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| **ANNEX 3: Consolidated Proposal for use as base document** |
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| **Summary:**  This document (annex 3 to document [TDAG-25/19(Rev.1)](https://www.itu.int/md/D22-TDAG32-C-0019/en)) is a revision of extracts from Resolution 2 annexes including the terms of reference of study Questions. It captures the rich discussions at the six meetings of the TDAG Working Group on the Future of Study Group Questions (TDAG-WG-futureSGQ). The document was prepared by engaging the widest possible set of contributions received formally and informally, while maintaining collaboration with the work of relevant study groups of ITU-T and ITU-R.  The document is hereby proposed for use as a base document at WTDC-25 instead of annex 1 and 2 of WTDC Resolution 2 (Rev. Kigali, 2022) and its related terms of reference of Study Group Questions. It is a guide for consideration by all members who will be submitting contributions at WTDC-25 for annex 1 and annex 2 extracts of WTDC Resolution 2 (Rev. Kigali, 2022) including the terms of reference of Study Group Questions. |

RESOLUTION 2 (Rev. Baku, 2025)

Establishment of study groups

The World Telecommunication Development Conference (Baku, 2025),

considering

*a)* that the mandate for each study group needs to be clearly defined, in order to avoid duplication between study groups and other groups of the ITU Telecommunication Development Sector (ITU‑D) established pursuant to No. 209A of the ITU Convention and to ensure the coherence of the overall work programme of the Sector as provided for in Article 16 of the Convention;

*b)* that, for carrying out the studies entrusted to ITU‑D, it is appropriate to set up study groups, as provided for in Article 17 of the Convention, to deal with specific task-oriented telecommunication questions of priority to developing countries[[1]](#footnote-2), taking into consideration the ITU strategic plan and goals, and prepare relevant outputs in the form of reports, guidelines and/or Recommendations for the development of telecommunications/information and communication technologies (ICTs);

*c)* the need as far as possible to avoid duplication between studies undertaken by ITU‑D and those carried out by the other two Sectors of the Union;

*d)* the results of the studies under the study Questions adopted by the World Telecommunication Development Conference (Buenos Aires, 2017) and the World Telecommunication Development Conference (Kigali, 2022) and assigned to the two study groups,

resolves

1 to continue the work within the Sector of two study groups, with a clear responsibility and terms of reference, as set out in Annex 1 and Annex 3 to this resolution;

2 that each study group and its relevant groups will conduct studies within the framework of the ITU-D study Questions adopted by this conference and assigned to it in accordance with the structure shown in Annex 2 to this resolution, and the ITU‑D study Questions adopted or revised between two world telecommunication development conferences (WTDCs) in accordance with the provisions of Resolution 1 (Rev. Kigali, 2022) of this conference;

3 that the organization of the study groups should lead to increased synergy, transparency and efficiency with minimal overlap between ITU‑D study Questions;

4 that ITU‑D study Questions should be linked with the implementation of WTDC and Plenipotentiary Conference resolutions, and also with the Telecommunication Development Bureau (BDT) programmes set out in the ITU‑D action plan, so that the study groups and the BDT programmes benefit from each other's activities, resources and expertise, and jointly contribute to the achievement of ITU-D objectives;

5 that the study groups should make use of the relevant outputs and materials of the other two Sectors and the General Secretariat relevant to their terms of reference and collaborate closely with study groups in the other Sectors on issues of mutual interest;

6 that the study groups will be managed by the chairmen and vice-chairmen as shown in Annex 3 to this resolution.

Annex 1 to Resolution 2 (Rev. Baku, 2025)

Scope of ITU‑D study groups

# 1 Study Group 1

# Universal meaningful connectivity[[2]](#footnote-3)

* National policy and regulatory aspects of broadband telecommunication/ICT development
* Economic aspects in the field of national telecommunications/ICTs, including facilitating the implementation of the digital economy and the provision of telecommunication/ICT services, including for rural and remote areas
* National approaches for providing access to telecommunications/ICTs in rural and remote areas, with special focus on developing countries, including least developed countries, small island developing states, landlocked developing countries and countries with economies in transition
* Access to telecommunication/ICT services to enable inclusive communications, especially for persons with disabilities and persons with specific needs
* Migration and adoption of digital technologies for broadcasting for different environments
* Use of telecommunications/ICTs for disaster risk reduction and management, particularly in developing countries
* Consumer information, protection and rights for telecommunication/ICT services, especially for vulnerable groups

# 2 Study Group 2

# Digital transformation

* Telecommunications/ICTs for digital services including e-health and e-education
* Building confidence and security in the use of ICTs
* Using telecommunications/ICTs for monitoring and mitigating the impact of climate change, and consideration of circular economy and safe disposal of electronic waste
* Implementation of conformance and interoperability testing for telecommunication/ICT devices and equipment
* Human exposure to electromagnetic fields
* Challenges and prospects for developing countries in access to emerging technologies, platforms, applications and use cases
* Using telecommunications/ICTs to create smart cities and the information society
* Adoption of telecommunications/ICTs and improving digital skills
* Availability and affordability of users’ terminals/devices
* Utilisation of new emerging ICT technologies

Annex 2 to Resolution 2 (Rev. Baku, 2025)

Questions assigned by the World Telecommunication   
Development Conference to the ITU‑D study groups

# Study Group 1

**Question A/1**:Enabling policies and regulations to extend connectivity including broadband everywhere with focus on rural and remote areas (merged previous Q1/1 with previous Q5/1)

**Question 2/1**: Enabling policies and regulations for adopting digital technologies for content distribution and broadcasting (updated title)

**Question 3/1:** The use of telecommunications/ICTs for disaster risk reduction and management

**Question 4/1**: Economic aspects of national telecommunications/ICTs

**Question B/1**: Consumer protection, and universal and meaningful accessibility. (merged previous Q6/1 with previous Q7/1)

# Study Group 2

**Question A/2:** Digital services and smart sustainable cities and communities (merge of previous Q1/2 with previous Q2/2)

**Question B/2**: ICTs for the environment, and human exposure to electromagnetic fields (merge of previous Q6/2 with previous Q7/2)

**Question 3/2**: Securing information and communication networks: Best practices for developing a culture of cybersecurity

**Question** **C/2**: Availability and affordability of users’ terminals/devices, and equipment conformance and interoperability (inclusion of new topic on device availability & affordability in previous Q4/2)

**Question D/2**: Utilisation of new emerging ICT technologies, and development of digital skills (inclusion of topic on emerging technologies in previous Q5/2)

Part V – ITU-D Study Questions and their terms of reference

**Extracts of the WTDC Action Plan[[3]](#footnote-4) 2022**

Only key items to review for each study Question are below for modification. These are items 1 and 2 of each ToR. Items 3-11 may be reviewed and harmonised for all study Questions in due course.

