



Note by the Secretary-General

WSIS+20 REVIEW ACTION LINES MILESTONES, CHALLENGES AND EMERGING TRENDS BEYOND 2025

Purpose

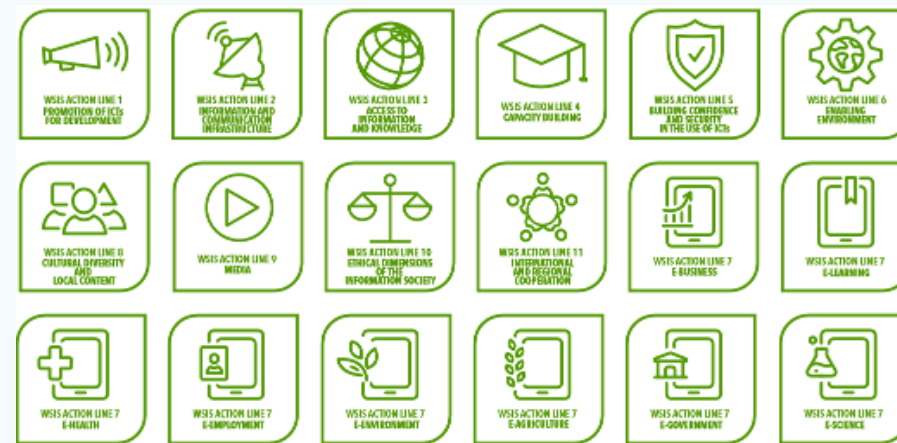
This document outlines the presentations of the WSIS+20 Review Action Lines, prepared by the WSIS Action Lines facilitators, highlighting the milestones, challenges, and emerging trends beyond 2025.

Action required

This report is transmitted to the Council Working Group on WSIS and the SDGs **for information**.

References

[CWG-WSIS&SDG website](#); [Geneva Declaration of Principles](#); [Geneva Plan of Action](#); [WSIS website](#)



WSIS+20 Review Action Lines Milestones, Challenges and Emerging Trends beyond 2025

by WSIS Action Lines facilitators





WSIS+20 Review Action Lines Milestones, Challenges and Emerging Trends beyond 2025

C1 The role of governments and all stakeholders in the promotion of ICTs for development

The Evolution of Context

- Bridge the digital divide: This gap refers to the unequal access to and use of ICTs between different countries, communities, and individuals.
- Empower individuals and communities: ICTs can be powerful tools for education, healthcare, economic development, and citizen participation.
- Promote good governance: ICTs can enhance transparency, accountability, and citizen engagement in government processes.
- Achieve sustainable development: ICTs can play a key role in addressing various development challenges, including poverty, hunger, and climate change.

Key Milestones: 20 years of Achievements

- 2004-2010
 - Establishing the Multi-Stakeholder Model
 - Defining priorities and action plans
 - Building capacity
- 2010-2015
 - Expanding infrastructure
 - Mobile revolution
 - E-government
- 2015-2024
 - Digital inclusion
 - Rise of big data and analytics
 - Smart cities
- Beyond 2024
 - Integrating AI

Challenges in implementing the Action Line

- **Coordination and Collaboration:** Bringing together diverse stakeholders with different priorities and interests can be difficult. Effective communication and mechanisms for collaboration are essential.
- **Capacity Building:** Many stakeholders, particularly in developing countries, may lack the necessary skills and resources to effectively participate in the ICT for development agenda. Building capacity across all stakeholder groups is crucial.
- **Funding and Resource Constraints:** Implementing ICT for development initiatives often requires significant financial resources. Securing adequate and sustainable funding can be a major challenge.
- **Digital Divide:** The very action line aims to bridge the digital divide, but this prevalent issue itself creates hurdles. Unequal access to technology and infrastructure can hinder participation from marginalized communities.
- **Privacy and Security Concerns:** The increasing use of ICTs raises concerns about data privacy and security. Measures need to be put in place to ensure that ICTs are used responsibly and ethically.
- **Regulatory Frameworks:** Existing regulations may not be conducive to innovation and investment in ICTs. Updating and adapting regulations to support the evolving ICT landscape is essential.
- **Sustainability:** Ensuring that ICT for development initiatives are sustainable in the long term can be challenging. This requires ongoing support, maintenance, and capacity building.

Trends and Opportunities Beyond 2025

- Technological advancements
 - Widespread adoption of AI
 - Rise of Quantum Age
 - Next-Generation Connectivity
- Focus on Sustainability
 - Climate change solutions
 - Circular economy
 - Biotech revolution
- Social and Economic Shifts
 - The future of work
 - Growing urbanization
 - Evolving geopolitical landscape



WSIS+20 Review Action Lines Milestones, Challenges and Emerging Trends beyond 2025

C3 Access to Information and Knowledge

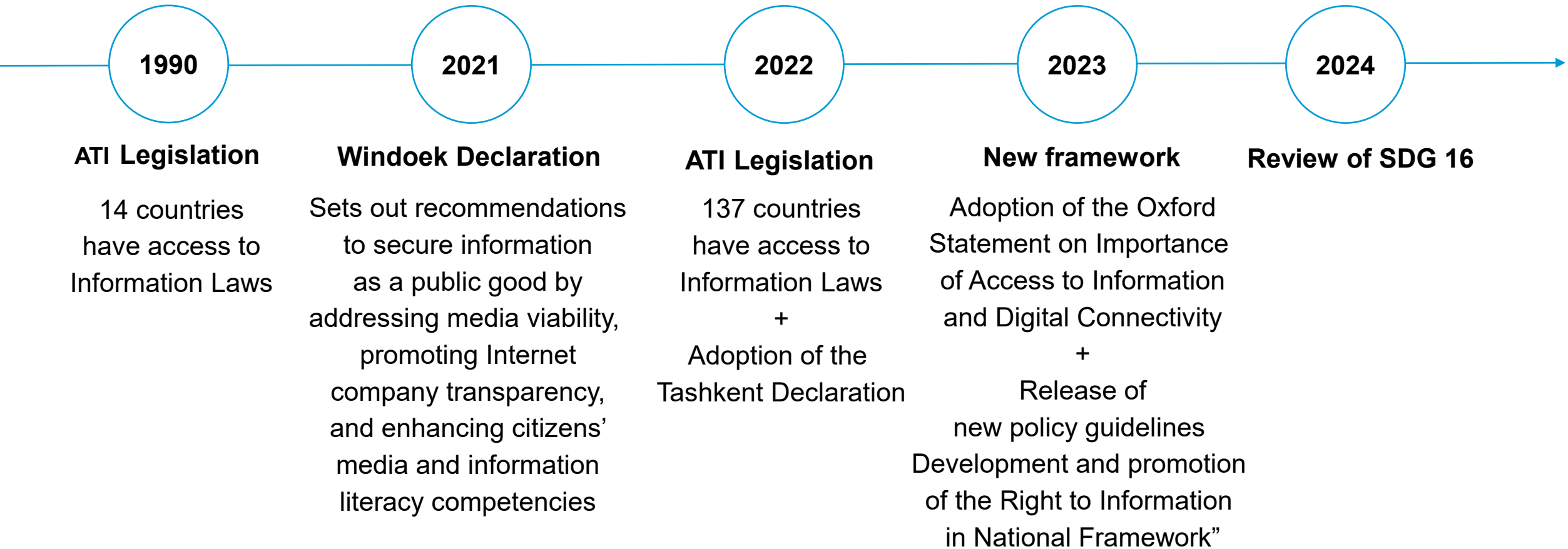
The Evolution of Context

- The informational space has drastically changed and the ways to access information too. Given the rapid rise of the internet age and social media, there has been an increasing access to news and information on which media professionals can report, empower and inform the public and, where possible, use in decision-making.
- Libraries, museums, archives and other cultural institutions hold information **and data**, that can be classified. These institutions are also increasingly considering the potential brought by the involvement of volunteers (or crowdsourcing) in digitization projects, and particularly their contribution in collections' cataloguing and providing additional support in interpreting documents.

The Evolution of Context

- In addition to traditional information systems in analog or digital forms, public agencies increasingly use the newest digital technologies, namely Artificial Intelligence (AI), mobile, Big data, analytics and cloud to boost operational efficiency and to enhance their response to citizens, enterprises, partners' needs.
- There is a disproportionate increase in incomplete, false, and misleading information as well as the overload of unverifiable information, presented in culturally and linguistically inappropriate manner, there does not appear to be a commensurate increase in the availability, visibility, prominence, and engagement with verified information itself. The multiplication of sources of information (noise), as well as the emergence of new technologies powered by artificial intelligence, have intensified the consequences of disinformation. In an algorithmic system based on mass opinions, the use of bots distorts human perception of values, historical realities, products, or even governments and institutions.

Key Milestones: 20 years of Achievements



Challenges in Implementing the Action Line

- **Challenge 1** : Ubiquitous connectivity, strong mobility, intuitive and user-friendly interfaces and new transactions channels, look beyond the classical governmental services available online and/ or through mobile devices. These technologies raise bigger challenges of an open and equitable access for all citizens to the knowledge and benefits to be derived from the resulting important expansions of Public Sector Information and Data.
- **Challenge 2** : An unprecedented open release of public information is nowadays coupled to a high-volume exchange of extremely sensitive and/or personal data across government agencies and citizens.
- **Challenge 3** : Digital phenomena such as cloud computing, mobility, social media, big data, and artificial intelligence give rise to several complex security challenges as well as countless concerns for citizen privacy, with potential threats ranging from hacking or misinformation and disinformation to cyber-terrorism.

Trends and Opportunities Beyond 2025

Trends

- Access to Information and Access to Data are both rights that are enshrined in legislation;
- An increasing numbers of countries adopted access to information legislation (137 countries in 2024)
- Access to information, including through the Internet, is widely recognized as an enabler of a broad range of human rights, and that access to information includes accessibility for persons with disabilities.

Trends and Opportunities Beyond 2025

Opportunities

- Proactively address citizen-consumer complaints through independent regulatory authorities.
- Foster interdisciplinary research collaborations to effectively tackle societal challenges, improve research quality, and facilitate the education of new researchers.
- Establish a universal framework guiding AI legislation, prioritizing human rights, dignity, equality, and equitable access to AI developments.



WSIS+20 Review Action Lines Milestones, Challenges and Emerging Trends beyond 2025

C4 Capacity Building

The Evolution of Context

Evolution of technology over 20 years

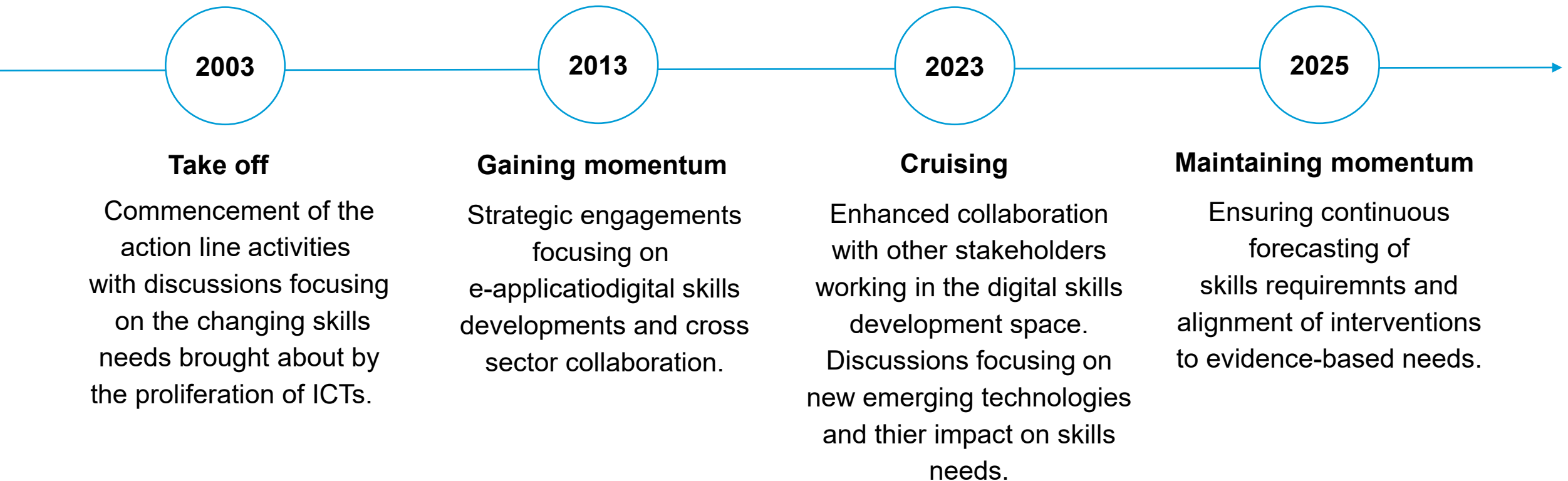
- Artificial Intelligence (AI) and Machine Learning (ML) led to the development of applications such as Natural Language Processing (NLP), image recognition and autonomous systems.
- New digital learning and collaboration solutions enabled by Augmented Reality (AR) and Virtual Reality (VR) contribute to the expansion of the outreach and impact of learning programmes.
- Continued growth of online learning and use of technology in learning and skills development.

The Evolution of Context

Evolution of the engagement of stakeholders: Need for a multistakeholder collaboration which promotes an inclusive approach and fosters partnerships between all stakeholders involved

- **Governments** contribute to creating an enabling environment through policy frameworks that support capacity building Initiatives, and regulatory support.
- **Academic Institutions** leverage expertise to develop curricula and work with the technical community to incorporate the latest technological advancements into capacity building programs.
- The **private sector** has been engaging in partnerships to contribute to capacity building initiatives as part of CSR activities. This guarantees an alignment of those programmes with industry needs.
- **Civil society and community-led initiatives** ensure that capacity development programmes are tailored to the needs of local communities and promote a bottom-up approach that gradually empowers citizens.
- **International Organizations** leverage global expertise and resources for capacity building, while disseminating knowledge and facilitating the exchange of best practices among countries.

Key Milestones: 20 years of Achievements



Challenges in implementing the Action Line

- **Limited resources:** Insufficient ICT infrastructure (access to connectivity, devices) can impede effective capacity development Initiatives. Lack of sufficient funds to carry out comprehensive capacity building programmes is a challenge to ensuring sustainability and scalability of such initiatives.
- **Persisting digital divide and digital skills gap:** Unequal access to digital technologies, especially in areas which are difficult to reach, exacerbates the digital skills gap within underserved communities, which are at risk of being left further behind.
- **Policy and regulation:** The lack of coordination and alignment of policies at national level could lead to inconsistencies in implementing global capacity development programmes.

Challenges in implementing the Action Line

- **Adaptability to a fast-paced technological landscape:** The rapid evolution of technology can render capacity development efforts obsolete if they do not keep pace with the latest technological developments. Therefore, it is crucial to continually adapt to emerging technologies and the changing needs.
- **Monitoring and Evaluation:** Lack of standardized M&E systems to accurately measure the impact of capacity building programmes, particularly the long-term benefits of capacity building interventions in enabling socio-economic development and citizen empowerment.

