundational ISMS standard for all digital governance. It is designed to build practical audit skills, enabling participants to assess security frameworks, mitigate cyber vulnerabilities and implement robust institutional resilience.

3. **AI management system practitioner training:** An AI-focused e-learning course, designed to equip participants with the knowledge and tools to assess impact, mitigate risks and implement responsible AI governance. It features interactive drop-in sessions and an inclusive data governance webinar.

Highlights from the implementation of the Standards-led Digitalization project:

- Successfully trained over **250 delegates across six diverse digital economies** (Brazil, Indonesia, Kenya, Nigeria, South Africa and Vietnam), establishing a robust baseline for digital development.
- The combined trainings achieved an aggregate satisfaction score of **9.1 out of 10**.
- **Over 90% of participants** stated they are now equipped to embed information security directly into everyday business processes and **proactively reduce vulnerabilities**.

Knowledge sharing for standards-led digitalization

The Standards-led Digitalization Toolkit aims to foster coordinated action across public, private and civil society stakeholders in inclusive, responsible and sustainable digital transformation.

The Standards-led Digitalization Toolkit focuses on:

- ✓ establishing networks of digital champions to advocate key benefits of international standards;
- ✓ strengthening inter-agency and inter-sectoral coordination to align efforts and resources; and
- ✓ creating a platform for the exchange of best practice and lessons learned in applying standards.

Key activities include the following

1. **Community of practice:** A digital hub connecting cross-border stakeholders to streamline communication, share resources and drive sustained engagement through continuous programme updates and collaborative networking.
2. **Global knowledge exchange:** Targeted engagement in key international forums, empowering developing economies to showcase their expertise, assert their voice and directly shape the future of digital governance.

Key takeaways from the implementation

Bridging the policy awareness gap

The initial assessment identified a need for targeted capacity building on how international standards and certifications support digital public policy, both through voluntary market adoption and direct referencing within technical regulations.

Reducing institutional silos

The project identified opportunities to form a closer alignment between digital transformation policymakers and NSBs. The Toolkit was deployed to facilitate this partnership, fostering the multi-stakeholder collaboration necessary to streamline policy development and ensure domestic regulations integrate with the global market.

Harmonizing sector-specific needs

Our engagement highlighted the need for further alignment of sector-level policies (particularly in healthcare). Better policy alignment would help prevent data silos and reduce compliance complexities for scaling businesses.

Standards-led Digitalization Toolkit: Overview of case studies

Across these varied contexts, the project found that the participants faced similar challenges, which the toolkit was able to address, delivering positive outcomes.

Training participants' shared challenges and priorities

- ✓ **Keeping regulation in step with technology:** There is a clear need for digital frameworks that match the rapid pace of technological change and work across sectors.
- ✓ **Ensuring business continuity:** Organizations need established processes that maintain resilience through organizational and staff changes.
- ✓ **Understanding international best practice:** Organizations want to be able to understand international standards and how to apply them in country-specific contexts.
- ✓ **Clarifying policies and accountability:** Participants want to strengthen their digital governance with clear, consistent rules and responsibilities.

Key outcomes from the Standards-led Digitalization Toolkit

- ✓ **Increased confidence and authority:** Participants felt more empowered to lead, speak up and make decisions in their roles.
- ✓ **Greater awareness of risk:** Improved ability to identify, assess and address risks in digital systems, services and governance.
- ✓ **Strengthened technical knowledge:** Deeper understanding of standards, regulations and best practice, and how to apply them.
- ✓ **Expanded professional networks:** New connections with peers, regulators and institutions for collaboration and knowledge sharing.
- ✓ **Practical application:** Ability to use the learning to improve processes, policies and service delivery.





Interviews with stakeholders from Brazil, Indonesia, Kenya and Nigeria, who participated in the Standards-led Digitalization Toolkit training sessions, provided positive feedback on the project. These individuals represented financial services, data protection, public procurement, and the wider public sector.

> These sessions are enablers that... [are] a competitive differentiator for the business.

Public Services Director, Brazil

> It's increased my confidence at work because I now know what the actual problem is.

Senior Procurement Official, Indonesia

> It has increased my risk awareness. I'm able to see opportunities for improvement.

Financial Sector Leader, Kenya

> I got some validation of what I was doing. I got more guidance.