**QUESTION A/1** Enabling policies and regulation to extend connectivity including broadband everywhere with focus on rural and remote areas

(Note : Items from revised TOR of Question 1/1 and revised TOR of Question 5/1 of 2022-2025 study period from Document [TDAG-WG-futureSGQ/28](https://www.itu.int/md/D22-TDAG.WG.SGQ-C-0028/en), have been included below for a balanced new Question)

**1. Statement of the situation or problem**

In order to continue to contribute to the achievement of the objectives set by the Geneva Plan of Action of the World Summit on the Information Society (WSIS) and, as well as assist in the attainment of the Sustainable Development Goals (SDGs) , it is necessary to address the rural urban digital divide through digital infrastructure development coupled for access digital services for all in the rural and remote areas of developing countries[[4]](#footnote-5) , including LDCs, LLDCs and SIDS, where more than half of the world's population live. Solutions that involve both terrestrial and satellite broadband connectivity to support network technologies that enable the use of common broadband applications required by citizens for digital transformation is now priority

According to ITU data, 2024 marked the first full year when more than 70% of the world begun to participate in the global digital economy by logging onto the Internet. The latest ITU data show that some 30 per cent of the world's population currently remain unconnected (ITU, 2024 estimates).

Broadband technologies has been transforming the way we live. Broadband infrastructure, applications and services offer important opportunities for boosting eco­nomic growth, enhancing communications, improving energy efficiency, safeguarding the planet and improving people's lives.

Broadband access has had a significant impact on the world economy and is instrumental in providing meaningful connectivity to all. Rapid evolution and new business opportunities are driving rapid but uneven growth in digital technologies.

**Least developed countries, small island developing states, landlocked developing countries and countries with economies in transition needs in this regard include**:

– Policies, strategies and regulatory aspects of broadband

– Analysing best practices of national broadband plans

– Broadband access technologies including wired/wireless terrestrial and non-terrestrial networks

– Financing and investment aspects of broadband

– Digital Infrastructure that is a required for inclusive digital transformation with consideration of co-deployment and sharing

It is also important to consider broadband demand creation and affordability programmes for the adoption of broadband and e-services by people in rural and remote areas. Government incentives, subsidies and other financing mechanisms are necessary. Work on the effective use of Universal Service Funds and best practices also needs to continue.

**2. Question or issue for study**

It is important to update the study of broadband digital connectivity for rural and remote areas and to adapt and embrace social innovation and emerging technologies for rural inhabitants of developing countries, including LDCs, LLDCs and SIDSs, in respect of the following items

**2.1 Continuing topics to consider from Question 1/1 and Question 5/1 of 2021-2025 study period**

* Techniques and sustainable solutions that can impact on the provision of telecommunications/ICTs and availability of broadband digital infrastructure in rural and remote areas, with emphasis on those that employ up-to-date technologies designed to lower infrastructure capital and operating costs and support convergence between services and applications.
* Challenges in creating, building and deploying broadband digital infrastructure in rural and remote areas.
* Needs and policies, mechanisms and regulatory initiatives to reduce the digital divide between rural and urban areas by increasing broadband digital access, including (1)methodologies for the planning and implementation of migration to broadband technologies, taking into account existing networks, as appropriate (2) National digital policies, strategies and plans which seek to ensure that broadband is available to as wide a community of users as possible.
* Improvement of Quality of the services in rural and remote areas and with increased data traffic in broadband infrastructure (in collaboration with Question 4/1 and Question B/1)
* Licensing approaches and business models for sustainable deployment of network in rural and remote areas using new and emerging technologies. This would be including consideration of public, private and public-private partnerships for investment for broadband deployment at large with more effective integration of the use of terrestrial, satellite, backhaul and submarine telecommunication infrastructure.
* Local content development and relevant policies to tap on opportunities for and challenges to access to services in locally relevant languages for indigenous people and for people with specific needs.
* Affordability of services/devices especially for rural users to adopt so as to fulfil their development needs (in collaboration with Question 4/1 )
* Strategies to promote small and medium enterprises (SMEs), and complementary access and village connectivity networks, in accordance with national regulations, to provide telecommunication/ICTs services in rural and remote areas for promoting innovation and achieving national economic growth, in order to reduce the digital divide between rural and urban areas.
* Cross-border connectivity and challenges for small island developing states.
* The regulatory and market conditions necessary to promote deployment of broadband networks and services, including, as appropriate, the establishment of asymmetric regulation for operators with significant market power (SMP), such as local loop unbundling, if required, for such SMP operators, and organizational options for national regulatory authorities resulting from convergence. This will also include considerations for (1) flexible, transparent approaches to promoting robust competition in the provision of network access (in possible collaboration with Question 4/1) and (2) co-investment, co-location and co-deployment and sharing of broadband infrastructure with other infrastructure networks.

**2.2 New topics for this study period**

(Note : Items from revised TOR of Question 1/1 and TOR of Question 5/1 have been included )

* Harnessing the complementarity of Terrestrial and Non terrestrial networks
* How Artificial intelligence can improve rural infrastructure and access (in collaboration with Question D/2)
* The benefits of artificial intelligence (AI) and challenges of AI Adoption in rural and remote areas
* Harnessing AI to enhance digital literacy and skills in rural communities (in collaboration with Question D/2)
* Innovative solutions to deliver high-speed broadband connectivity.
* Pricing models and affordability strategies for satellite-based broadband (in collaboration with Question 4/1)
* Innovative PPP models for financing infrastructure deployment and service delivery, Blended financing mechanisms and incentives, including multilateral development banks, relevant international organizations and other private sector (in collaboration with Question 4/1)
* Renewable energy sources and energy-efficient technologies for powering network infrastructure (in collaboration with Question B/2)

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**QUESTION 2/1 Enabling policies and regulations for adopting digital technologies for content distribution and broadcasting**

**1. Statement of the situation or problem**

**(**Revised TOR of Question 2/1 as in Document [TDAG-WG-futureSGQ/28](https://www.itu.int/md/D22-TDAG.WG.SGQ-C-0028/en).**)**