Trends and Opportunities Beyond 2025

Trends

- By 2030, it is expected that 40 per cent of existing jobs will be lost to automation, while 24 million new jobs will be created worldwide.
- Emerging technologies bring opportunities to accelerate the achievement of the SDGs. However, they are also likely to generate more inequalities.
- Continuous need for upskilling and reskilling.
- Development of inclusive capacity development programmes which are tailored to the needs of all beneficiary groups (women, youth, persons with disabilities, older persons, underserved communities).
- Global collaboration and knowledge sharing.

Trends and Opportunities Beyond 2025

Opportunities for ITU beyond 2025

- Continue to support member States in designing, developing, and deploying ICT-enabled systems in a safe, trustworthy, and inclusive manner that respects human rights.
- In line with its new resolution on AI, ITU will continue its research, information sharing, and capacity development activities on AI to foster an enabling ecosystem for the development of AI technologies for development.
- Move towards a co-creative programmatic approach to inform contextualized practices, strengthen learner-instructor relations, and improve instructional design.
- Invest in multi-stakeholder partnerships and cooperation frameworks where the private sector provides the technologies while the public sector ensures political buy-in and users' readiness.



WSIS+20 Review Action Lines Milestones, Challenges and Emerging Trends beyond 2025

C5 Building Confidence and Security in the use of ICTs

Comparative Snapshot

2005

- Only 1 billion people were online.
- Mobile phones were primarily used for calls and texts.
- Mobile payments were just starting to gain traction.
- The cost of cybercrime to the global economy was \$400 billion, significant for that time.
- Threat vectors, though sophisticated for their time, were very different from today's.

2024

- 5.4 billion people are online.
- Cyberattacks are increasing by 80% year-on-year. The cost of cybercrime has skyrocketed, rising more than 20 times from \$400 billion in 2005 to an estimated \$8-11 trillion.
- An attack occurs approximately every 39 seconds somewhere on the web.
- With our growing dependence on digital technology, cybersecurity and privacy concerns have intensified.
- Resilience now involves safeguarding a wide range of physical infrastructures such as submarine cables, satellites, and terrestrial networks, alongside implementing robust cyber resilience

The Evolution of Context

The ICT landscape has changed drastically since 2005, with ICTs now underpinning every sector of society and the bulk of critical infrastructure. Examples -

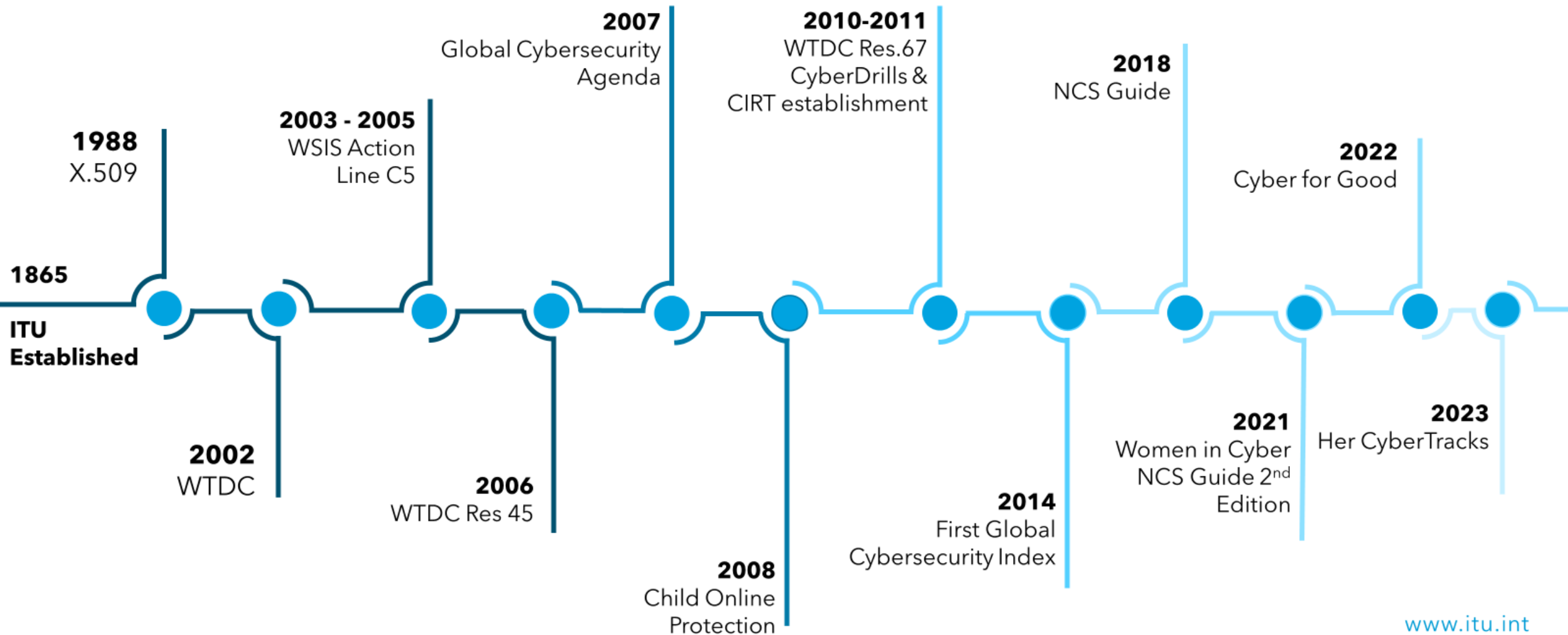
- **Emergence of Artificial Intelligence (AI)** allowing humans and machines to make more informed decisions – while raising challenges of security, trust, and safeguarding human rights.
- **Wider adoption of the Internet of Things** with billions of new interconnected devices, opening up significant new potential vulnerabilities.
- **New communication technologies and standards**, such as 5G, enabling communication at exponentially faster speeds.
- **Quantum computing**, offering computing speeds far beyond current capabilities, presenting great opportunities while also threatening current cryptographic algorithms.
- **New security technologies**, such as Distributed Ledger Technologies (e.g., blockchain), offering significantly better ways to safeguard systems and data. More countries are adopting digital identity systems.
- **Wide-scale adoption of social networks**, which have brought forth significant trust concerns.
- Emergence of the **dark web** has raised growing concerns worldwide about criminal activity in cyberspace.

The Evolution of Context

Evolution of the engagement of stakeholders

1. There has been growing recognition among all stakeholders on the diversity of urgent actions needed to advance cybersecurity, ranging from protection of critical infrastructure to safeguarding user privacy.
2. The COVID-19 pandemic highlighted the centrality of ICTs to health and safety, and the need to address rapidly evolving cybersecurity challenges.
3. The framework offered by the ITU's Global Cybersecurity Agenda (GCA) continues to offer a broad framework for international cooperation on cybersecurity within the framework of the WSIS outcome documents.
4. More than 125 countries have signed and/or ratified different cybersecurity and cybercrime conventions, declarations, guidelines or agreements.
5. A number of national, regional and international organizations, many of them multistakeholder in nature - have been set up to tackle the issue of cybersecurity.
6. Pursuant to UNGA Resolutions, groups such as the Group of Governmental Experts (GGE) and Open-ended Working Group (OEWG) have studied several issues related to the use of ICTs in the context of international security.
7. In accordance with General Assembly resolution 75/282 and General Assembly decision [78/549](#) the [Ad Hoc Committee to Elaborate a Comprehensive International Convention on Countering the Use of Information and Communications Technologies for Criminal Purposes](#), established by the General Assembly in its resolution 74/247, held its reconvened concluding session from 29 July to 9 August 2024 in New York where a Draft United Nations convention against cybercrime; Strengthening international cooperation for combating certain crimes committed by means of information and communications technology systems and for the sharing of evidence in electronic form of serious crimes has been agreed.

ITU and Cybersecurity: a Timeline





Challenges in implementing the Action Line

Challenge 1 Timely and sufficient resource mobilization

Challenge 2 Stakeholder participation

Challenge 3 Evolving needs and capacities



Trends and Opportunities Beyond 2025

- UN remains critical fora for cyber discussions as well as technical collaboration
- Increasing focus for the need on capacity development
- New intervention models are needed to ensure long term sustainability
- Enhanced private sector engagement
- Continuing to share best practices and engagement with standards development

Thank you!



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C6 Enabling Environment

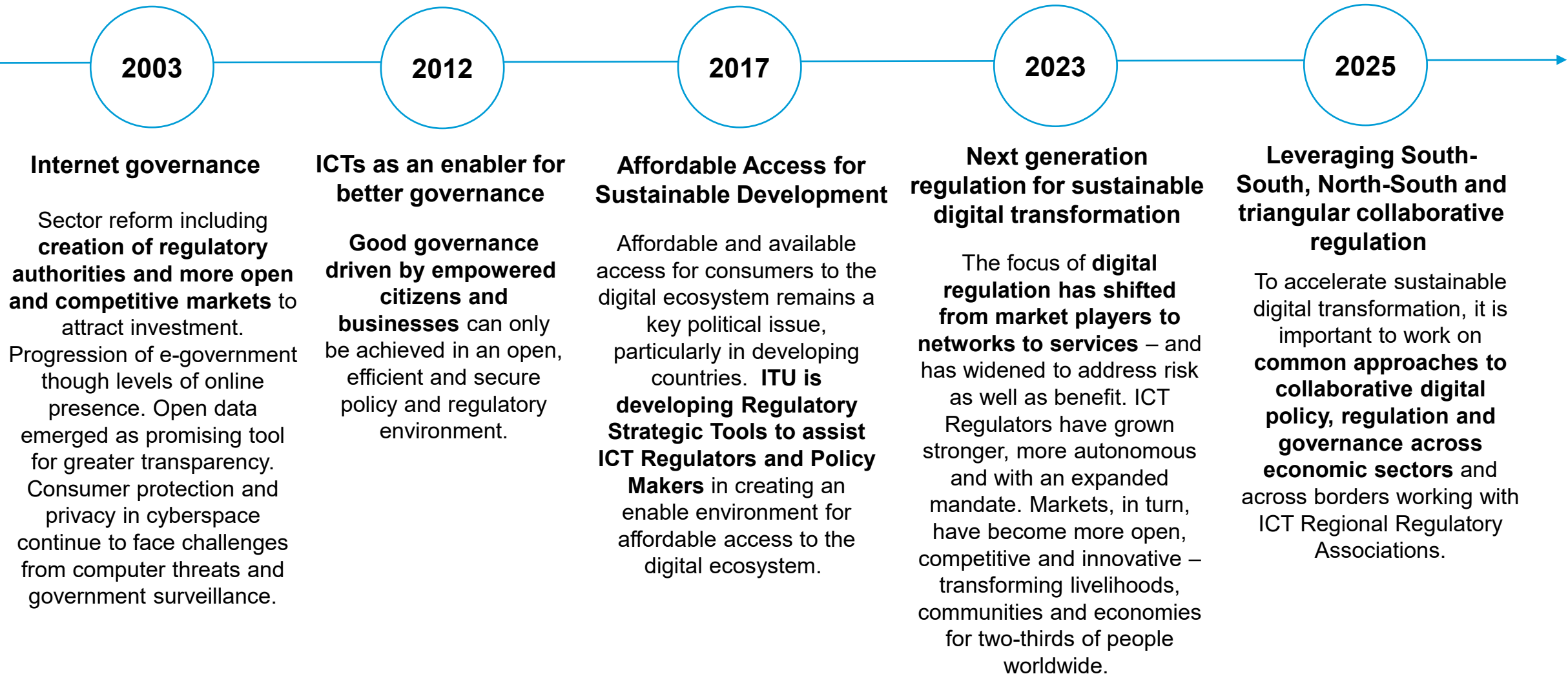
The Evolution of Context

- **Transition** has characterized the development of communication technologies since telecom sector reform in the early 1990s – voice to data, fixed to mobile, monopoly to competition.
- Telecommunications/ICT is present in virtually **all sectors** and underpins today's global digital economy and society.
- The challenge is not only one of infrastructure development. **Expanding connectivity is not enough.** WE need to address innovation opportunities for value creation, the skills needed for adoption and the infrastructure for access.
- Digital transformation is creating **convergence** in the business of different industries and associated convergence in the responsibilities of different regulators. The digital landscape depends on a **collaborative** approach between the regulator, other relevant government authorities, industry, and other key stakeholders.

The Evolution of Context

- New overlapping emergencies call for a **more strategic, systemic and concerted approach** to digital policy if we are to enhance public services, build long-term economic resilience, and spearhead innovation and social entrepreneurship over the mid- to long term.
- While the regulatory basics still apply and core regulatory mandates still need to be thoughtfully used – the job of regulators requires **new approaches, new skills, new tools, and new thinking** to create an enabling environment , attract investment, ensure access for all, in a safe, secured an informed manner.
- **Change is needed in policy and regulation.** Iteration, trouble-shooting and incremental improvement are decisive in policy implementation – without this agile approach, one third of the world's people will be left behind.

Key Milestones: 20 years of Achievements



Challenges in implementing Action Line C6

- **Challenge 1:** change is needed in the ICT policy and regulation frameworks to create an inclusive and conducive enabling environment, therefore there is a need to develop a common language, based on consultation and evidence; we need to reframe and operationalize policy agendas, and we need to skill up, and up again.
- **Challenge 2:** based on the outputs from our Action Line C6 facilitation meetings, one of the main challenges of collaborative regulation at national and regional level is to break across silos and break through insularity, to bring together the expertise and the enforcement needed to level the playing field across borders.
- **Challenge 3:** while governments could collaborate more closely on regulatory and economic incentives at regional and international level, what is key is an investment-friendly policy and regulatory framework to support digital transformation that positively impact all industries and markets in all sectors. It is very important to have the right incentives to encourage industry to invest on ICT technologies to enhance affordable access and reduce inequalities.

Trends and Opportunities Beyond 2025

Trends

- The new equilibrium will require a systems thinking approach to leverage the connection between digital technologies, public goods and economic activities, and to move towards lean governance models. One of the core focus areas of ICT policy makers and regulators should be to work on the design and adoption of flexible, forward-looking and light-handed regulatory frameworks to enable digital innovation.
- Consumers are confronted with new issues brought about by the wider availability of digital technologies in terms of greater choice of devices, online services and applications. Identifying pro-active policy and regulatory measures in addition to co-regulatory and self-regulatory solutions and initiatives geared towards educating and empowering consumers is essential to protect the rights of all users in an open, transparent and inclusive digital world.
- In the framework of the ITU Global Symposium of Regulators (GSR) and ITU's knowledge exchange platforms and data, research and analysis work, tools are available for effective regulation and assistance provided to members to support them to update their national regulatory frameworks to respond to the new requirements of Digital Regulation.

Trends and Opportunities Beyond 2025

Opportunities for ITU beyond 2025:

- Collaborative regulation should be a multi stakeholders-based activity, including end-users. Bring all together to collaborate is the best way to move forward.
- There are still many digital points that policy makers, regulators and stakeholders need to work together, such as market competition policy, digital taxes, fake news, privacy, security, AI, new technologies...