Data Protection Regulator, Nigeria

Case study: Financial services (Kenya)

Challenge

Mary (not her real name) began her career in banking over 20 years ago, at a time when cheques and transactions were manually recorded in books. In her current role at the Central Bank of Kenya, Mary oversees a new wave of non-bank digital payment providers. The dynamic landscape presents emerging business models and urgent issues related to consumer protection, data privacy and financial crime. While regulatory oversight must evolve to support responsible innovation, regulators currently face a critical capacity gap, navigating complex new challenges, such as interoperability, digital identity and information security, with limited prior exposure.

> “How can regulatory oversight keep pace with responsible innovation in this fast-moving space?

Approach

Mary has been a highly engaged participant in the Standards-led Digitalization Toolkit process since 2023. She began by bridging theory and practice through foundational Standards-led Digitalization Toolkit training and the Digital Symposium. Rapidly scaling her technical expertise, Mary is now qualified as both an ISMS lead auditor and an AI management practitioner. Leveraging these credentials and her strategic insights, she was selected as a key facilitator for the December 2025 AI Standards Summit in Seoul, where she successfully represented developing economies and engaged in global dialogue with international stakeholders.

Result

- ✓ **Increased confidence:** Mary described the training as giving her “expert power”, a more informed and authoritative position in her work.
- ✓ **Advanced knowledge of standards application:** She developed a clear, practical understanding of how to harmonize international best practices with domestic legislation to ensure market consistency.
- ✓ **Network of experts:** Mary joined a network of digital toolkit peers and experts across industries, regulators and countries.



Case study: Public services (Brazil)

Challenge

Joaquim (not his real name) works in Brazil's Ministry for Management and Innovation, where he oversees a wide mandate that involves coordinating efforts across all areas of government agencies. Brazil has made significant strides in its digital transformation, but rapid digitalization created new risks in personal data and information security. Faced with a lack of methodological consistency caused by different standards being used in different ways, he was looking for ways to ensure digital inclusion and accessibility for all citizens.

> "Standards help us to share knowledge… it's a very important job to transfer your knowledge with the next generation in mind.

Approach

In collaboration with the BSI team working on the Standards-led Digitalization Toolkit, Joaquim and his team convened a strategic series of workshops and training sessions for nearly 70 federal chief information officers. Joaquim actively spearheaded the Digital Symposium, tailoring the agenda to focus strictly on risk evaluation against critical cyber threats. Throughout the Standards-led Digitalization Toolkit implementation, Joaquim's leadership in assembling the right stakeholders and injecting highly contextualized insights proved essential in driving consensus.

Result

- **Reinforced crisis management:** The Standards-led Digitalization Toolkit provided structured frameworks (ISO 22361 and ISO 22301) that supported Joaquim's team's ongoing efforts in mapping the incident life cycle, identifying risks rapidly, and streamlining escalation protocols
- **Elevated trust and credibility:** By integrating ISO 27001, the engagementstrengthened the agency's existing commitment to supply chain security. International standards further solidified their credibility, reinforcing their position as a secure, mature partner for future digital initiatives.
- **Harmonized cross-departmental language:** The Standards-led Digitalization Toolkit introduced a shared international taxonomy that complemented the agency's collaborative culture. Cross-functional teams are now able to approach emerging risks with a standards-based framework, optimizing their internal collaboration.
- **Anchored digital inclusion:** The standards-led approach reinforced Brazil's established commitment to digital equity, equipping the team with verifiable methodologies to ensure accessibility is consistently embedded into their training and service design.



Case study: Revenue Authority (Nigeria)

Challenge

Musa (not his real name) has witnessed a major digital transformation process in Nigeria's revenue authority, which led to a significant improvement in revenue collection. Yet this success brought new challenges related to digital operations and data security. Faced with internal and reputational risks when engaging with external and international partners, Musa needed guidance on which standards to apply to data governance.

> "If people share data with us, they need to trust that we can safeguard it properly.

Approach

As an active participant in the Standards-led Digitalization Toolkit, Musa completed the foundational training and Digital Symposium in 2024. He is currently pursuing his AI management practitioner certification. For Musa, participation in the Standards-led Digitalization Toolkit initiative created the space to rigorously interrogate his organization's legacy approaches and exchange high-level perspectives with cross-border, cross-institutional colleagues.

Result

- ✓ **Strengthened data governance:** Musa has since applied this learning to support the introduction of a new protocol that limits access to sensitive taxpayer data. Each tax office now has clear accountability and time-bound deletion requirements.
- ✓ **Improved interoperability:** Musa reinforced efforts to reduce fragmentation between different tax offices. A strategic plan is now underway to integrate siloed internal applications using international standards.