* 1. The migration to digital broadcasting technologies has been completed in some countries, while others are in the process of completing the transition. The final reports of the last study periods indicate that the transition results in a variety of strategies, plans and implementation actions that achieve a successful process to maximize the benefits.
  2. The ITU Telecommunication Development Sector (ITU-D) can continue playing a role in helping Member States evaluate the technical and economic issues involved in the adoption and implementation of digital technologies and services. On these matters, ITUD has been collaborating closely with both the ITU Radiocommunication (ITUR) and the ITU Telecommunication Standardization Sector (ITUT), thus avoiding duplication.
  3. ITU has been working to analyse and identify best practices for the adoption and implementation of digital broadcasting, including new and innovative systems.
  4. In this context, the reports from the last study periods presented best practices that accelerate the transition and narrow the digital divide by deploying new services, communication strategies for public awareness on digital broadcasting, and radio spectrum issues related to the analogue switch-off process, among other case studies.
  5. It is also important to acknowledge the relationship between different environments, notably broadcasting and broadband, and the necessity to treat broadcasting in a more general manner and consider the relationship among the various networks which deliver audiovisual content. As well as, the adoption and implementation of new and innovative broadcasting services and applications.
  6. Moreover, the broadcasting arena is changing and the offers to users are evolving. New experiences in accessing audiovisual content are being provided, and one of the consequences of these new offers is that users no longer have only the traditional media services/applications. They are instead starting to experience different ways of watching audiovisual content in their broadcasting services. It is important, in this context, to analyze other digital audiovisual service offers, and new and emerging broadcasting/audiovisual content distribution systems, services, and applications, including OTTs and other distribution platforms, such as satellite and cable networks, to assess the television landscape.
  7. Therefore, to implement new broadcasting technologies, services and applications in this new environment, which seems to be heading towards a global media strategy for service providers and not restricting the service offers to the traditional broadcasting market, it seems that consolidation, co-investment and infrastructure sharing are key trends to reduce costs and allow massive investments in network deployment and content delivery.
  8. Bearing that in mind, it is beneficial to study broadcasting as a key infrastructure for delivering innovative applications and services when combined with other networks and service platforms. Additionally, it is important to consider these interactions from the regulatory, economic and technical points of view, so as to leverage the strengths of each network for the benefit of the users and to make available a more diverse range of services.
  9. There have been developments of broadcasting systems and integration with ICT networks using IP throughout the broadcasting chain, and using cellular networks for media transmission. Such developments and convergence between media and ICT sectors call for special consideration from policy, investment, and technology perspectives and open the door for a variety of services and applications.
  10. Taking into account possible innovations for broadcasting in the UHF band, proposed by new systems like 5G Broadcast, ATSC3.0 and the expected new Brazilian second-generation system, and also with the use of VHF Band III for DAB or DTT, this could lead to new forms of broadcasting services and applications.
  11. The use of the "digital dividend" is an important issue and continues to be widely debated by broadcasters and operators of telecommunication and other services operating in the same frequency bands. The role of the regulatory authorities in this regard is crucial to balancing the interests of users with the demands of growth in all branches of the industry. Furthermore, it appears that the availability of the digital dividend and its effective usage, for example, to bridge the digital divide and to provide new innovative broadcasting applications and services, is still a priority that needs to be addressed.
  12. Other issues to consider are the studies from other ITU Sectors, especially taking into account the decisions of the World Radiocommunication Conferences (WRC-15, WRC-19 and WRC-23) on exploiting the digital dividend in the future. In this regard, it is relevant to consider maintaining study topics related to technical and economic aspects involved in the transition from analogue to digital broadcasting.
  13. Finally, another important issue for the future of broadcasting is the emergence of new broadcasting technologies and standards that could be taken into account when developing countries[[5]](#footnote-6) are implementing the digital television transition. At the same time, traditional broadcasting services, with or without the interaction with other platforms and networks, should also be considered.

**2. Question or issue for study**

The focus of the Question’s items of study will be on new and emerging broadcasting/audiovisual content distribution systems, services, and applications, including OTTs and other distribution platforms, such as satellite and cable networks, and new topics targeted at new deliverables for the ITU-D study period 2026-2029, as appropriate.

Aggregate study of spectrum planning, digital broadcasting and the usage of the digital dividend, to cover new topics and interests from developing countries will continue.

Studies under the Question will focus on the following issues:

**2.1 Continuing topics to consider from Question 2/1 of 2021-2025 study period**

(Revised ToR as in Document [TDAG-WG-futureSGQ/28](https://www.itu.int/md/D22-TDAG.WG.SGQ-C-0028/en).)

1. Analysis of methods and issues for the adoption and implementation of digital broadcasting (sound and television), including the deployment of new services and applications, such as UHDTV, AR/VR, interactive applications, for consumers/viewers in various environments (in possible collaboration with Question A/2).
2. Analysis of the effects for public broadcasting services in the developing countries of the rapid growth of traditional and online linear TV and video-on demand subscription services.
3. National experiences on strategies for the introduction of new broadcasting technologies, applications, emerging services and capabilities, including regulatory, economic, financial and technical aspects, reflecting the need for massive cost of the implementation and investments to cope with the ever-growing demand for video content (in possible collaboration with Questions A/2 and 4/1, where appropriate).
4. Analysis of the development of broadcasting systems using IP-based technologies throughout the broadcasting chain, including the production, contribution and transmission parts.
5. Best practices and national experiences on spectrum- including interference mitigation, the use of the digital dividend technical, regulatory and economic aspects, and other related spectrum management matters.
6. Analysis of the gradual transition to digital sound broadcasting, study cases, sharing of experiences and strategies implemented, including the use of VHF Band III for DAB or DTT.
7. Analysis of possible innovations for broadcasting in the UHF band, proposed by new systems for broadcasting, such as 5G Broadcast, ATSC3.0 and other next generation systems.

**2.2 New topics for this study period**

1) Analysis of strategies, policies and regulation for the adoption and implementation of digital audiovisual services, in the context of audiovisual content distribution;

2) Evaluation of new broadcasting services and technologies, emerging applications and capabilities, including regulatory, economic and technical aspects, both in traditional and other distribution platforms, including through IP;

3) Assessment of next generation broadcasting and audiovisual content distribution systems, including IP-based technologies;

4) Analysis of the deployment strategies of new services and applications for audiovisual content distribution platforms, such as UHDTV, AR/VR, interactive applications, metaverse and AI, among others; (in possible collaboration with Question D/2)

5) Evaluation of other digital audiovisual service offers, and new and emerging broadcasting/audiovisual content distribution systems, services, and applications, including OTTs and other distribution platforms, such as satellite and cable networks, to assess the television landscape.

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**QUESTION 3/1 The use of telecommunications/ICTs for disaster risk reduction and management**

(Revised TOR of Question 3/1 as in Document [TDAG-WG-futureSGQ/28](https://www.itu.int/md/D22-TDAG.WG.SGQ-C-0028/en).)

**1. Statement of the situation or problem**

The importance of telecommunications and ICTs to support disaster mitigation, preparedness, response and recovery is well established. Over the study period from 2022 to 2025, under Question 3/1 ITU-D Study Group 1 examined the use of ICTs in disaster risk reduction with case studies, examples of technologies, applications and planning for ICT resilience for disaster management. Before that, during the study period 2018-2021, the focus had been on the utilization of telecommunications/ICTs for disaster preparedness, mitigation and response' with focus on drills and exercise.