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C7 ICT Applications: E-agriculture

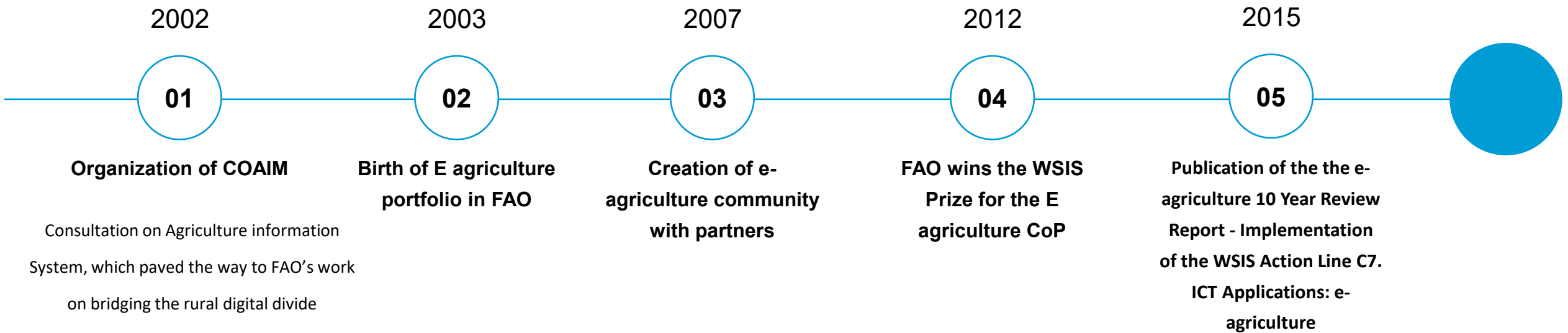
The Evolution of Context

- The WSIS Action Line C7 on e-agriculture specifically focuses on the use of information and communication technologies (ICTs) to enhance agricultural productivity, sustainability, and rural development. Digital initiatives for agriculture under AL C7 should aim at leveraging ICTs to address challenges and unlock opportunities in the agricultural sector, while keeping abreast of the latest developments worldwide to best address the world's global challenges, through targeted interventions to reduce poverty, hunger and increase economic development, directly contributing to the Sustainable Development Goals (SDGS) in a collaborative approach.
- Over the years, the promotion of digital technologies for agrifood systems transformation that impact positively agricultural development and food security has been strengthened with new initiatives to harness mobile technology, remote sensing, geographic information systems (GIS), and other digital tools to further support farmers in decision-making, crop management, and natural resource conservation.
- Focus has been given with renewed impetus to the following initiatives: developing knowledge sharing collaborative platforms and digital resources to facilitate the exchange of information and best practices in using ICTs for agriculture and rural development among agricultural stakeholders; fostering capacity building -to enhance digital literacy and technical skills among farmers, extension workers, and agricultural professionals-; providing policy support and technical assistance to governments and regional organizations in developing ICT policies and strategies for agricultural development; and finally, forging partnerships with other UN agencies, international organizations, academia, and civil society groups to advance the use of ICTs for agriculture within the broader context of sustainable development.

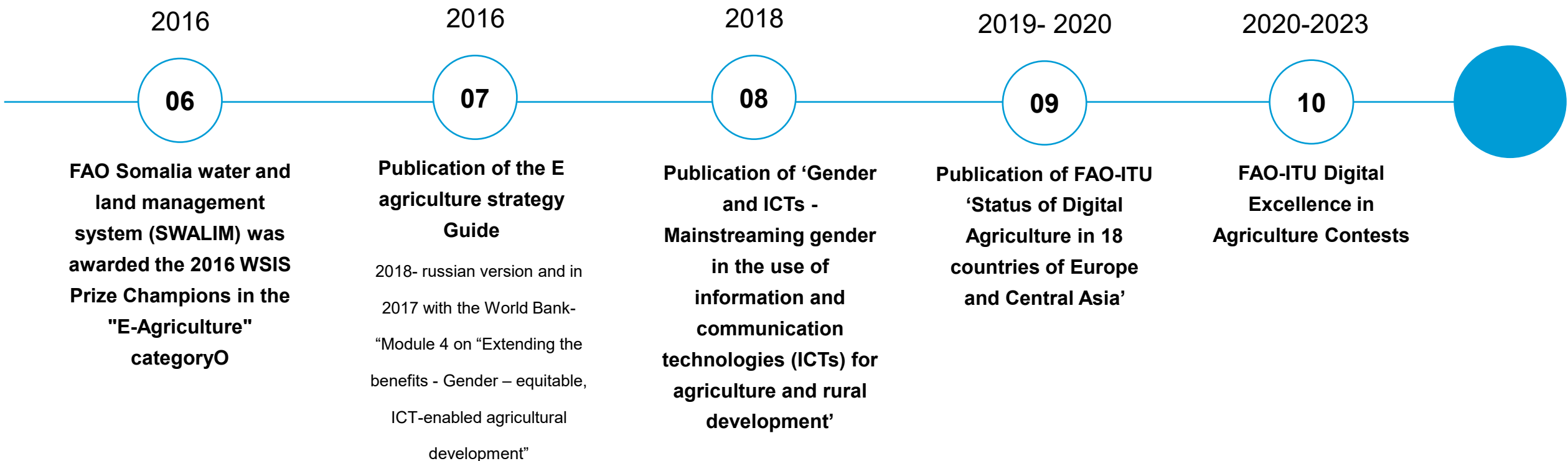
The Evolution of Context

- The need for ICTs in agriculture, fostering innovation and development doesn't need to be highlighted anymore as it is widely recognized now, also through a renewed digital inclusion focus, including empowering women, youth, and vulnerable populations in the agricultural sector.
- Stakeholders have been increasingly emphasizing the importance of capacity building, with boosted acquisition of digital literacy at several levels; as well as strengthening partnerships, through the promotion of cross-country and cross-sectoral collaboration and capitalization on good practices.
- Now with the rise of emerging technologies, that do not entail only a technological shift but trigger a whole economic, social and cultural revolution, the growing interest in AI, Big Data, and other disruptive technologies, open new possibilities to advocate for guidance on their ethical use, including in the food and agriculture sector.
- Scaling up digital solutions can therefore help now more than ever in addressing the current food crisis by using new, high-impact, sustainable digital-based and data driven solutions. Embracing new technologies, such as generative AI, has the potential, if used in a safe and ethical way, to revolutionize agriculture by improving efficiency, productivity and sustainability, through enhanced data-driven decision-making, precision farming, resource management, climate adaptation and resilience of agrifood systems.

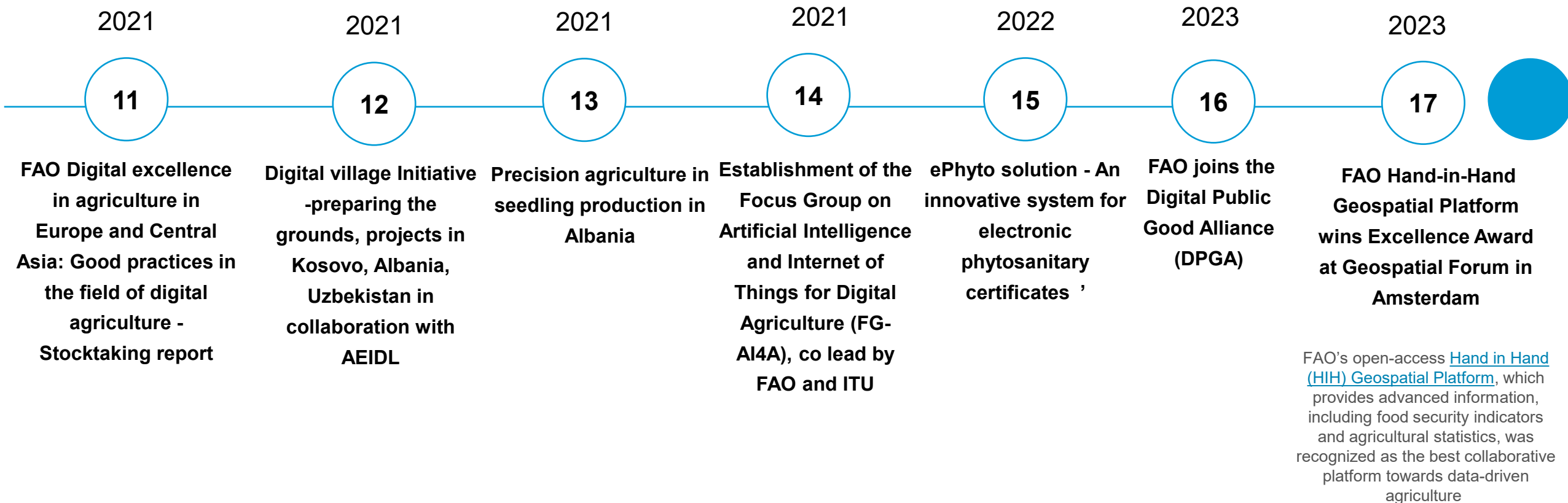
Key Milestones: 20 years of Achievements



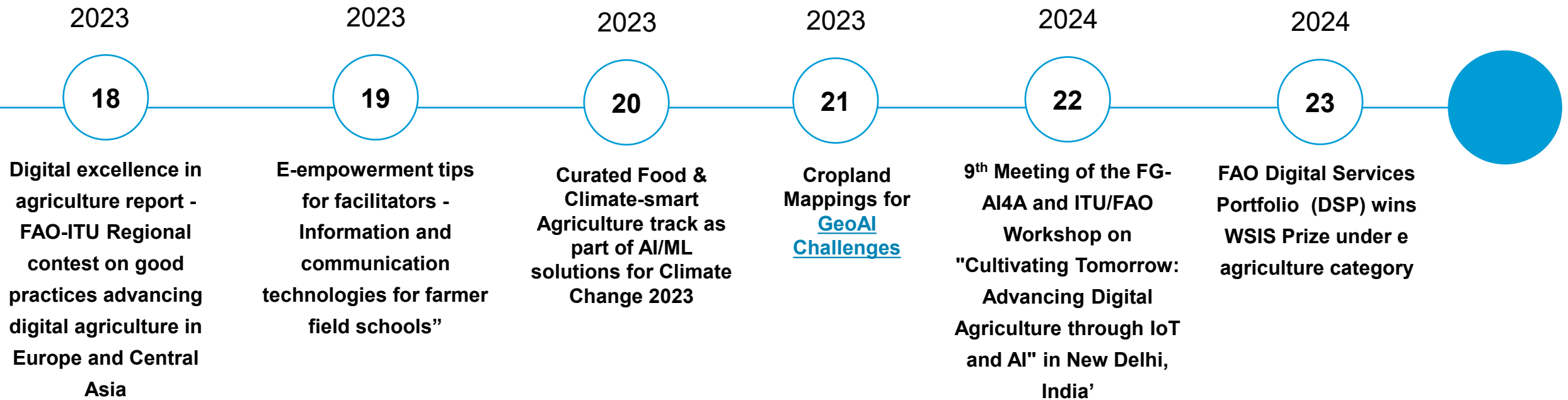
Key Milestones: 20 years of Achievements



Key Milestones: 20 years of Achievements



Key Milestones: 20 years of Achievements



Challenges in implementing the Action Line

Infrastructure gap: Despite progress, infrastructure limitations remain a hurdle to wider e-agriculture adoption.

Digital divide. The digital divide still persists despite the efforts made. According to the ITU (ITU, n.d.(a)), an estimated 2.6 billion people are still not online. 94% of the world's 'unconnected' population live in LMICs, and are more likely to be poor, living in rural areas, and women (GSMA, 2022(a)). Digital skills can be a powerful catalyst for women's and girls' economic, social and political empowerment and gender equality (SDG 5) and accelerate progress towards all the SDGs. Thus, the importance of digital inclusion in digital development should be further emphasized, especially compared with the accessibility and efficiency brought by digitalization, as there are still risks in excluding vulnerable groups, widening the digital divide, and solidifying digital inequality. Risk can be exacerbated with the misuse of new emerging technologies such as AI too if raising awareness on digital inclusion and providing technical assistance in this area are not done correctly.

Risk and ethics. Risk can be exacerbated with the misuse of new emerging technologies such as AI too if raising awareness on digital inclusion and providing technical assistance in this area are not done correctly and implementing the relevant safeguards to make a strong and lasting impact on our agrifood systems, ensuring food security thanks and within a digitally safe environment

Trends and Opportunities Beyond 2025

▪ TRENDS

We are now witnessing a trend of evolving demands that need to be addressed in a holistic perspective including the following:

- Countries are increasingly seeking support for institutional capacity building and systemic approaches like digital extension.
- Focus has shifted from just providing digital solutions to building institutional capacity for a systemic approach (e.g., digital extension services)
- A shift is occurring from individual projects to coordinated platforms and strategies for broader impact.
- The need for comprehensive analysis and ex-ante/ex-post feedback mechanisms is growing.
- The interest for new generative models and technologies needs to be regulated under a common global framework for a safe and inclusive digital governance, within a global digital ecosystem, while staying abreast of all the latest changes and trends that affect us to our core, preventing unwelcome new economic, social and ethical challenges and risks.

Trends and Opportunities Beyond 2025

▪ OPPORTUNITIES

- **Global evidence:** evidence-base in agrifood systems should be strengthened, not biased, but based on factual information and accurate data to feed in the most efficient way decision-making with scientific proven and action driven results.
- **Digital inclusion:** Digital inclusion, particularly for women and youth, in the transformation of agrifood systems should be kept as part of the broader focus on ICTs (e.g. rural radio was the most impactful ICT tool during the Covid-19 (WB) so as to ensure an inclusive transformation of agrifood systems that will leave no one behind.
- **Risks and ethics:** international platforms for addressing ethical and regulatory challenges related to emerging digital technologies should be leveraged to further explore common solutions to best serve the interests of the international community, complementing stakeholders' mandates under a robust digital cooperation framework.
- **Enhanced digital cooperation framework:** in the midst of the AI and digital revolution, there is a need to jointly develop context-specific solutions that consider the unique needs and challenges of each region while striving for sustainable agrifood systems and still being careful of still unknown risks. Governments, private sector, academia and civil society need to work together to catalyze new opportunities for furthering partnerships and better coordination of resources and to advance together concrete, integrated and targeted policies and actions to drive SDG transformation and the 2030 Agenda achievement in the midst of the AI revolution.