Case study: Public procurement (Indonesia)

Challenge

Nurhaliza (not her real name) works for a government procurement agency in Indonesia, helping to develop and support national procurement frameworks. As digital innovation accelerates, the agency must modernize systems and make sure procurement frameworks are secure, resilient and interoperable. Without structured documentation, the agency lacked a verifiable mechanism to assess compliance, putting the operation at risk. In addition, a lack of structure meant that key knowledge could be lost when people move roles, highlighting the urgent need for long-term resilience.

> "
> Technology is moving faster than regulation.

Approach

Nurhaliza joined the Standards-led Digitalization Toolkit training and took part in the ISO/IEC 27001 lead auditor course, where she was introduced to the principles and methods of auditing for ISMS. Through hands-on learning with peers, she acquired skills to lead audits, assess organizations against standards, plan audit processes and report findings with confidence. She successfully passed the exam and is now a certified ISMS lead auditor.

Result

- ✓ **Verifiable accountability:** Nurhaliza is now equipped to support her team's transition from informal processes to structured frameworks, enabling her to demonstrate and manage compliance.
- ✓ **Systemic risk mitigation:** She acquired the skills to systematically document risks, ensuring critical knowledge is retained during staff transitions.
- ✓ **Strengthened compliance:** With ISMS methodologies, she can now proactively identify security gaps and confidently enforce rigorous procurement standards.

5.

Building digital trust: A playbook for policymakers

1. Digital transformation: opportunities and risks ›

2. The role of standards in digital transformation ›

3. Sector applications: agriculture, e-commerce, education, energy, healthcare ›

4. Standards-led Digitalization Toolkit: insights from implementation ›

5. Building digital trust: A playbook for policymakers ›



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Standards-enabled digital transformation

The experience and insights gained through the Standards-led Digitalization Toolkit project, demonstrated a clear need to translate these lessons into a structured and transferable approach that can be adapted and applied across different country contexts. This reflects a shift from individual initiatives towards amplifying impact and supporting systemic change, well aligned with FCDO's UK Digital Access Programme and wider approach to digital development.

While international standards provide essential foundations for trust, interoperability and effective governance, their impact depends on how they are integrated alongside other policy instruments, such as regulation, institutional frameworks and investment strategies, within a coherent national approach.

In this context, policymakers require a clear and practical answer to what comes next: how to move from piloting and learning to broader implementation. This section introduces a strategic playbook for standards-enabled digital transformation, drawing on practical experience to support this transition.

The playbook outlines structured steps to integrate standards as a complementary tool within wider digital policy, enabling countries to align cross-cutting and sector-specific priorities, strengthen institutional capacity and support coordinated implementation across stakeholders. These steps are organized within four interrelated pillars – strategic planning, using standards to build trust, strengthening capacity and quality infrastructure, and implementation, monitoring and measuring impact – which together provide a coherent framework for application. The approach is designed to be adaptable to countries at different stages of their digital transformation journeys.

Success factors include:

- ✓ Senior leadership and commitment.
- ✓ Alignment with economic priorities.
- ✓ Multi-stakeholder governance.
- ✓ NSB involvement.
- ✓ Use of internationally recognized standards.
- ✓ Regulatory coordination.
- ✓ Conformity assessment capability.
- ✓ International cooperation.



Pillar 1: Strategic planning for standards-enabled digital transformation

1 Establish national leadership and governance

Identify the institutional lead to avoid fragmentation between regulators, ICT agencies and standards institutions. Create a national digital trust steering committee or a standards coordination mechanism to establish a governance structure, terms of reference, national priorities and a stakeholder map.

2 Conduct a national digital trust and readiness assessment

Begin with a diagnostic phase to examine both technical infrastructure and institutional trust architecture. Evaluate existing digital strategies, cybersecurity maturity, privacy and data protection frameworks, institutional capabilities, the conformity assessment ecosystem and skills gaps. This assessment should take into account existing institutional capacity, available resources and implementation constraints.

3 Identify priority economic and public sectors

Rather than attempting whole-system digitalization at once, prioritize sectors such as government services, healthcare, financial services and agriculture. Link these to concrete national economic or social development priorities such as interoperable health systems or trusted e-commerce.

Pillar 2: Using standards to build trust

1 Map relevant international standards and good practices

Identify existing international standards, conformity assessment mechanisms and governance models that can support trusted digitalization, emphasizing adaptation to local context, not blueprinting (see Table 11).