Disasters—ranging from earthquakes and hurricanes to floods and droughts—claim approximately 40,000 to 50,000 lives each year, on average, over the last few decades. In 2023, the Emergency Events Database (EM-DAT) recorded 399 disasters related to natural hazards. These events resulted in 86,473 fatalities and affected 93.1 million people. The economic losses from these disasters amounted to US$202.7 billion. The most catastrophic event of the year was the earthquake in Türkiye and the Syrian Arab Republic, which caused 56,683 deaths and US$42.9 billion in damages. This earthquake impacted an estimated 18 million people, making it the second most impactful event in terms of affected individuals, following the 2023 Indonesian drought, which affected 18.8 million people between June and September.

While these figures represent a relatively small fraction of global deaths, disasters can have disproportionately large impacts on specific populations. Extreme events can kill tens to hundreds of thousands of people in a single instance. In the 20th century, it was not uncommon for disasters to claim over a million lives annually.

Beyond loss of life, disasters also lead to significant displacement, with millions of people left homeless each year. The economic costs of such events can be severe and difficult to recover from, particularly in lower-income countries.

However, we are not helpless in the face of disasters. The number of deaths from disasters has significantly decreased over the last century, thanks to early warning systems, better infrastructure, improved agricultural productivity, and more coordinated responses.

As climate change increases the frequency and severity of extreme events, strengthening resilience will be critical to prevent reversing our recent progress. To achieve this, we must continue working towards enhancing resilience in vulnerable countries, leveraging Information and Communication Technologies (ICTs) and other strategies to reduce the vulnerability of populations and ensure that no one at risk is left behind.

Most developed and developing[[6]](#footnote-7) countries recognize emergency telecommunications as a priority and are taking steps to:

– build national emergency telecommunication plans;

– develop and implement early warning systems; and

– test that technologies and systems are in place and ready to be used to ensure disaster-resilience.

Based on the past three years' experience, it is felt that during the next phase of study the focus should be on preparing : checklists; guidance on how to prepare standard operating procedures as well as best practices for countries to use to create resiliency in disaster response and recovery.

In view of the above, the focus of the study Question for the year 2026-202X should remain: ''The use of Telecommunications/ICTs for disaster response and recovery''.

**2.Question or issue for study**

1) Continue examination of terrestrial, space based and integrated telecommunications/ICTs to assist affected countries in utilizing relevant applications for disaster prediction, detection, monitoring, early warning, response, relief and recovery, including consideration of best practices/guidelines for implementation, and in ensuring a favourable regulatory environment to enable rapid deployment and implementation.

2) Continue gathering and examining national experiences and case studies in the use of telecommunications/ICTs for disaster preparedness, mitigation, response and recovery, including response to pandemics, and analysing lessons learned and common themes between them.

3) Examine the role that administrations and Sector Members and other expert organizations and stakeholders share in collaboratively addressing disaster management and the effective use of telecommunications/ICTs, particularly in the areas of planning for ICT resilience for disaster management.

4) Examine the enabling environment for more resilient communication networks and for the deployment of emergency communication systems and the latest digital communication technologies, which includes, but is not limited to, emergency preparedness, response and recovery.

5) Collect case studies and best practices to ensure the inclusion of vulnerable groups such as persons with disabilities, women and youth for the use of ICTs for disaster management and risk reduction.

6) Gather national experiences and case studies and develop best practices for the elaboration, implementation and refinement of national and regional disaster-management plans or frameworks for the use of telecommunications/ ICTs in disaster and/or emergency situations, including pandemics, working in coordination with the relevant BDT programmes, regional offices and other partners. This would include a guide for countries to develop standard operating procedures, and for the development and implementation of National Emergency Telecommunication Plans as well as early warning systems.

New topics:

1. Responding to and managing emergency infrastructure cut-off or unavailability to provide network resilience and continuity
2. The use of AI tools for disaster risk prediction, reduction, and management (in collaboration with Question D/2)

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**QUESTION 4/1 Economic aspects of national telecommunications/ICTs**

**(**Items from revised TOR of Q4/1 has been added, as received in Document [TDAG-WG-futureSGQ/28](https://www.itu.int/md/D22-TDAG.WG.SGQ-C-0028/en).)

**1 Statement of the situation or problem**

As recognized in the Final Reports on Question 4/1, consideration of economic aspects of national telecommunications/ICTs continues to be important.

With the emergence of new types of telecommunication enterprise, such as mobile virtual network operators (MVNOs), tower companies and capacity wholesale operators, and the convergence of traditional telecom businesses, regulators and operators are having to adapt their policies and strategies to this new digital reality. Finding suitable authorizations, cost models and business models and using relevant policy and regulatory tools such as infrastructure-sharing should be considered by national regulatory authorities (NRAs) in order to help their national markets thrive, as shown in contributions received from NRAs, policy-makers and operators alike which were considered by the Rapporteur Group for Question 4/1 in the most recent study period.

At the same time, further global forces pushing towards increased digitalization, as well as national economic and global emergencies like the coronavirus disease (COVID-19) pandemic, are throwing up many new relevant issues that call for additional study and investigation in the next ITU-D study period.

Expansion of the number of topics stems from the need to divide up the work on final reports on Question 4/1. Thus, the topics which will continue from the ITU-D study period 2018-2021 could be reviewed in the scope of revision of the Final Report on Question 4/1 for that study period, whereas new topics could be considered under the Final Report on the new Question 4/1 for the 2022-2025 study period.

Accordingly, the work programme set out below to guide the activities related to Question 4/1 should cover:

– identification of active collaborators;

– expected outputs of the Question;

– working methods; and

– work programme.

**2. Question or issue for study**

**2.1 Continuing topics from ITU-D study period 2018-2021**

The Question will continue to cover the following main topics from national perspectives in the scope of possible revision of the Final Report on Question 4/1 for the ITU-D study period 2018-2021:

1) New charging methods (or models, if applicable) for services provided over NGN networks, including cost-modelling methods.

2) Consumer price and tariffs evolution and impact on ICT service usage, innovation, investment and operator revenues.

3) Trends in the development of virtual mobile operators and their regulatory framework.

**2.2 Continuing topics for ITU-D study period 2022-2025**

The Question will continue to cover the following main topics from national perspectives in the scope of possible revision of the Question 4/1 Final Report for ITU-D study period 2022-2025:

1) Impact of new converging ICTs on cost-modelling strategies traditionally carried out by stakeholders constituting the ICT networked value chain (e.g. telecom operators, over-the-top, digital service providers, etc.) (in possible collaboration with Question 2/2):

1.1) The role and design of new tariffs for convergent networks/services (e.g. bundling)

1.2) The role and impact of tower companies as new entrants for a converging telecommunication/ICT market.