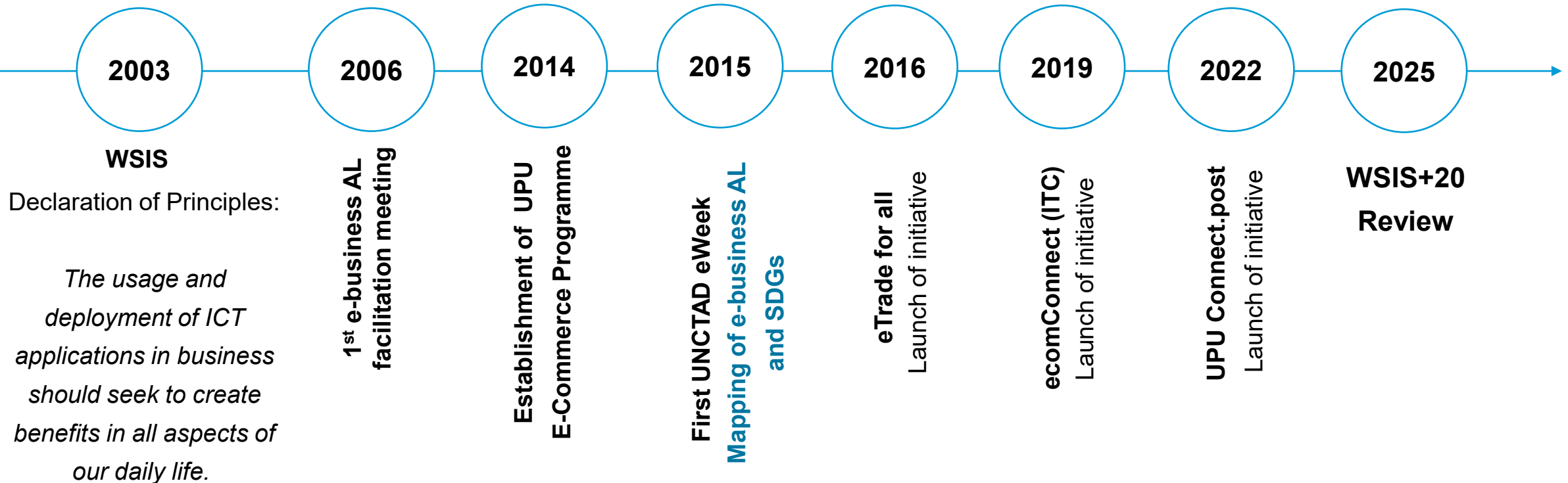
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C7 ICT Applications: E-business

The Evolution of Context

- Over the last 20 years, digital technologies have transformed the way we live, work, consume, and do business. Digitalization has facilitated participation in regional and global value chains of trade in goods and services.
- Data is now critical to be competitive in many sectors. The Internet of Things and AI are transforming how we produce and access goods and services. The data-driven digital economy could be harnessed to accelerate progress towards sustainable development goals.
- The COVID-19 pandemic accelerated the digital transformation while highlighting the persistent digital divide, both between and within countries.
- Digital technologies have become pervasive in the global economy. Effective digital cooperation is needed to ensure that e-business supports economic development outcomes that are inclusive and socially and environmentally sustainable.

Key Milestones: 20 years of Achievements



- Mapping of E-business action line to SDGs 1, 2, 5, 8, 9, and 17.
- 35 partners in the eTrade for all initiative so far
- 18 e-business action line facilitation meetings so far
- 8 editions of the UNCTAD eWeek with multi-stakeholder participation so far

Challenges in implementing the Action Line

- **Challenge 1:** Many developing countries and LDCs still lack the digital infrastructure, skills, resources, enabling environments, and access to capital needed to compete in e-business with developed countries.
- **Challenge 2:** They also lack official statistics on the use, value, or volume of e-business, e-commerce, and the digital economy to guide policy (evidence-based policy making).
- **Challenge 3:** The COVID-19 pandemic highlighted the continued divide between developed and developing countries regarding their digital readiness and their ability to leverage the data-driven digital economy for development goals.
- **Challenge 4:** Support from the international community to improve the e-business readiness of developing countries and LDCs is not yet enough to reduce the divide.

Trends and Opportunities Beyond 2025

- Global efforts to boost the digital readiness of developing countries should be scaled up.
- Least developed countries in particular need support to boost digital infrastructure, skills, and regulatory frameworks.
- The environmental footprint of the digital economy could be reduced through innovation in ICT production, e-waste management, and a shift to renewable energy.
- Women entrepreneurs in the digital economy need more support to improve their access to finance, services, and capacity building, and to involve them in crafting digital economy policy.
- It is time for a global governance approach to data, digital platforms, and technologies like AI, that will aim to ensure equal access, shared benefits, and the protection of human rights.



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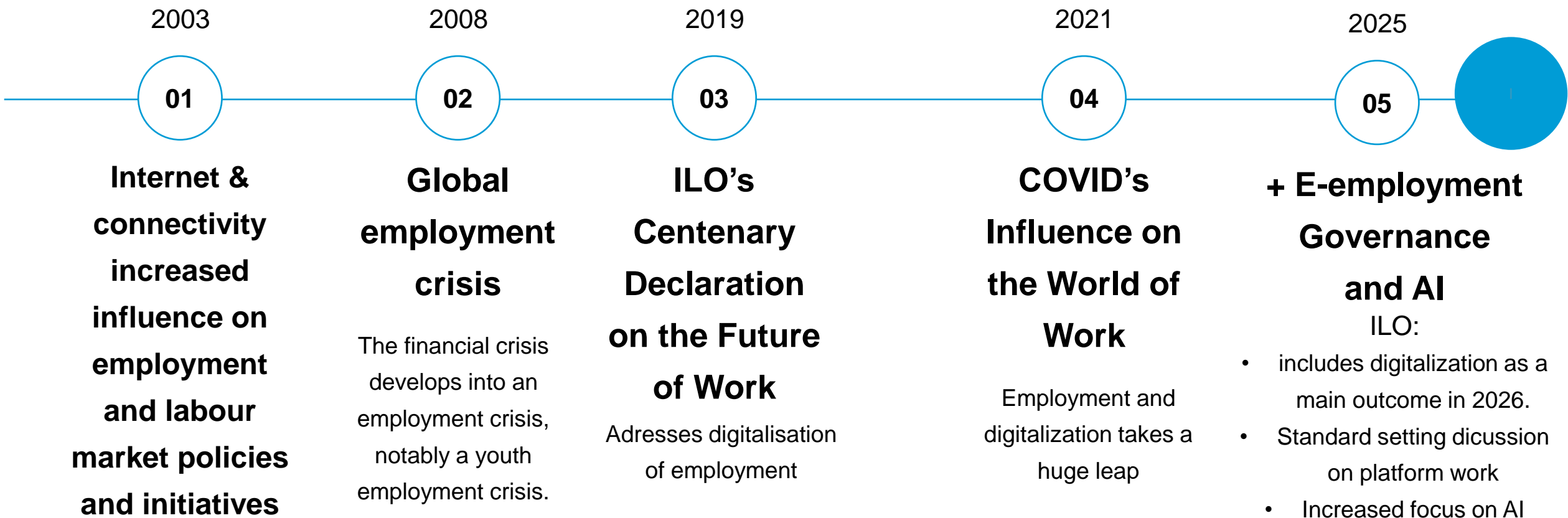
C7 ICT Applications: E-employment

The Evolution of Context

Since 2003 significant progress has been achieved and several emerging trends and challenges have been identified. Some of the trends are:

- The use of digital tools in many jobs is increasing exponentially.
- Employment services (including job matching) have become increasingly digital, many countries have, are in the process, or planning a digitalisation of their public employment services.
- Telework, although always a “possibility” mainly for middle management and above, COVID19 has accelerated its implementation.
- Platform work (the gig economy), although still a fraction of the labour force, is increasing.
- Demand for e-governance of employment (E-employment Governance) is increasing around the world.
- Workers’ Organizations, Employers’ Organizations and Governments are making the digitalisation of work their priority.

Key Milestones: 20 years of Achievements



Challenges in implementing Action Line C7 E-employment

- In the context of employment, the negative effects of digitalization are associated with **income and job insecurity, work intensification, the deterioration of (mental) well-being**, etc. For instance, digital labour platforms provide new sources of jobs and income (which is very positive), but raise serious challenges for workers' protection, representation and fair treatment. Another example is the generation of large amounts of data on workers that can pose risks for workers' privacy.
- A few years ago, the main challenge that was considered was a possible “job destruction” as a consequence of digitalization. It was then disputed that rapid technological progress had an overall positive impact with some winners and some losers. However, with time, it is becoming more frequent to consider that the trend is not job destruction or job creation but rather **a change of the way we work** and the tools we use that constitute the challenge.
- An important challenge is to **find a way to regulate** the different emerging forms of digital work without hampering job creation. With the objective of improving labour conditions in terms of social benefits, job stability, training and working conditions, among others. The right to disconnect (in the context of work) is also an area where regulations are evolving.
- **Unequal access** to connectivity and digital tools is an important challenge for e-employment. As there are vast differences between nations and between populations (old/young/rural/urban, etc.) and between men and women, where women are often less connected. This inequality is an important barrier for SGD achievement. The COVID-19 crisis has further exposed the problems of access, as one can work remotely (and be safe from the Pandemic) or be part of the digital economy only if you have digital skills and access to the necessary infrastructure.

Trends and Opportunities Beyond 2025

Examples of opportunities, in the area of e-employment, include:

- Increasing digitalization & AI of work is highlighted by governments, employers and workers organisations as crucial in policy development and implementation.
- Digital youth employment initiatives can address the global youth employment challenge.
- Increased targeting of female connectivity can support an increase in female participation rates.
- Inclusion of marginalised groups through digital access, including people with disabilities, refugees, etc., can reduce inequalities.
- An increase in the demand of the digitalisation of skills development, including entrepreneurship training can support lifelong learning.
- Training in ICT related technologies can enhance employment credentials.
- Job matching through digital employment portals can make employment services more efficient.
- Portability of rights and skills certification that can support migrant workers in finding decent work, including through a blockchain approach.
- An increasing number of governments promoting the application of new technologies to simplify and facilitate the transition from the informal to the formal economy ("e-formality") can support better governance of employment.

Maria Prieto (Sr Employment Specialist, ILO)

Thank you!



WSIS+20 Review Action Lines Milestones, Challenges and Emerging Trends beyond 2025

C7 ICT Applications: E-environment

Goals

The WSIS Geneva Plan of Action defined three goals for Action Line C7 E-Environment:

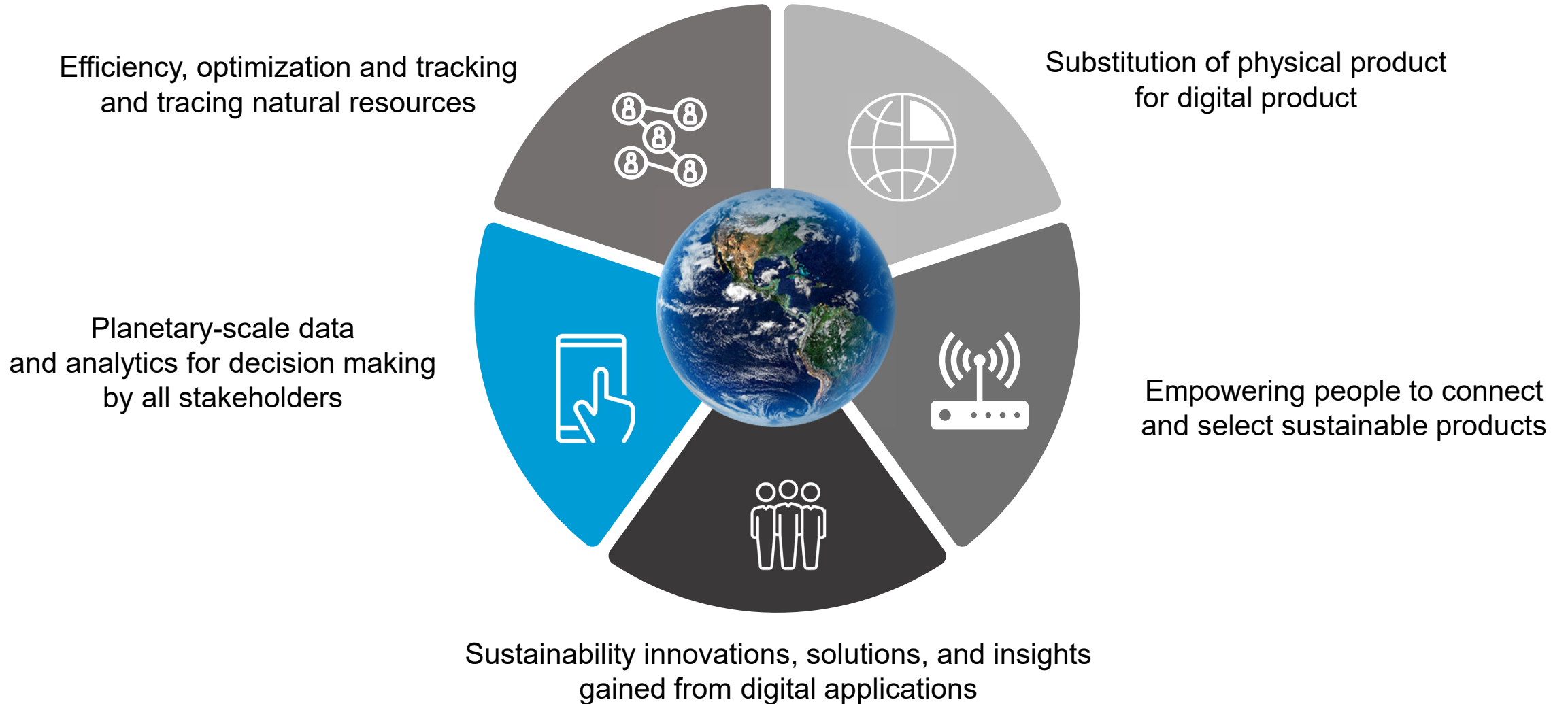
- **Goal 1:** Use and promote ICTs as an instrument for environmental protection and the sustainable use of natural resources;
- **Goal 2:** Initiate actions and implement projects and programs for sustainable production and consumption and the environmentally safe disposal and recycling of discarded hardware and components used in ICTs; and
- **Goal 3:** Establish monitoring systems, using ICTs, to forecast and monitor the impact of natural and man-made disasters, particularly in developing countries, LDCs and small economies.

The Evolution of Context

Digital technologies offer major opportunities to speed and scale solutions to the Triple Planetary Crisis:

- **Climate action:** digital information and communication technologies (ICT) can enable a 20 per cent reduction of global CO₂ emissions when applied to five sectors: mobility, manufacturing, agriculture, energy, and buildings. ICT solutions can help cut nearly 10 times more CO₂e than they emit.
- **Nature protection:** digital technologies and improved design can help reduce natural resources and other materials used in products by 90 per cent - through efficiency, tracking and tracing as well as by turning products into services in a circular economy.
- **Pollution prevention:** digital technologies can help reduce waste & detoxify supply chains by a factor of 10-100 times through improved design, resource substitution and circularity showcasing the evolution of the engagement of stakeholders.