2 Integrate standards into national digital policy and regulation

Use standards strategically within legislation, technical regulation, procurement and public policy. Regulate outcomes, while using standards to operationalize implementation, aligning with WTO TBT principles and international harmonization.

Table 11

Topic	Status	Standards/frameworks
Information security	Standard incorporated into or referred to in regulations	ISO/IEC 27001
Privacy	Partial use of the standard on a voluntary basis	ISO/IEC 27701
AI management systems	Awareness of the standard, but not implemented	ISO/IEC 42001
Cloud computing	Not adopted as a national standard	ISO/IEC 27017
IoT interoperability	No awareness of the standard	ISO/IEC 21823
Digital identity	Not adopted as a national standard	ISO/IEC 24760

Before the formulation or implementation of national policies and regulations, consider the advantages of aligning them with internationally agreed practices set out in ISO and IEC standards.

- ✓ Assess the strategic applicability of the standards referenced in this publication to your specific national context. To support this evaluation, all cited standards can be previewed, free of charge, at the ISO and IEC. Both platforms feature advanced search functions that help users identify other relevant standards that are relevant to specific policies.
- ✓ Engage with your NSB to find out about the international standards that have already been adopted in your country, often accompanied by localized translations.
- ✓ Explore pathways for participating directly in the international standards development process through active engagement with NSBs. A full list of ISO member bodies is available from the ISO and IEC national committees from the IEC.



Pillar 3: Building capacity and quality infrastructure for standards-led digital transformation

1 Build national capacity and awareness

Address institutional competence by training regulators and SMEs, running awareness campaigns and supporting certification and standards education.

2 Strengthen the national quality infrastructure (NQI)

Access competent and credible accreditation, testing, certification and market surveillance. Make use of internationally recognized standards nationally, build accreditation capability, train auditors and create cybersecurity certification schemes to build a trust ecosystem.



Pillar 4: Piloting, monitoring and measuring impact of standards-led digitalization

1 Run pilot projects

Implement pilot projects that can then be scaled up, such as secure e-government platforms, standards-based digital ID, or interoperable healthcare records. Pilots help build confidence, test interoperability and demonstrate value to policymakers.

2 Establish monitoring, metrics and continual improvement

Establish key performance indicators (KPIs) such as cybersecurity incident reduction, SME digital adoption, accredited certification uptake and interoperability indicators. Use a Plan-Do-Check-Act (PDCA) approach to continual improvement.

3 Link digitalization to trade and international recognition

Link trusted digitalization to international trade, regional integration and digital economy participation. This can involve mutual recognition, regional harmonization, and alignment with frameworks that support cross border data flows, digital services trade and AI governance compatibility.

Conclusion

Digital transformation is entering a new phase, one defined not only by rapid technological advancement driven by AI, but also by increasing interdependence between systems, markets and institutions. For policymakers, this raises a critical question: how to ensure that digital systems are not only innovative, but also coherent, resilient, inclusive, and able to operate effectively at scale.



International standards provide an essential part of the answer. They offer structured, internationally recognized frameworks that can help governments move from fragmented or ad hoc digital initiatives towards more coordinated and sustainable approaches. When used strategically, standards can support alignment across policy, regulation and implementation, enabling more consistent outcomes across sectors and over time.

Looking ahead, the role of standards is likely to become increasingly significant. As technology solutions such as digital identity, cross-border data systems, and AI-enabled platforms, continue to evolve, the need for common approaches to governance, interoperability and risk management will grow. Countries that engage actively with international standards through both adoption and participation in their development will be better positioned to shape these frameworks in line with their national priorities.

At the same time, effective use of standards depends on broader institutional factors. Sustained progress will require investment in national quality infrastructure, strengthening coordination between policymakers and NSBs, and building the technical and regulatory capacity needed to apply standards in practice. This is not a one-off exercise but an ongoing process of adaptation, learning and refinement.

The experiences presented in this guidance suggest that progress is achievable when standards are embedded as part of a wider policy toolkit, alongside regulation, capacity-building and stakeholder engagement. In this context, standards should be seen not as an end in themselves, but as practical instruments that support more effective digital governance and implementation.

Ultimately, digital transformation will continue to evolve in ways that are uncertain and context-specific. However, the need for trusted, interoperable and well-governed systems is consistent across countries and sectors. By taking a structured and context-sensitive approach to the use of international standards, policymakers can strengthen their ability to navigate this complexity and to deliver a more inclusive, responsible, and sustainable digital transformation, with outcomes that are durable, adaptable and aligned with their national economic and social development objectives.

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