2) The role and impact on achieving the United Nations Sustainable Development Goals (SDGs) of new types and modes of investment in telecommunications/ ICTs, e.g. blended investment and crowdfunding.

3) Analysis of case studies on the economic contribution of digital telecommunication/ICT technologies and services to the national economy and country’s GDP

4) Economic incentives and mechanisms for bridging the digital divide to provide accessible and affordable access.

5) Analysis of the economic impact of the COVID-19 pandemic.

6) Economic aspects/implications of digital transformation.

7) The economic value of usage of personal data (in possible collaboration with Questions B/1 and 3/2)

8) Impact on innovation and productivity and other national economic aspects of digital financial inclusion.

**2.3 New topics for the next study period**

The Question will cover the following main topics from a national perspective in the scope of developing the new Question 4/1 Final Report or other deliverables for the ITU-D study period 2026-2029:

1. Digital Currencies
2. Economics of AI and Metaverse (in collaboration with Question D/2)
3. Digital Taxes
4. National aspects of spectrum economics
5. Social Return of Investment
6. Cataloguing/sharing national experiences and best practices in collecting data and measuring the affordability of end-user telecommunication/ICT devices, with particular regard to disaggregation by gender and geography (in collaboration with Question C/2)

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**QUESTION B/1 Consumer protection, and universal and meaningful accessibility**

**(**Items from revised TOR of Q6/1 and from revised TOR of Question 7/1 of study period 2022-2025, as in Document [TDAG-WG-futureSGQ/28](https://www.itu.int/md/D22-TDAG.WG.SGQ-C-0028/en), are listed below for merging)

**1. Statement of the situation or problem**

1.1 Emerging telecommunications and ICT technologies have enabled a paradigm shift in how people live, work, and interact, resulting in new opportunities for digital engagement, empowerment, socio-economic growth, and improved consumer experiences. The development of artificial intelligence (AI) technologies promises to be a key enabler for telecommunications and ICTs to contribute to universal sustainable digital connectivity and achieving SDGs. Developing nations, in particular, stand to benefit from digital transformation.

1.2 However, these new opportunities are accompanied by novel challenges. These include fostering and maintaining consumer trust in digital services despite the possibility of being harmed online, including through the misuse of personally identifiable information (PII). Given the increasing sophistication of misinformation, disinformation, and online scams perpetuated over telecommunications/ICT, protecting consumers requires a renewed focus and a more holistic and collaborative approach than what is currently in place.

1.3 The digital revolution has shaped global awareness of consumer rights, making consumer information, awareness, and rights highly relevant to the ITU’s mission. On the one hand, digital transformation has created new types of rights and, on the other hand, is influencing the nature and implementation of traditional consumer rights revolving around price, quality, and safety. This interaction is complex and constantly evolving with global and borderless technological advancements, requiring ongoing international cooperation and collaboration.

1.4 Regulators in developing countries face the dual pressure of ensuring universal access expeditiously bringing unconnected populations online and protecting consumers by promoting their trust in applications deployed to enable much-needed digital transformation. By facilitating the sharing of perspectives, challenges and solutions under the aegis of Q 6/1, developing countries will benefit from learning from the experience and regulatory innovations of the developed world to leapfrog towards meaningful connectivity while minimising consumer harm. In turn, developing countries' perspectives can inform the trajectory of inclusive and equitable digital transformation for all.

1.5 Consumer vulnerabilities can arise when individuals face barriers or challenges that limit their ability to make informed decisions about accessing ICTs safely. These vulnerabilities may stem from personal circumstances, societal inequalities, or systemic factors. They can also result from insufficient measures to empower consumers, including through appropriate levels of information and transparency. Consumer vulnerabilities can manifest as unequal access to services, falling prey to exploitative practices, or difficulty resolving disputes. Regardless, they can threaten global efforts towards early and sustained digital transformation.

1.6 Addressing consumer vulnerabilities and focusing on consumer information, awareness, and rights is critical to ensuring that all individuals can exercise their rights to participate effectively and meaningfully in the digital world and benefit from technological advances. Thus, ensuring informed decision-making by increasing awareness, encouraging transparency, and respecting consumer rights and interests are critical pillars for fostering trust and sustainability in ICTs in the digital era. Given the global and pervasive nature of telecommunications/ICTs, this requires multi-stakeholder cooperation, cross-border capacity building, and collaboration.

1.7 With the increasing deployment of AI in ICTs, biases and discrimination can arise inadvertently from the unequal representation of various segments of the global human population in the data used to train AI and in AI governance, including the decision-making surrounding its design and deployment. Consumers in developing countries may be particularly vulnerable in this regard, as are rural populations, persons with disabilities and women. Involving marginalised groups in regulatory and governance decisions is therefore important. The Question will provide a forum to promote a more participative discussion and discuss how to encourage broader participation.

1.8 Safeguarding PII means informing consumers on the need for them to be aware and exercise due diligence while sharing their information online. It also involves the right regulatory incentives to minimise the misuse of PII. Effective PII protection measures represent a commitment to strengthening consumer trust. When organisations are transparent about PII processing activities, consumers feel more confident sharing their information for individual and societal good. The regulation and supervision of consumer protection require a renewed focus on processing PII carefully and not harming consumers. Industry best practices will be encouraged and shared during the study period to address PII use, storage, processing transfer, etc.

1.9 Consumers can make informed decisions by accessing clear, accurate, and complete information about the terms and conditions of ICT services and their rights and obligations. As technology evolves, the need for robust protections and clear communication among stakeholders will increase.

(Content below is statement of the situation or problem, from revised ToR of Quesiton 7/1 of study period 2022-2025 as in Document [TDAG-WG-futureSGQ/28](https://www.itu.int/md/D22-TDAG.WG.SGQ-C-0028/en).)

As it states in the Article 9 of the United Nation Convention on the Rights of Persons with Disabilities (UNCRPD) States Parties shall take appropriate measures to ensure to persons with disabilities access, on an equal basis with others, inter alia, to information and communications, including information and communications technologies and systems.

Disability – whether temporary, situational or permanent – is something that can affect people at any time. Designing with and for people with disabilities and specific needs leads to greater benefits for everyone. Telecommunication/ICT accessibility is not only important for persons with disabilities but also benefits the increasing elderly population, migrants that do not speak the native language and persons with low literacy.

The World Health Organization (WHO) estimates that one billion persons in the world live with some type of disability. According to WHO, about 80 percent of persons with disabilities live in low income countries. Disability appears in different forms and degrees, regarding physical, sensitive or mental aspects. Also, increasing life expectancy results in older persons having reduced capabilities. Therefore, it is likely that the number of persons with disabilities will continue to rise.