Enabling Environmental Sustainability *Five Main Pathways:*



Generating New Environmental Impacts *Five Types:*

Energy and materials use and pollution:

3% of global electricity consumption
2-4% of GHG emissions
24 critical minerals needed for digital sector
53 million metric tons of e-waste per year

Hyper consumption and rebound effects:

62% of advertising sales are now digital and worth 710 billion.
More efficient production leads to lower prices and higher consumption

Digital divide:

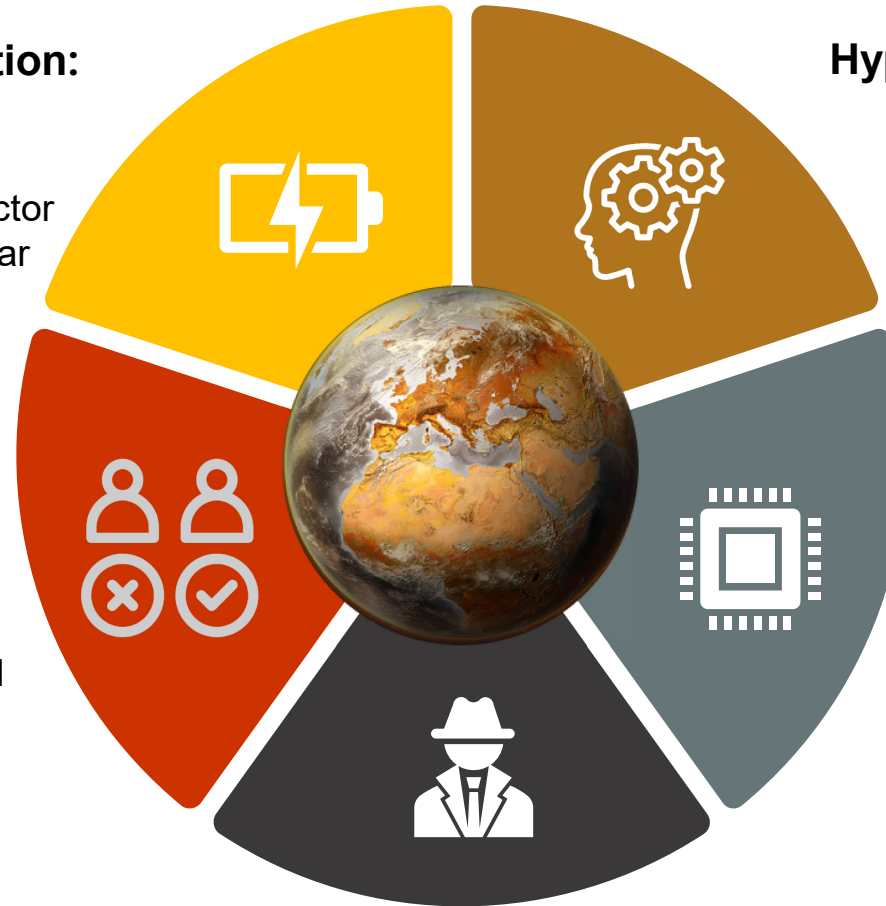
Lack of environmental services and economic opportunities for the disconnected - 2.6 billion people

Obsolescence effects:

Rapid evolution of digital technologies incentivize constant replacement.
20% of smartphone owners upgrade each model

Spread of misinformation:

misinformation spreads 6X faster than facts,
70% more likely to reshared

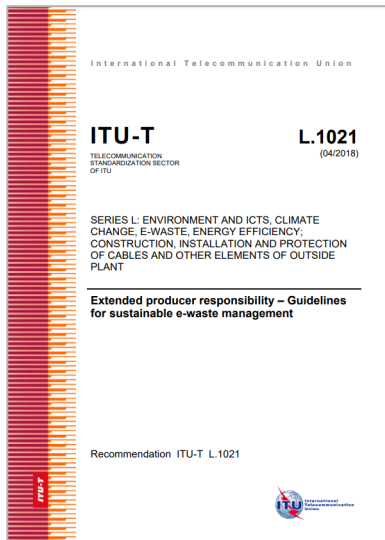


Key Milestones: 20 years of Achievements

Standards, Guidelines and Training

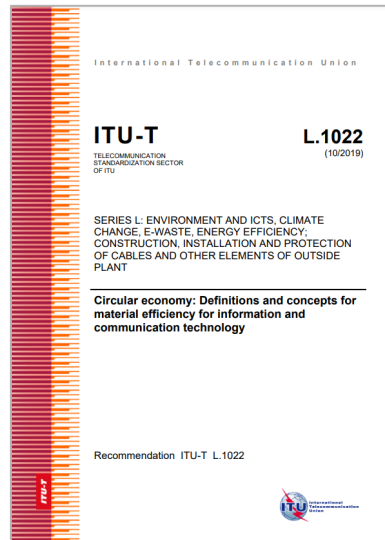
2018

Guidelines on E-waste



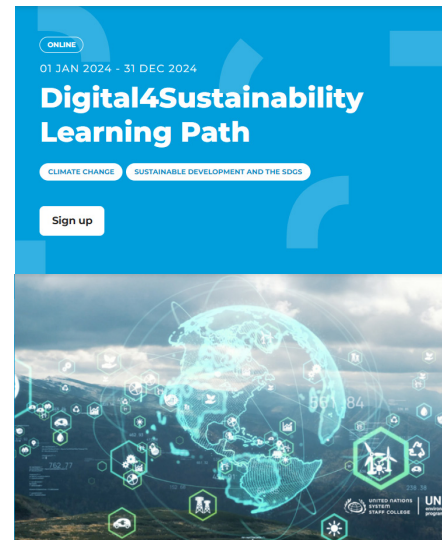
2019

Recommendations on Circularity and ICT



2022

Digital 4 Sustainability e-learning



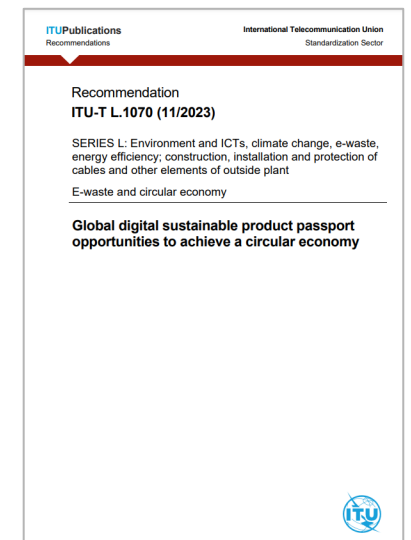
2023

Green Data Centers



2024

Recommendations on Digital Product Passport for ICT



Key Milestones: 20 years of Achievements

Assessments, Agreements, Coalitions

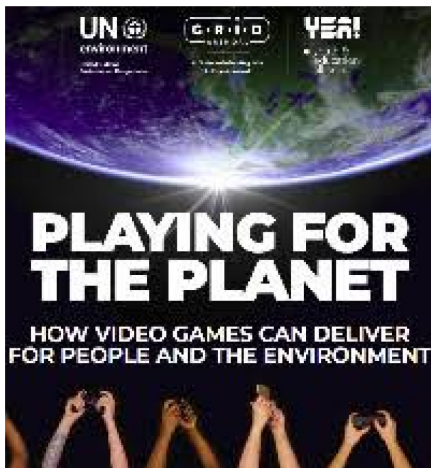
2019

Global
Environmental
Data Strategy



2020

Playing for
the
Planet



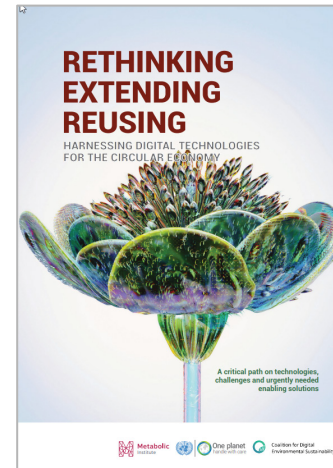
2022

CODES Action
Plan for the
Digital Age



2023

Digital for
Circularity
Impact Initiative



2023

Greening
Digital
Companies



2024

**Digital Economy
Report:
Environment**



Key Milestones: 20 years of Achievements

Environmental Monitoring Platforms

2003

GCOS Essential
Climate
Variables

2014

Global
E-waste
monitor

2019

Freshwater
Surface Water
Explorer

2021

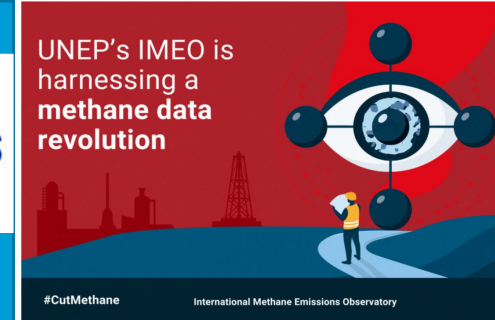
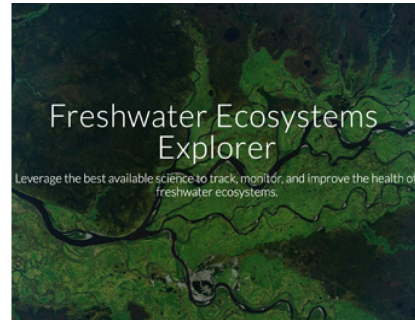
UN
Biodiversity
Lab v2.0

2023

Early
Warnings
for All

2024

International
Methane Emissions
Observatory



Challenges in implementing the Action Line

- **Challenge 1:** environmental fora (e.g. multilateral environmental agreements) are not systematically including digital technologies as enablers of their goals or considering negative impacts from digital technologies
- **Challenge 2:** national strategies for digital transformation and digital public infrastructure are not considering environmental opportunities and risks in a systematic manner
- **Challenge 3:** there are a lack of international standards for measuring digital environmental sustainability, disclosing impacts and sharing environmental data

Trends and Opportunities Beyond 2025

- Embedding sustainability within filters, recommendation engines and algorithms of major digital platforms (e.g. social media, e-commerce, gaming) to enable sustainable consumption
- Use of digital product passports to track and trace the environmental footprints of products across their supply chains and lifecycles as well as to contribute to circularity
- Embed digital enabling goals within major international environmental agreements to accelerate their work
- Establish digital sustainability standards and environmental data standards to enable global measurement, sharing, etc.
- Potential resolution on digital environmental sustainability at UNEA 7 in 2025



WSIS+20 Review Action Lines Milestones, Challenges and Emerging Trends beyond 2025

C7 ICT Applications: E-government

The Evolution of Context

Increase efficiency and transparency: E-government allows for streamlined processes, faster service delivery, and easier access to government information.

Enhance participation: E-government platforms can facilitate communication between citizens and government, enabling feedback mechanisms and participation in decision-making processes.

Reduce corruption: Increased transparency through e-government can help to reduce opportunities for corruption.

Improve service delivery: E-government allows citizens to access services online, anytime, anywhere, reducing bureaucratic hurdles.

Empower citizens: E-government can empower citizens by providing them with the tools and information they need to interact with their government effectively.

The Evolution of Context

Developing National E-Government Strategies: This involves setting goals, identifying priority areas for e-government development, and outlining a plan for implementation.

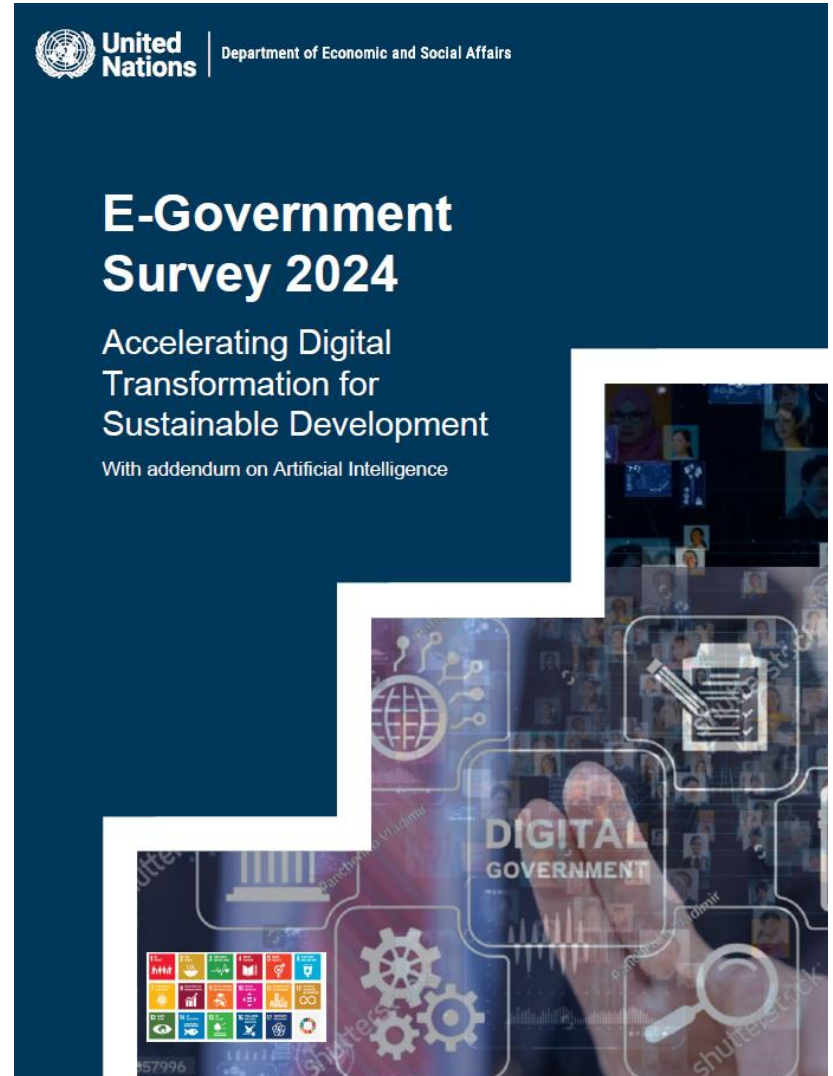
Investing in ICT Infrastructure: Building a robust and secure ICT infrastructure is essential for e-government initiatives to function effectively.

Developing E-government Services: This involves creating online platforms for citizens to access government services, such as applying for permits, paying taxes, or registering births.

Promoting Digital Literacy: Ensuring citizens have the necessary skills to access and utilize e-government services is crucial.

Key Milestones: 20 years of Achievements

UN E-GOVERNMENT SURVEY 2022
UN E-GOVERNMENT SURVEY 2020
UN E-GOVERNMENT SURVEY 2018
UN E-GOVERNMENT SURVEY 2016
UN E-GOVERNMENT SURVEY 2014
UN E-GOVERNMENT SURVEY 2012
UN E-GOVERNMENT SURVEY 2010
UN E-GOVERNMENT SURVEY 2008
UN E-GOVERNMENT SURVEY 2005
UN E-GOVERNMENT SURVEY 2004
UN E-GOVERNMENT SURVEY 2003
BENCHMARKING E-GOVERNMENT 2001



Key Milestones: 20 years of Achievements

- Expansion of Online Services
- Open Government Initiatives
- Digital Identity and Authentication
- Interoperability and Standards
- Cybersecurity and Data Protection
- Mobile Government (m-Government)
- Cloud Computing Adoption
- Emergence of Smart Cities
- Focus on Digital Inclusion
- International Collaboration and Knowledge Sharing



Challenges in implementing the Action Line

1. Digital Divide
2. Cybersecurity Risks
3. Data Privacy Concerns
4. Interoperability Issues
5. Capacity Building
6. Resistance to Change
7. Legal and Regulatory Frameworks
8. Sustainability
9. Digital Literacy
10. Accessibility

Trends and Opportunities Beyond 2025

1. Citizen-Centric AI Solutions
2. Blockchain for Transparent Governance
3. Smart City Governance
4. Digital Twins for Infrastructure Management
5. AR/VR for Enhanced Citizen Engagement
6. Data-Driven Governance Strategies
7. Open Data Platforms
8. E-Government Cybersecurity Innovations
9. Digital Inclusion Programs
10. International E-Government Collaboration



WSIS+20 Review Action Lines Milestones, Challenges and Emerging Trends beyond 2025

C7 ICT Applications: E-health

WSIS Action Line C7 eHealth

The Evolution of Context

The evolution of technology over 20 years

- **2004 onwards** : Various open source electronic health record platforms emerge including OpenMRS, OpenClinic, OpenHospital, OpenEHR, Bahmni etc, to support the delivery of health care in developing countries.
- **2012** : Development of Fast Healthcare Interoperability Resources (FHIR) as a set of rules and specifications for exchanging electronic health care data.
- **2012** : WHO and ITU launch an NCD mitigation programme using mobile technology called Be He@lthy Be Mobile.
- **2016** : WHO launches a global digital health solutions repository called the Digital Health Alas.
- **2020** : WHO commences development of computable versions of WHO guidelines, a programme called SMART Guidelines that leverages FHIR.
- **2020** : WHO introduces AI interventions for Quitting Tobacco.
- **2022** : WHO releases a digitized version of the International Classification of Diseases (ICD11).
- **2023** : WHO establishes a Global Digital Health Certification Network platform (GDHCN).