It is also pertinent to mention that broadband access and usage are highly dependent on literacy, and ICT literacy as well. The United Nations Educational, Scientific and Cultural Organization (UNESCO) estimates that 750 million people aged 15 and above worldwide are illiterate, i.e. they cannot read or write, while two-thirds of them are women. Several issues encountered by both disability groups and illiterate groups of people have common solutions.

As highlighted by the Joint Inspection Unit JIU Report 2018/6, "*among the UN specialized agencies, only ITU has a specific mandate on accessibility from its legislative body*." ITU governing body has adopted a number of pertinent resolutions on accessibility to benefit persons with disabilities and persons with specific needs, including age-related disabilities. These include inter alia: conducting studies and research and issuing recommendations and guidelines on telecommunication and ICT accessibility; prioritizing work on accessibility terms and definitions; considering aspects of universal design, including the drafting of non-discriminatory standards, service regulations and measures and so on.[[7]](#footnote-12)Also, within the UN framework, **ITU is recognized as the** **“UN leader in technology and accessibility,**” as echoed at the 45th session of the High-Level Committee on Management (HLCM) from 3-4 April 2023.

It is recognised that accessible telecommunication/ICTs are products and services that include embedded features at the design and fabrication stage so that they can be used by persons with disabilities and can benefit persons with specific needs irrespective of their capacity, needs, or circumstances. Integrating user needs in universal design, accessibility standards, and usability procedures ensures that ICTs are not only technically functional but also usable by all people including persons with disabilities, older persons, or illiterates.

During the current cycle of work on Question 7, the ITU Members agreed on the necessity of incorporating digital accessibility requirements, principles, and standards from the design stage to ensure that digital products, services, applications, and solutions cater to the widest range of end-users, encompassing a diverse range of abilities and needs. Moreover, promoting the universal design in technology and mainstreaming ICT accessibility policies and strategies was recognised not only as a compulsory requirement to ensure that all people have equal and equitable use of telecommunication/ICT products and services but also as key to achieving an inclusive digital transformation as a whole. As a result, ITU Members - stated in their discussion (*as reflected in the Reports of Question 7, in particular, Rapporteur Meeting Reports 2024*) that the Question should evolve and include a holistic and human-centric approach that encompasses the needs of all people to use technology, as so ensure that digital transformation includes everyone equally and equitably.

Collecting information and data addressing many key issues relating to accessibility to telecommunications/ICTs for persons with disabilities offer valuable facts on initial digital inclusion and on how persons with disabilities and specific needs can navigate in digital society. Therefore, a methodology should be developed to assist the information-gathering process.

**2. Question or issue for study**

(Revised ToR of Question 6/1 of study period 2022-2025 as in Document [TDAG-WG-futureSGQ/28](https://www.itu.int/md/D22-TDAG.WG.SGQ-C-0028/en))

2.1 The question will continue the work of previous study periods and cover existing consumer protection issues, given that different member states are at various stages of adopting ICTs and digital transformation. The Question will also cover new topics in the scope that align with new resolutions approved in the last ITU Plenipotentiary Conference and WTSA 2024, such as those about AI, metaverse, and meaningful and sustainable digital transformation, in possible collaboration with Question D/2. The overarching theme for this Question would be meaningful and sustainable digital transformation based on consumer trust and safety. The goal is that availability, accessibility, and affordability must be supported by consumer information and awareness measures for connectivity to achieve the SDGs effectively. In this study period, the emphasis will be on sharing consumer protection challenges faced universally and those faced by developing countries in particular and on experience sharing between members to find solutions towards promoting consumer information awareness and rights.

* 1. In particular, studies under the Question will focus on the issues set out below:

2.2.1 Enhancing traditional responses and updating the traditional regulators’ toolkit in the digital age. This would include measures that promote innovation, competition and consumer safety, as well as methods and tools to protect consumers from unsolicited commercial communications, online fraud, and the misuse of personally identifiable information as an integral part of telecommunication/ICT policy.

2.2.2 Innovative means and best practices for providing consumers with the requisite information, awareness and skills to become more aware of and resistant to potentially harmful and deceptive practices. This would include measures undertaken by service providers, regulators, and consumer organisations. Sharing challenges and solutions between less and more experienced jurisdictions would help the global population leapfrog towards fulfilling the SGDs by benefitting from faster uptake of connectivity and advanced digital products and services.

2.2.3 Protection of vulnerable consumers: The large online data flows tend to exacerbate the information asymmetries between suppliers and consumers. Therefore, a key question is how to rebalance this dynamic by enhancing transparency while leveraging data to protect consumers. Data can also be used to identify vulnerable consumer segments such as older people, PwDs, women, and children and provide them with tailored support. The question’s focus in this study period will include how to gather and use consumer behavioural insights to help regulators collaboratively:

2.2.3.1. Understand consumer decision-making and design better regulations to inform and protect them in the digital age.

2.2.3.2. Engage with service providers to collaborate on consumer information, awareness and safety by design, keeping in view the needs of the most vulnerable consumers.

2.2.4. The question would deliberate on how we can identify unique requirements of skilling aimed at consumer awareness and safety in using ICT services enabled by the age of new and emerging technologies, including the unique requirements of developing countries and marginalised groups of consumers. This would include how to:

2.2.4.1 Educate consumers about their rights and how to navigate risks in the digital era.

2.2.4.2. Enhance the focus on PwDs, children, women, and the elderly to foster trust in ICTs, keep them safe online, and help them engage effectively with the digital world.

2.2.4.3. Promote more balanced and beneficial digital transformation outcomes for women as a consumer group, including strengthening women’s participation and unique contributions to the global governance of emerging technologies.

3. The question would deliberate on how, given the global nature of digital transformation and online harms, we can cooperate effectively to protect consumer rights worldwide, even as we move to benefit from digital transformation expeditiously. Can we identify common best practices and principles? To this end, the study period will be used to create a toolkit on better regulatory design for consumer protection in the digital age and create awareness based on members' experiences and workshops as the main deliverable besides the report.

3.1*.* Recommendations would be based on evidence, including the impact of good regulation (that protects consumers as a complement to digital connectivity initiatives) on enhancing the take-up of digital transformation initiatives. For example, the success of digital public infrastructure is based on good regulations that foster consumer trust, apart from excellent technological design*.*

3.2The study period would help Q6/1 focus on experience sharing and capacity building to enable regulators to assess and mitigate any potential adverse impact of new and emerging technologies like generative AI on safety in consumers' online experience from the viewpoint of helping retain their trust in digital connectivity and wholeheartedly adopt digital transformation (in collaboration with Question D/2) including:

3.2.1*.* The manner and extent regulators foster a collaborative approach to consumer protection, education and empowerment, i.e. with other regulators, consumer organisations, civil society, etc. What are the best practices they apply?