The evolution of the engagement of stakeholders

- **2000s** : Donor and multilateral representatives begin discussing common challenges in implementing digital development projects.
- **2005** : WHO Member States agree on a resolution regarding the use of ICTs in health. This led to the resolution on eHealth.
- **2010** : The Greentree Principles are created out of a concerted effort to capture the most important lessons learned by the digital development community.
- **2014** : WHO Member States agree on a resolution on eHealth Standardization and Interoperability.
- **2014** : Principles of Digital Development launched by various developing partners.
- **2018** : The Principles of Donor Alignment for Digital Health launched by various donors, UN agencies and development partners.
- **2018** : WHO Member States agree on a resolution on Digital health.
- **2023** : WHO, India G20 presidency and partners launch a Global Initiative on Digital Health (GIDH).

WSIS Action Line C7 eHealth

Key Milestones: 20 years of Achievements

2005



First global survey on eHealth completed

2009



Second global survey on eHealth completed

2010



Repository of eHealth Strategies established

2013



eHealth standardization and interoperability resolution

2014



2015



3rd Global survey in eHealth completed

2018



Resolution on Digital health



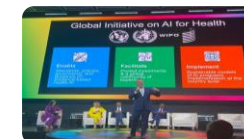
Launch of the WHO-ITU Digital Health Learning programme

2020



2023

Launch of the Global Initiative on AI4H

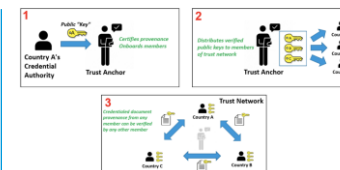


WHO-ITU Digital Health Learning review Meeting

Approval of the Global strategy on digital health



2024



Launch of Global Digital Health Certification Network

Public launch of the Global Initiative on Digital Health

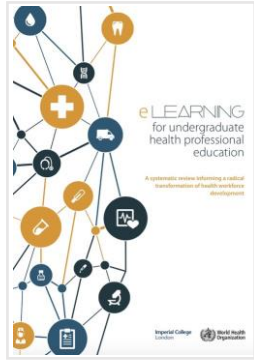


WSIS Action Line C7 eHealth

Key Milestones: 20 years of Achievements, continued



2012 WHO-ITU National eHealth toolkit.



2015 WHO report eLearning for undergraduate health professional education.



2019 WHO Recommendations on Digital Interventions for health systems strengthening.



2020 WHO-ITU Digital Health Platform: Building a Digital Information Infrastructure.



2020 WHO Global Strategy on Digital Health.



2020 IDB Governance for Digital Health : The Art of Health Systems Transformation.



2020 WHO Digital Implementation investment guide (DIIG).



2020 WHO Digital education for building health workforce capacity.



2021 WHO Generating Evidence for Artificial Intelligence-based Medical Devices.



2021 WHO Ethics and Governance of Artificial Intelligence for Health.



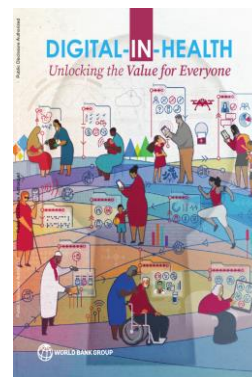
2022 WHO WHO-ITU Global Standard for accessibility of telehealth services.



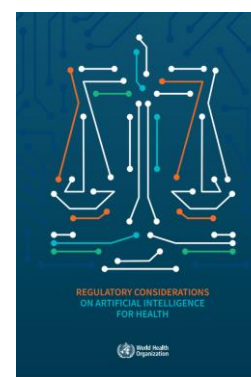
2022 WHO Classification of digital interventions, services and applications in health.



2022 BB Comm The Future of Virtual Health and Care.



2023 WB Digital in Health: Unlocking the value for everyone.



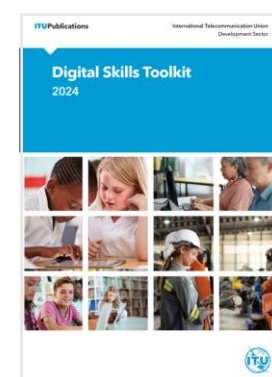
2023 WHO Regulatory Considerations on Artificial Intelligence for Health.



2023 WHO Consolidated telemedicine implementation guide.

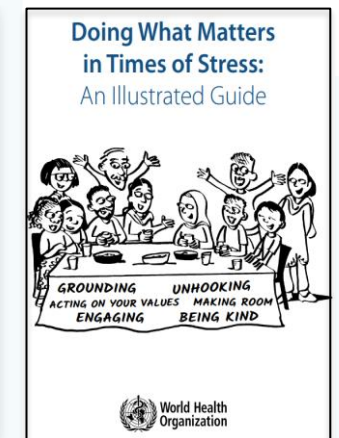
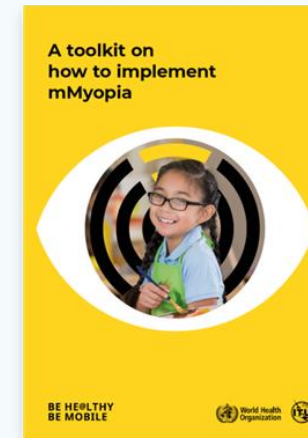


2024 WHO Ethics and Governance of AI for Health: Large Multi-Modal Models.



2024 ITU Digital Skills Toolkit

11 Be Healthy Be Mobile (BHBM) programmes on NCDs currently available, with 1 on mental health



Challenges in implementing the Action Line C7 eHealth



Interoperability



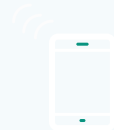
Limited availability of digital health skills



Infrastructure and Connectivity



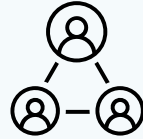
Regulatory and Legal Frameworks



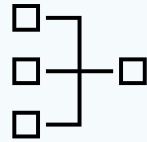
Trends Beyond 2025



Artificial Intelligence and Machine Learning in Healthcare



Telemedicine and Remote Patient Monitoring



Digital Public infrastructure, Interoperability and Health Data Exchange



Digital Therapeutics and Virtual Reality



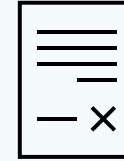
Genomics and Precision Medicine

Opportunities Beyond 2025



Global Digital Health Mechanism such as :

- The Global Initiative on Digital Health
- The Global Initiative on AI for Health
- The Global Digital Health Certification Network

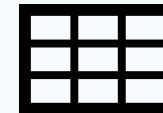


Global Mechanism's such as

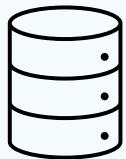
- The Global Digital Compact
- The pact for the future
- The Global Strategy on Digital Health



Expanded Use of Digital Therapeutics

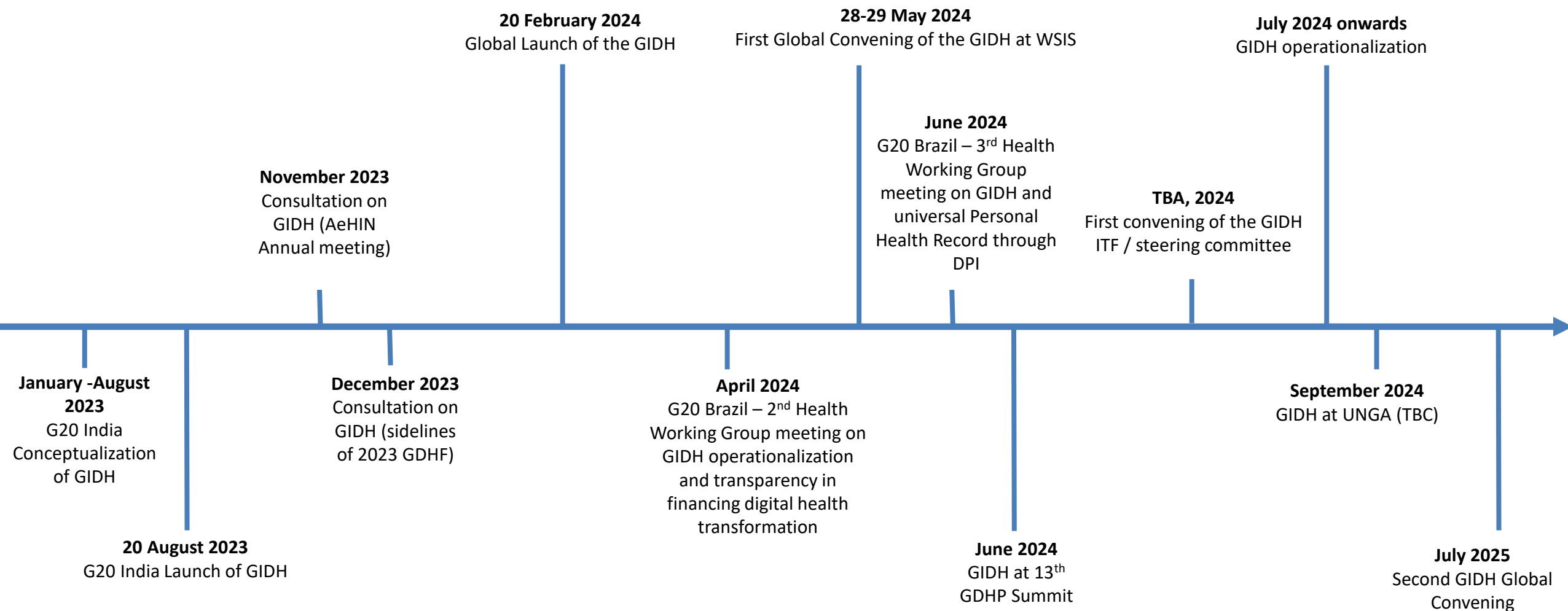


Advanced AI and Predictive Analytics



The Digital Public Infrastructure agenda

The GIDH Timeline



Thank you!



WSIS+20 Review Action Lines Milestones, Challenges and Emerging Trends beyond 2025

Action Line C7 - eLearning

The Evolution of Context - Action Line C7 eLearning

TECHNOLOGY and LEARNING

Integration of Technology

Mobile Learning, leveraging smartphones and tablets.

Cloud Computing facilitating easy access to learning resources.

Virtual and Augmented Reality for immersive learning experiences.

Big Data and Learning Analytics to personalize and enhance the learning experience.

Content Creation and Access

Increased creation and use of Open Educational Resources (OER)

Rise of User-Generated Content, allowing learners to contribute to the learning ecosystem.

Development of Massive Open Online Courses (MOOCs) providing accessible education globally.

Social and Collaborative Learning

Growth of Social Networking platforms to foster peer-to-peer learning and collaboration.

Development of Social Learning Platforms enabling social polling, rating, and sharing content.

Utilization of Games and Gamification to enhance engagement and motivation.

Innovative Learning Approaches

Emergence of Flipped Classroom models, - traditional homework and in-class activities are inverted.

Adoption of Microlearning and Microcredentials for focused, bite-sized learning and certification.

Implementation of Intelligent Assistants and Chatbots to provide immediate support and guidance.

HUMANS and LEARNING

Global Digital Learning Evolution

Enhanced Global Connectivity : Connecting educational institutions worldwide to the internet, increasing access to digital learning resources.

COVID-19 pandemic revolutionizing and 'mainstreaming' digital learning.

Embracing Lifelong Learning

Establishing the principle that learning is lifelong and knowledge should be open and collectively built, utilizing technology to construct inclusive knowledge societies that foster continuous education.

Transforming Education Summit UN SG 'Our Common Agenda'

UN movement to accelerate the achievement of the Sustainable Development Goals (SDGs)

• Commitment 1 'Leave no one behind – Digital Inclusivity

• Commitment 7 'Global Digital Compact' – Digital Commons as a global public good

Key Milestones: 20 years of Achievements



2002

Term '**Open educational Resources**' (**OER**) coined at UNESCO's 2002 Forum on the Impact of Open Courseware for Higher Education in Developing Countries



2011

UNESCO ICT CFT Competency Framework for Teachers (ICT CFT V2) published, providing an international revised framework to support teachers' use of technology in their professional practice



2012

Paris OER Declaration
First UNESCO World OER Congress (UNESCO HQ, Paris) which advanced **the** principle and practice of open access to publicly funded resources



2015 - 2017

Qingdao Declaration on ICT in Education on how technology can be used to achieve educational targets for SDGs adopted

UNESCO ICT CFT Version 3 published, addressing emerging challenges including AI, OER

Ljubljana OER Action Plan adopted at the 2nd UNESCO World OER Congress (Ljubljana, Slovenia September 2017). This Action Plan charted the basis of the UNESCO 2019 Recommendation on OER



2019 - 2021

UNESCO 2019 Recommendation on OER adopted by 193 UNESCO Member States at UNESCO's 42nd General Conference. First UN Normative instrument in the area of technologies and education

Beijing Consensus on AI and Education 2019 on guiding principles to leverage AI for inclusive and equitable quality education and lifelong learning opportunities for all.

Rewired Global Declaration on Connectivity for Education 2021 on connected technology for education, drawing from lessons learned after COVID



2022 - 2023

Transforming Education Summit 2022

Action Track 4 outlining Digital Transformation of Education Systems, narrowing the digital divide, platforms for learning and open digital content

Guidance for generative AI in education and research 2023

guidance on GenAI in education to support countries for short and long- term actions and policies and develop human capacity to ensure a human-centred vision



2024

UN Summit of the Future (Sept 2024)
Commitment 1 'Leave no one behind – digital inclusivity and reinforcement of education;
Commitment 7 – Global Digital Compact – towards a digital commons as a global public good

3rd UNESCO World OER Congress 'Digital Public Goods: Open Solutions for Inclusive Access to Knowledge' (November 2024)

Challenges in implementing the Action Line

Challenge 1: Leave No One Behind: Ensure global connectivity and create inclusive digital learning spaces for all, irrespective of background or ability.

Challenge 2: Quality of Content and Lack of Multilingualism on the Internet: Addressing the need for high-quality, diverse, and multilingual digital educational content to ensure equitable access and usability for all learners.

Challenge 3: Teacher Training: Overcoming the challenge of providing continuous and effective professional development for educators to integrate ICT into their teaching practices.

Challenge 4: Improve Digital Cooperation: Bridging the digital divide by addressing disparities in technology access, content quality, teacher training, cybersecurity, and securing sustainable funding for e-learning initiatives.

Trends and Opportunities Beyond 2025

TRENDS

Trend: Global Connectivity and Inclusive Digital Learning Spaces

- Creating enabling environments that embed and sustain digital inclusion is essential. This involves ensuring that everyone, regardless of their background or abilities, has access to digital learning opportunities.

Trend: Digital Public Goods

- UNESCO's Recommendation on Open Educational Resources (OERs) urges governments, educational authorities, and institutions to support open licensing and adopt open formats. This facilitates the reuse and repurposing of educational resources, ensuring equitable access, co-creation, curation, and searchability for all, including persons with disabilities and other vulnerable groups. This requires the use of platforms with metadata interoperability, open-source authoring tools, libraries, digital repositories, search engines, and advanced technologies such as AI tools for OER processing and language translation.