3.2.2 What are the best practices of multi-stakeholder cooperation, including industry self-regulation and co-regulation?

3.2.3. How can regulators leverage research and regulatory impact assessment to enhance consumer protection and education mechanisms, programmes and initiatives?

3.2.4. How do regulators and service providers leverage emerging technologies to enhance consumer protection mechanisms and empower consumers?

3.2.5 How can regulators and industry provide consumers with the requisite information and teach consumers to protect their PII from misuse?

(Revised ToRs of Question 7/1 of study period 2022-2025 as in Document [TDAG-WG-futureSGQ/28](https://www.itu.int/md/D22-TDAG.WG.SGQ-C-0028/en).)

1) Sharing good practices on implementing national telecommunication/ICT accessibility policies, legal frameworks, directives, guidelines, strategies and technological solutions to improve the accessibility, compatibility and usability of telecommunication/ICT digital products, tools, platforms, services, and solutions.

2) Mainstream ICT/digital accessibility of e-government and other socially relevant digital services.

3) Increase accessibility of telecommunication/ICT products and services by promoting AI and emerging technologies. (in collaboration with Question D/2)

4) Foster inclusive education by ensuring the digital education platforms are accessible from design and so digitally accessible for all its intended users including those with disabilities ( including deaf and blind).

5) Promote training for persons with disabilities and specific needs in the use of telecommunications/ICTs.

6) Promote the development of telecommunication/ICT accessibility professionals as well as education and expertise to assist persons with disabilities and persons with specific needs (including older persons, illiterate) to use telecommunications/ICTs.

7) Use of accessible telecommunications/ICTs to promote equal and equitable employment opportunities for all people including for persons with disabilities to ensure an inclusive and open society.

8) Develop national expertise and ensure the collection of information and statistics on telecommunication/ ICTs accessibility by disaggregated end-users.

9) Establish mechanisms to involve from the design stage persons with disabilities - as the most exigent end-users and persons with specific needs such as older persons in the process of elaborating legal/regulatory provisions, public policies, standards and strategies related to advance telecommunication/ICT/digital accessibility of products and services. Persons with disabilities can also serve as validators of these digital accessible products and services.

10) Ensure that ICT accessibility is addressed from planning and design and mainstreamed in the development of smart cities and villages to ensure that these are “smart for all[[8]](#footnote-17)” cities and communities in which no one is left behind.

2.1 New topic to study

Best practices to ensure that the adoption of AI enhances inclusive social benefits especially for persons with disabilities, the elderly and vulnerable groups. (in collaboration with Question D/2)

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**QUESTION A/2: Digital services and smart sustainable cities and communities**

(Relevant extracts from Q2/2 for study period 2022-2025 have been merged with Q1/2. They are shown in change tracks below.)

1. **Statement of the situation or problem**

All areas of society – culture, education, health, transport, trade and tourism – will depend for their development on the advances made through information and commu­nication technology (ICT) systems and services in their activities. ICTs can play a key role in the protection of property and persons; smart management of motor vehicle traffic; saving electrical energy; measuring the effects of environmental pollution; improving agricultural yield; increasing efficiency in global travel and tourism; management of health care and education; management and control of drinking-water supplies; and solving the problems facing cities and rural areas. A smart society can be realized by achieving smartness and digitalization across either:

1. A specific sector: employing digital services in different sectors such as health, education, tourism,…
2. A specific region: at a city, village, or community level.

Similarly, as highlighted by the World Summit on the Information Society (WSIS), ICT services and applications can support sustainable development in public administration, business, education and training, health, the environment, agriculture and science within the framework of national cyberstrategies. The offerings of digital services including e-services, m-services and over-the-top (OTT) applications present new opportunities for economic development, particularly in developing countries. Enabling technologies such as cloud computing offer ubiquitous, convenient and on-demand network access to a shared pool of configurable computing resources (e.g. networks, servers, storage, applications and services) that can be rapidly provisioned and released with minimal management effort or service-provider interaction.Furthermore, application of AI in agriculture improves productivity, promoting poverty alleviation and rural industrial development. AI also enhances clinical diagnostic accuracy and accessibility of medical treatment.

The United Nations 2030 Agenda for Sustainable Development recognizes the enor­mous possibilities offered by ICTs and calls for significant increase in access to such technologies, which have a decisive contribution to make in support of implementation of all the United Nations Sustainable Development Goals (SDGs). ITU therefore deems it a priority to support its membership in achieving the SDGs, in close collaboration with other associates.

Delivering the promise of the smart society relies on three technological pillars – con­nectivity, smart devices/terminals and software – as well as on sustainable development principles.

Connectivity or the underlying infrastructure encompasses both traditional and emerg­ing networks and new technologies. It is a key enabler upon which all smart services could be provided. Examples include machine-to-machine (M2M) communication, the Internet of Things (IoT), and resulting applications and services such as e‑government, traffic management and road safety.

Smart devices/terminals are the things and edge components that are connected via the enabling infrastructure and connectivity layer to exchange data between the field and the city operation centre. Cars, traffic lights and cameras, water pumps, electricity grids, home appliances, streetlights and health monitors are all examples of things that need to become smart so as to deliver significant advancements towards the achieve­ment of sustainability and economic and social goals. This is especially important in developing countries[[9]](#footnote-18).

Then the role of software development becomes essential to exploit and capitalize on the first two pillars (connectivity and terminals), such that all three pillars can function together to support new services that would never have been possible before. Software includes both the city platform which interfaces with all terminals seamlessly as well as the service-specific functions that are tailored to perform each vertical application or service in the city.

It will be possible for the work carried out under this study Question to be founded on Resolution 11 (Rev. Kigali, 2022) on telecommunication/ICT services in rural, isolated and poorly served areas, Resolution 68 (Rev. Kigali, 2022) on assistance to indigenous peoples and communities through ICTs, and Recommendation ITU-D 19 on telecommunications for rural and remote areas of the World Telecommunication Development Conference; on Resolutions 139 (Rev. Bucharest, 2022), on the use of telecommunications/ICTs to bridge the digital divide and build an inclusive information society, and 197 (Rev. Dubai, 2018), on facilitating IoT to prepare for a globally connected world, of the Plenipotentiary Conference; Resolutions 44 (Rev. New Delhi, 2024), on bridging the standardization gap between developing and developed countries, and 98 (Rev. New Delhi, 2024), on enhanc­ing the standardization of IoT, digital twins and smart sustainable cities and communities for global development of the World Telecommunication Standardization Assembly; and Resolution ITU-R 66-2 (Rev. Dubai, 2023) of the Radiocommunication Assembly, on studies related to wireless systems and applications for the development of IoT.