Trend: Digital Capacity Building and Global Digital Cooperation and Knowledge Sharing

- Based on concepts like interdependence, interconnectedness, multilateralism, and multi-stakeholderism, the focus is on enhancing digital capacity. The implementation of the ICT Competency Framework for Teachers, along with the use of OERs, facilitates the contextualization of training materials globally, making them accessible to teachers, including those with disabilities. Initiatives such as the UNESCO /UNICEF Gateways project provide avenues for supporting the use of public platforms to share educational content.

Trends and Opportunities Beyond 2025

OPPORTUNITIES

Opportunity: AI and Machine Learning Integration

- By leveraging AI algorithms, educational platforms can dynamically adapt content delivery based on individual learning needs and preferences, aligning with the goal of creating an inclusive and personalized digital learning environment accessible to all learners worldwide. X5GON is a Cross Modal, Cross Cultural, Cross Lingual, Cross Domain, and Cross Site Global OER Network powered by Artificial Intelligence.

Opportunity: Governmental and Institutional Support:

- In line with the principles outlined in the Global Digital Compact, governments and institutions worldwide commit to providing increased support and funding for the development and adoption of OER. Guyana is one of such countries, committing to digitizing the Education Management Information System (EMIS) to support policy.

Opportunity: User-Generated Content Empowerment:

- By engaging in the co-creation process, educators not only tailor resources to meet the diverse needs of learners but also contribute to a collective repository of knowledge that transcends geographical and cultural boundaries. Wikipedia is a prime example of user-generated content empowerment.



WSIS+20 Review Action Lines Milestones, Challenges and Emerging Trends beyond 2025

C7 - E-Science

The Evolution of Context

WSIS Action Line C7. E-Science



Influence of New Technologies on Science and Information

- AI, mobile technologies, big data analytics, and cloud computing have transformed how scientific research and data are collected, analyzed, and interpreted. These tools have increased operational efficiency and expanded the scope of research projects by handling large datasets more effectively, which are essential for advancement of science.
- The rise of the internet and other digital platforms has drastically democratized access to scientific research, tools and processes. This has enabled a broader spectrum of scientific collaboration across continents. Scientists in the global south now have better access to global research initiatives, although disparities in digital infrastructure still pose as significant challenges.

Rights and Openness in Science

- There has been a significant push towards open solutions to scientific publications, software, and data, aimed at reducing barriers to research. This movement has been crucial for scientists in developing countries who often face limited access to scientific information, tools and processes. A global statutory mechanism (Recommendation of Open Science) and non-commercial approaches to scientific research have been important breakthrough in the recent times.
- As digital tools become essential for modern science, the right to access these tools equitably has become a critical issue. In the global south, there's a need for policies that ensure equitable access to these technologies to avoid a widening of the existing scientific knowledge gap.

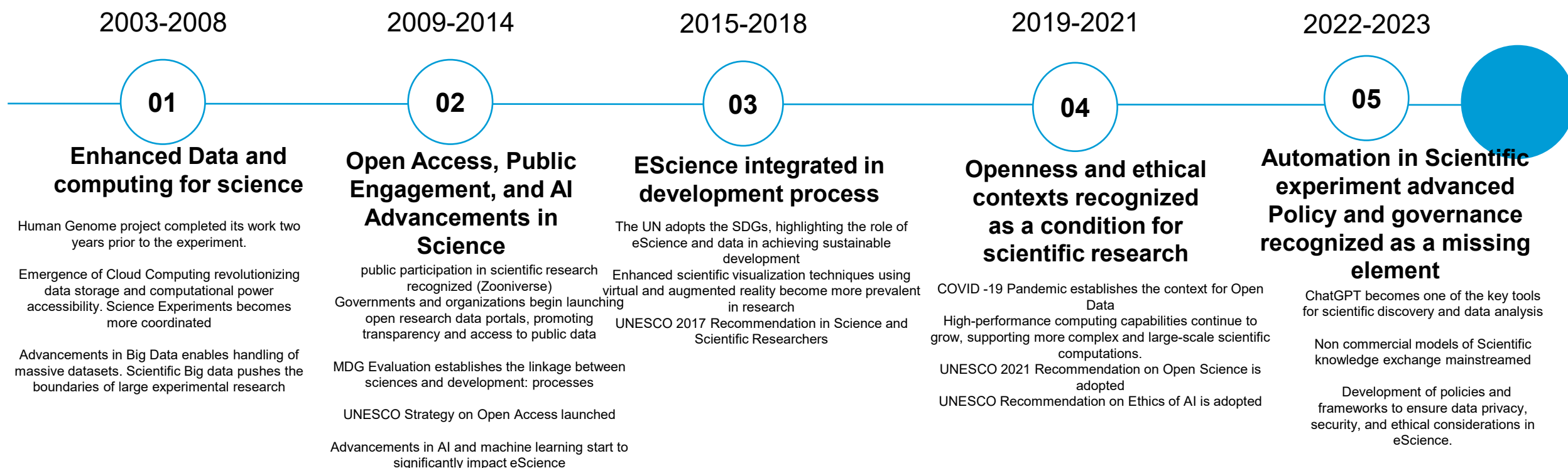


The Evolution of Context

Policy Gaps and Capacity Limitations

- There's a notable lack of comprehensive policies that address the integration of digital technologies in scientific research, particularly in the global south. This includes policies, *inter alia*, on data governance, open access, ethical usage, which are crucial for maintaining the integrity of scientific research.
- There is a significant gap in the capacities to utilize advanced technologies effectively in less developed regions. Training and investment in local expertise are required to harness the full potential of these technologies.
- Scientific information are not culturally or linguistically accessible to all, particularly in diverse regions like the global south. This exacerbates the challenges in discerning verified information from noise.

Key Milestones: 20 years of Achievements



Challenges in implementing the Action Line

- 1. Lack of policy framework that support escience agenda for government**
 - Development of policies and frameworks to ensure scientific research output, data and ethical considerations in eScience has failed to keep pace with the requirement.
- 2. Technological Challenges**
 - Digital divide between developed and developing countries. Many countries in the global south lack the infrastructure, resources, and technical expertise to fully participate in and benefit from eScience initiatives.
- 3. Increasing proprietary interests and business agendas in scientific research.**
 - Proprietary nature of business-linked research can restrict access to scientific data and findings, limiting the sharing of knowledge and collaboration that is essential for scientific progress.
- 4. Operational and Infrastructural Challenges**
 - progression of eScience is constrained by the lack of universal access to high-performance computing resources, sustainable funding models for long-term projects, adequate infrastructure, and modern educational frameworks that equip researchers with necessary skills.
- 5. Ethical and Cultural Challenges:**
 - Ethical considerations on data privacy and intellectual property, coupled with cultural and methodological barriers between disciplines, pose as challenges to effective collaboration and the ethical conduct of eScience.

Trends Beyond 2025

- Since its global adoption in 2021 as a statutory process, Openness of science is gaining traction as a movement aimed at enhancing the accessibility and reproducibility of scientific research, tools and processes. New scientific protocols, such as Diamond Open Access in 2023, have fostered accessibility and enhanced transparency in the research processes, leading to more reliable and verifiable scientific outcomes (<http://goap.info>). This will continue to remain as a key agenda
- The surge in data has necessitated the adoption of big data technologies and sophisticated analytics. Traditional tools are becoming useless because of the volume, veracity and complexity of data.
- AI and machine learning have become central to scientific processes, uncovering new insights and enabling researchers to tackle more complex scientific questions.
- Demand for robust and scalable data storage and processing capabilities has made cloud computing an essential resource in scientific research. Many platforms have emerged to provide flexible and scalable resources that can be adjusted as per any scientific project's demands.
- IoT devices and sensor networks are increasingly becoming more relevant in scientific research, this is enhancing the capabilities for real time data flow and predictive analysis
- Blockchain technology is emerging as tool to create “tamper-proof” records of research data, thereby enhancing the reliability and accountability of scientific findings.

Opportunities Beyond 2025

- WISS process could:
 - Develop universal standards and regulations for all aspects of technology and scientific practices. Harmonizing these standards internationally can streamline the integration and safe use of technologies across borders, enhancing global collaboration and innovation.
 - Bridge the digital divide beyond improving infrastructure. It must ensure equitable access to science and ICT resources worldwide.
 - Promote sustainability in technological and scientific initiatives by adopting green technologies and practices in ICT operations - like energy-efficient data centers, and encourage sustainable scientific research methods.
 - Establish robust ethical guidelines to address the broader implications of emerging technologies. These frameworks could navigate issues related to ethics in scientific inquiries and the socio-economic effects of technological advancements.
 - Enhance collaboration across academia, industry, and government to strengthen research and development ecosystems is essential. Instill new south-south and north-south-south process to support non-commercial models such as Diamond Open Access and FOSS agenda and public research initiatives that focus on social good rather than profit.



WSIS+20 Review Action Lines Milestones, Challenges and Emerging Trends beyond 2025

**C8 Cultural and Linguistic Diversity, and Local Content
Promotion**

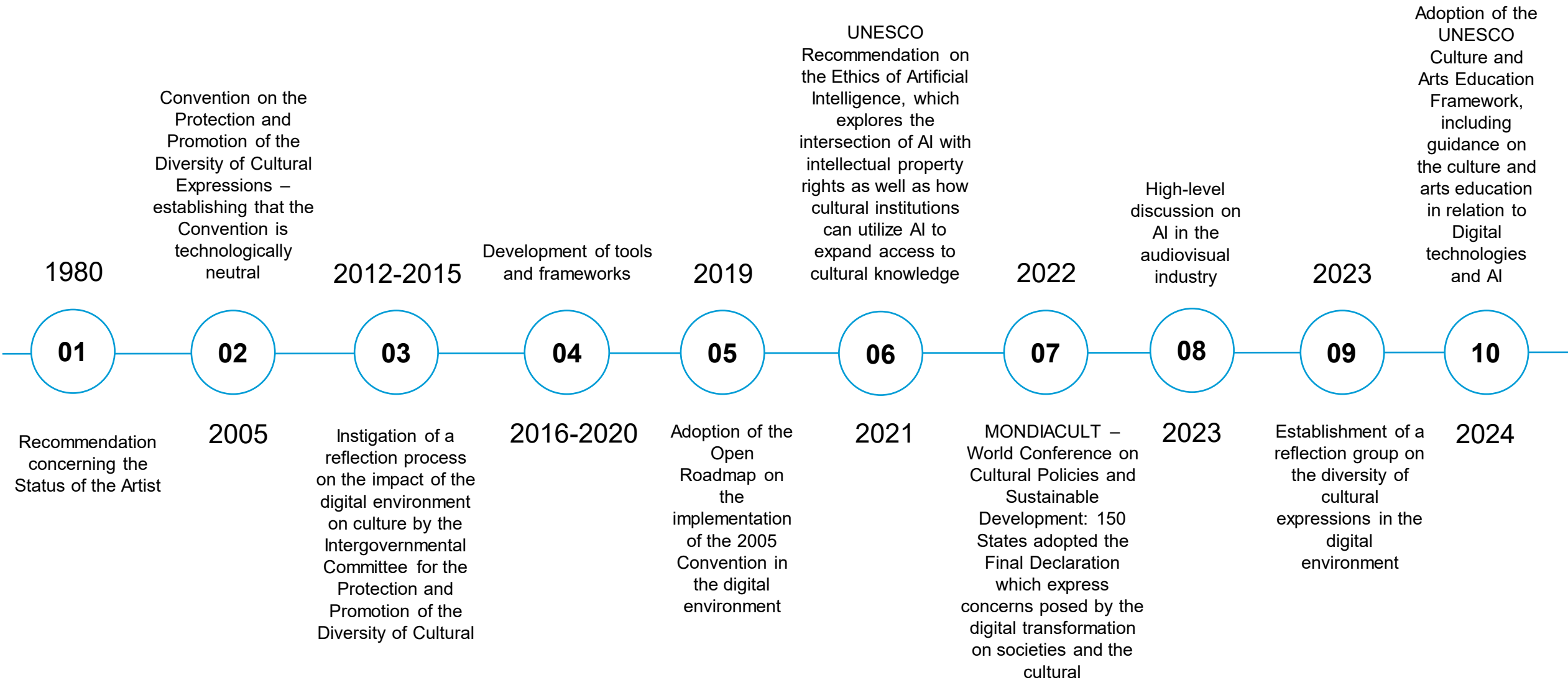
The Evolution of Context

- The integration of digital technologies into society has profoundly altered the way cultural expressions are created, produced, distributed, and consumed. The lightning speed at which technologies are developing far outpaces the amount of time policy-makers need to respond to such challenges, posing a threat to cultural diversity.
- There is a marked imbalance as regards the presence of linguistic diversity of cultural content in the digital environment whether cultural content in original minority, local, sign language or indigenous languages as well subtitled, dubbed, or translated content into those languages.
- The means of creating, producing, distributing, accessing, and exchanging cultural goods and services have greatly increased amidst the rapid development of digital technologies, posing challenges with regards to discoverability, i.e. international content (from culturally dominant countries) is more visible and national and local content from countries with small cultural markets is becoming less discoverable.

The Evolution of Context

- The emergence of new actors between the creators of cultural content (and traditional operators), on the one hand, and the recipient on the other, calls for a rethinking of the value chain. The main challenge is therefore to create a balanced market, ensuring transparency to guarantee the creation of a safer online environment for individuals and businesses using digital technologies, as well as the protection of fundamental rights in cyberspace, particularly cultural rights.
- With the rise of artificial intelligence, there has never been a technology that has reshaped the creative landscape so quickly and drastically. The advent of generative AI has brought considerable changes across all cultural and creative industries, including books, music, film, visual arts, and video games, among many others. This impact raises significant questions regarding the sustainability of the cultural value chain, market concentration in the hands of large tech companies, and other serious challenges.

Key Milestones: 20 years of Achievements



Challenges in implementing the Action Line

- **Support for digital transformation:** Ensuring that cultural and creative sectors can effectively adopt and benefit from digital advancements while maintaining the integrity and authenticity of cultural expressions.
- **Applications of artificial intelligence to culture and the cultural and creative industries:** Balancing the innovative potential of AI with the need to protect cultural heritage, creativity, and ethical considerations in the cultural sector.
- **Impact of regulating digital platforms:** Addressing the complexities of creating fair and effective regulations for digital platforms that impact cultural content distribution, while protecting artistic freedom and cultural diversity.
- **Access to cultural expressions:** Overcoming barriers to equitable access to diverse cultural expressions in the digital space, ensuring that all communities can participate and benefit from cultural expressions.
- **Discoverability of national and local cultural content:** Enhancing the visibility and discoverability of national and local cultural content in a global digital landscape dominated by major platforms and international content.
- **Status of artists in the digital environment:** Addressing the evolving status of artists within the digital environment, ensuring fair compensation, protection of intellectual property, and support for creative and artistic expressions.

Trends and Opportunities Beyond 2025

Trends

- **Supporting the digital transformation of cultural institutions:** measures supporting the digital transformation of cultural institutions and the digitization of cultural heritage
- **Strengthening digital skills and resources:** measures enabling cultural and creative actors to connect and benefit from digital skills and resources, including support and funding for digital content and capacity-building programmes.
- **Protecting the remuneration of artists and creators:** measures to guarantee fair remuneration for online content as part of a broader movement to ensure that technology companies adequately compensate creators for content shared on their platforms.
- **Promoting the diversity of digital cultural content through taxation:** measures to impose tax obligations on digital platforms in order to finance national funds for the creation, distribution and production of cultural content or reduced value added tax to electronic books and publications.
- **Discoverability of online content:** online cultural uses are evolving more rapidly than the rate at which policies are adapting to protect and promote the diversity of cultural expressions.
- **Recommendation data and algorithms:** measures to promote greater transparency in the use of algorithms non-specific to the creative sector.

Trends and Opportunities Beyond 2025

Opportunities

- **The promotion of linguistic diversity of cultural content** through the stimulation of policies to promote the linguistic diversity of cultural content, taking advantage of the opportunities offered by digital technologies to enhance the linguistic diversity of cultural content and taking into account the various issues relating to the use of AI systems to subtitle, translate or dub cultural content
- **The discoverability of national and local cultural content on digital platforms:** improving the online offering and increasing the diversity of sources for presenting and widely diffusing original national and local cultural content available on digital platforms, reducing technological and linguistic biases and discrimination by improving automated recommendation systems and the explainability of their results and the provision and effective exploitation of descriptive metadata and usage data to improve practices, public policies, and cultural/digital strategies for discoverability
- **The importance of greater and meaningful transparency on digital platforms regarding cultural issues, notably artistic freedom:** transparency on the content used and AI, transparency and fair pay, transparency and content moderation, transparency and content recommendation
- **The impact of artificial intelligence on the cultural and creative industries and opportunities:** policies addressing the condition of artists in the AI era, risks to the cultural market and survival of creative industries, and implementation of the UNESCO Recommendation on the Ethics of AI in cultural sectors



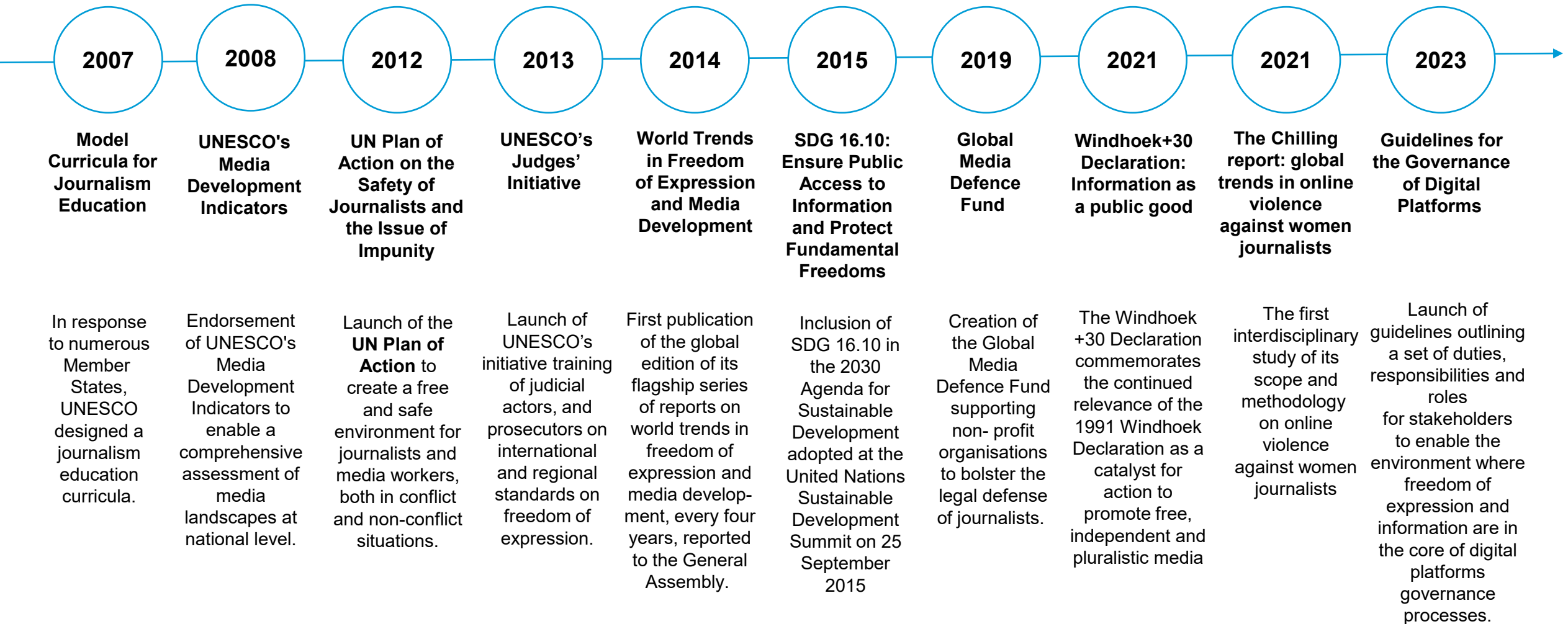
WSIS+20 Review Action Lines Milestones, Challenges and Emerging Trends beyond 2025

C9 Media

The Evolution of Context

- Positive trend with increased overall multilateral and global engagement and legislation (eg. SDG 16.10; multiple UN Resolutions). Although, the adoption or amendment of laws and regulations at national level threatening freedom of expression and press freedom continue.
- Declining trend in the killing of journalists, with however an increase in detentions and new types of attacks of journalists online, particularly against women journalists, and through misuse of legal systems, and remaining impunity for crimes against journalists.
- Increased access to information through a big increase in Access to Information Laws, access increased through digital content, whilst new pressures have emerged for local and national media, with a huge growth of disinformation and misinformation
- News media's traditional business model is at a breaking point. Growing numbers of media outlets have been forced to cut down on staff or close their doors permanently, with a loss of revenue to digital giants.

Key Milestones: 20 years of Achievements



Challenges in implementing the Action Line

- **Challenge 1:** The original challenges of threats to journalists' safety and legislation put in place which runs counter to International Standards on Freedom of Expression remain and are in some cases intensified.
- **Challenge 2:** The viability of journalism and the news media is being challenged through governmental activity, generational change, and loss of revenue to digital giants.
- **Challenge 3:** The emergence of digital news and artificial intelligence have created new pressures to local and national media and challenges on many of the elements falling under Action Line C9.

Trends and Opportunities Beyond 2025

- Broader access to information through digital content while more limited access to news media.
- Freedom of expression can be expanded by improved regulation and governance and support to public interest media.
- Technological development and plurality of voices gives access to public space to previously marginalized communities.
- Traditional business model of media facing significant risks and even existential challenges, which' impact has not been addressed or accounted for in many countries.
- The opportunities are linked to the development of the digital ecosystem where principles of information as a public good and the promotion of freedom of expression are central while countering hate speech and disinformation which are polluting the information space affecting which information is accessible by the public.



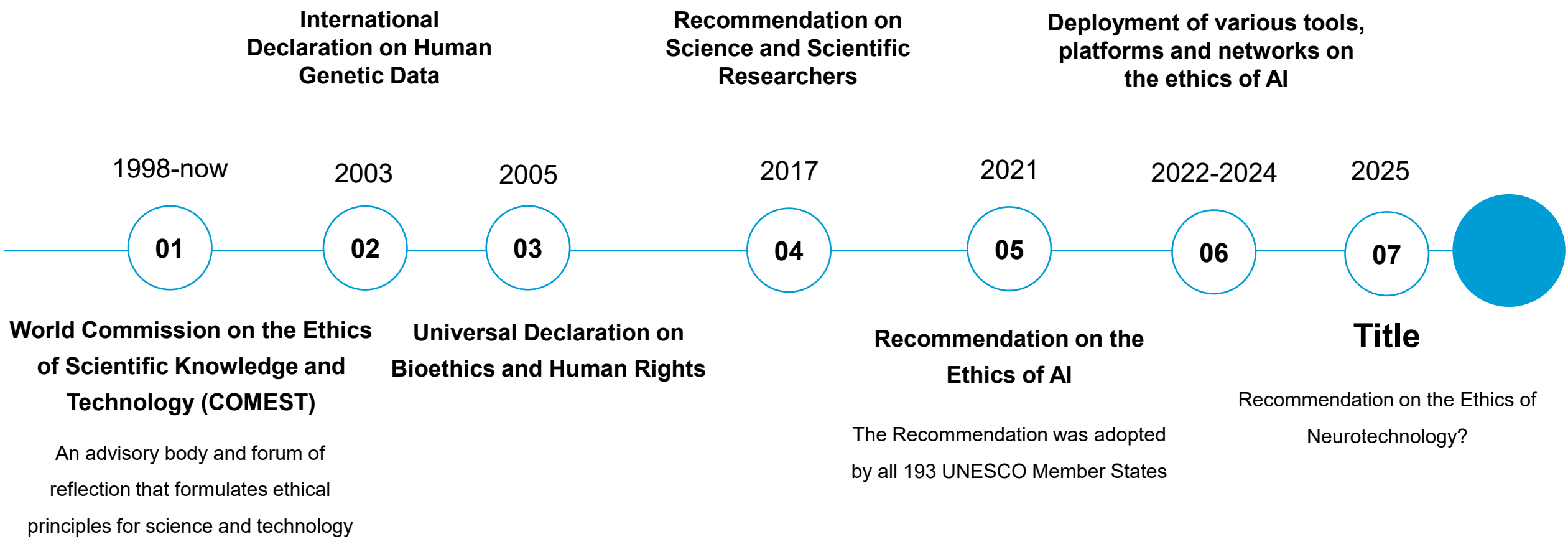
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Action Line C10 - Ethical dimensions of the Information Society

The Evolution of Context

- During the last decade, AI investment has significantly increased. In 2022, the amount of private investment in AI was **18 times greater than it was in 2013** (Stanford HAI AI Index 2023).
- The launch of generative AI has triggered an expansive, complex, and urgent global debate centered around the identification and governance of associated risks.
 - The number of **incidents related to the ethical misuse of AI has increased 26 times since 2012** (Stanford HAI AI Index 2023)
- In response to the serious concerns raised, the international community has embarked on a comprehensive deliberation, spanning both national and international levels.
- Governments have realized the risks and have taken steps to ensure a responsible use of AI: US Executive Order, EU AI Act, Brazilian AI Bill, AI Safety Institute Consortium, etc.
 - Between 2015 and 2022, 346 bills in the US, 32 in the EU, 38 in France, 31 in Germany, 7 in Switzerland, and 17 in the UK had at least one provision addressing AI, demonstrating the **clear trend of a growing number of bills relating to the regulation of AI**.
- Multiplication of international conferences and forums around AI, such as AI Summits

Key Milestones: 20 years of Achievements



Challenges in implementing the Action Line

- Recent advancements in technology, such as big data analysis and the Internet of Things (IoT), have raised discussions and ethical concerns about how these technologies may alter human interactions and the societal fabric. The synergy between IoT devices, infrastructure, and AI technologies is expected to deepen in 2024, furthering the progression of the artificial or augmented intelligence of things (AIoT). Machine learning (ML) algorithms embedded in IoT devices will expand, enabling them to analyze and interpret data locally or at the edge.
- The ethical challenges of the Information Society are growing as ICTs continue to become more pervasive and have an increased impact on human society. Technological innovation is presenting people with opportunities to do things that were previously inconceivable.
- The proliferation and potential misuse of generative AI, such as the creation of deepfakes and the spread of misinformation, have emerged as significant challenges. Misinformation and disinformation have been identified as the most severe short-term risks, with the potential to disrupt democratic processes and deepen polarized views in societies.

Trends and Opportunities Beyond 2025

Trends

- Many institutions and stakeholders see a need to focus on **the ethical governance of AI** – including the need for governments to implement rules and regulations rather than relying on companies to govern themselves
- Based on its mandate to pursue reflection and debate on the ethics of science and technology, UNESCO has started emphasizing the importance of **developing sound and ethical regulation in the field of neurotechnology** at the international level.
- Concepts such as security and privacy are evolving. In 2024, the landscape of privacy and security is undergoing a transformative shift, driven by innovative technologies and stringent regulations. Blockchain, AI, quantum computing, biometric authentication, and IoT security are reshaping the way sensitive information is protected.

Opportunities

- AI has the potential to **serve humanity positively** if the market is steered and guided for human-centric goals
- AI can accelerate progress in the **SDGs**, for instance in **education**, when developed, deployed and applied for the common good



WSIS+20 Review Action Lines Milestones, Challenges and Emerging Trends beyond 2025

The Evolution of Context

- Facilitate knowledge sharing and best practices among countries.
- Encourage joint initiatives and partnerships to address common challenges.
- Mobilize resources, both financial and technical, to support ICT for development programs in developing countries.

Collaborative approach

- Promote policy coherence: By working together, countries can develop harmonized policies that create an enabling environment for ICT investment and development.
- Ensure financial sustainability: International cooperation can help to secure long-term funding for ICT for development initiatives
- Bridge the digital divide: By fostering cooperation, resources can be pooled to reach underserved communities and regions.
- Promote innovation: Sharing knowledge and expertise can stimulate innovation and the development of new ICT solutions for development challenges.

Key Milestones: 20 years of Achievements

- 2004-2010
 - Establishing International Cooperation Mechanisms
 - Mobilizing resources
- 2010-2015
 - Thematic partnerships
 - The rise of multi-stakeholder platforms
- 2015-2024
 - Focus on SDGs
 - Emerging technologies
- Beyond 2024
 - Integrating AI

Challenges in implementing the Action Line

Coordination and Collaboration: Bringing together diverse international and regional organizations, each with their own mandates and priorities, can be difficult. Effective communication and mechanisms for collaboration are essential for streamlining efforts and avoiding duplication.

Resource Mobilization: Securing adequate and sustainable funding for international cooperation initiatives remains a challenge. Competing priorities and limited donor resources can hinder progress.

Digital Divide Within and Between Countries: The varying levels of ICT development across countries create challenges. Developed countries may have different priorities than developing countries, making it difficult to find common ground. Additionally, the digital divide within countries can make it challenging to ensure that international cooperation benefits all citizens.

Differing National Policies and Regulations: Inconsistent policies and regulations regarding ICT across countries can create obstacles to collaboration and knowledge sharing. Harmonizing policies to create a more enabling environment for ICT development is crucial.

Sustainability of Initiatives: Ensuring that internationally supported programs are sustainable in the long run can be difficult. This requires building local capacity, developing exit strategies, and fostering local ownership of ICT for development initiatives.

Measuring Impact and Effectiveness: Quantifying the impact of international cooperation programs on ICT development can be challenging. Developing robust monitoring and evaluation frameworks is essential for demonstrating the value of these programs.

Emerging Technologies and the Evolving Landscape: The rapid pace of technological change can make it difficult for international cooperation initiatives to keep up. Adapting strategies and building capacity to utilize new technologies effectively requires ongoing effort.

Trends and Opportunities Beyond 2025

- Evolving Landscape of International Cooperation
 - Multi-Stakeholder Partnerships
 - South-South and Triangular Cooperation
 - Data-Driven Decision Making
- Focus on Emerging Technologies
 - Harnessing AI for Development
 - Bridging the Digital Divide with New Technologies
 - Cybersecurity and Digital Trust
- Addressing Global Challenges
 - Climate Action and ICTs
 - Achieving the SDGs
- Evolving Funding Mechanisms
 - Innovative Financing Models
 - Focus on Sustainability and Long-Term Impact