1. **Question or issue for study**

Based on the statement of the situation set out in § 1 above, the issue of study will revolve around the three main pillars in addition to other complementary components, as follows:

1. Consideration of smart sustainable cities and communities (SSCCs) to enlarge the scope of study and include smart villages and any form of communities.
2. Raising awareness and sharing experiences on improving connectivity and underlying infrastructure to support the smart society and potential smart digital services, which include: smart grids, public administration, transport, business, the environment, agriculture, tourism and science, education, health, commerce, and finance.
3. Studying methods and examples of how software and platforms, both open-source and/or proprietary, enable efficient architecture and operation of smart services.
4. Studying policies and business models that ensure the involvement of different stakeholders and yield sustainable development of smart cities and communities.
5. Discuss and share reference data management architectures that would promote and enable development of smart cities and communities.
6. Defining performance benchmarks and assessment mechanisms for smartness in terms of quality-of-life, technical aspects and policy mechanisms.
7. Sharing of experiences and best practices in building smart cities and choosing/providing smart services and applications.
8. Promotion of capacity building and the acquisition of knowledge on ICTs for adoption of the skills required for development of a smart society.
9. Encouraging city planners and city officials to participate in the study and share their experiences.
10. Strategies and policies to foster the emergence of a cloud-computing ecosystem in developing countries, taking into consideration relevant standards recognized or under study in the other two ITU Sectors.
11. The application and impact of AI technologies in support of digital services and applications to enable an efficient telecommunication/ICT ecosystem and to empower the traditional ICT industry. (in collaboration with Question D/2)
12. Advanced knowledge support to BDT's digital service and application projects in cooperation with WHO or other UN bodies.

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(ToR of Q2/2 for study period 2022-2025 has been merged with Q1/2, see QA/2 above)

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**QUESTION B/2: ICTs for the environment, and human exposure to electromagnetic fields**

1. **Statement of the situation or problem**
   1. **ICTs and climate change**

(Section 1.1 from ToR of Q6/2 for study period 2022-2025 on climate change has been moved below. It is shown without change tracks to ease reading.)

The issue of climate change has emerged as a global concern and requires global collaboration by all concerned, in particular the developing countries[[10]](#footnote-19) (which are the most vulnerable group of countries with respect to climate change). International initiatives in this domain are seeking to achieve sustainable development and identify ways and means in which information and communication technologies (lCTs) can monitor climate change and reduce overall global greenhouse gas (GHG) emissions. The focus of this study Question is ''responsible consumption and production''.

ICTs have a direct and indirect effect on the environment. ICTs can help emerging economies overcome and thrive despite climate change and fluctuations, while helping the world mitigate climate change.

New technologies, systems and applications can monitor climate and reduce its adverse impact by utilizing big data. They can be pivotal in helping policy-makers and industry to tackle challenges with regard to environmental changes while formulating new policies and setting new standards of production towards reduction of emissions. Also, artificial intelligence (AI) can contribute to the collection of information through various methods and channels of data collection, by utilizing both human and historical experience to face extreme and unpredictable weather scenarios. AI contributes to environmental conservation by monitoring climate change, optimizing resource use, and supporting renewable energy development.

Study Group 5 of the ITU Telecommunication Standardization Sector (ITU-T) is the lead study group for the study of ICT environmental aspects of electromagnetic phenomena and climate change, including design methodologies to reduce environmental effects, such as recycling related to ICT facilities and equipment; and Study Group 7 (Science services) of the ITU Radiocommunication Sector (ITU‑R) is the lead study group for studies related to the use of radio technologies, systems and applications, including satellite systems, for environment and climate‑change monitoring and climate‑change prediction.

In this respect, the outcomes of ITU‑T and ITU‑R resolutions and Recommendations, and in particular Resolution 73 (Rev. Geneva, 2022) of the World Telecommunication Standardization Assembly (WTSA) and Resolution 673 (Rev. WRC‑12) of the World Radiocommunication Conference, should serve as a basis for the study of this Question.

* 1. **Telecommunication/ICT waste material**

(Section 1.2 from ToR of Q6/2 for study period 2022-2025 on e-waste has been moved below. It is shown without change tracks to ease reading.)

The growth of telecommunications/ICTs, especially in developing countries, has been exponential in recent years. For instance, between 2002 and 2007, mobile‑phone penetration in the Americas region grew from 19 to 70 terminals per 100 inhabitants. Globally, the share of mobile‑phone subscriptions in developing countries increased by 20 percentage points, from 44 per cent to 64 per cent over the same period of time.

The growth of electrical and electronic equipment and their peripherals, as well as the continuous updating of technology, has generated a significant growth in telecommunication/ICT waste. It is estimated that between 20 and 50 million tonnes of telecommunication/ICT waste are generated every year worldwide. However, recycling and responsible disposal of telecommunication/ICT waste remain at low levels, making it difficult to even find figures on this issue at regional level.

According to the Global E-waste Monitor 2020, the world generated 53.6 million tonnes of e‑waste in 2019, whilst global waste generation is predicted to reach 74 Mt by the year 2030, which is almost double the 2014 figures. This equates to an average of 7.3 kg per person.

Recycling and efficient disposal of telecommunication/ICT waste have not been handled properly, so it is proving a major challenge even to obtain correct figures for total ICT waste/e-waste present in the world.

The consequences of not carrying out proper recycling or disposal of e-waste constitute environmental problems of large magnitude and give rise to health issues, especially for developing countries.

The exponential growth of telecommunication/ICT terminals, the associated high turnover of terminals and advances in technology make it imperative to put forward actions in the immediate future to prevent the environmental catastrophe that would result in developing countries if we fail to produce an adequate regulatory framework and work towards policies that address this problem.

* 1. **Human exposure to electromagnetic fields**

(Section 1 from ToR of Q7/2 for study period 2022-2025 on EMF has moved below. It is shown without change tracks to ease reading.)

With the advent of the wireless technologies, human exposure to electromagnetic fields (EMF) raised public concerns. The importance of developing strategies and guidance concerning human exposure to EMF has been well discussed. Over the study cycle from 2018 to 2021, under study Question 7/2 Study Group 2 of the ITU Telecommunication Development Sector (ITU-D) has studied science-based policies, guidelines, national experiences and assessments of human exposure to radio-frequency EMF (RF-EMF). New versions of EMF standards have also been published during the study cycles: in March 2020, the International Commission on Non-Ionizing Radiation Protection (ICNIRP) published an update to the ICNIRP (1998) Guidelines. The Institute of Electrical and Electronics Engineers (IEEE) also published the updated C95.1-2019 in October 2019. The ICNIRP and IEEE limits are largely harmonized, and the power density limits for whole-body exposure to continuous fields are identical above 30 MHz.

Due to the characteristics of multiple-input multiple-output (MIMO), beamforming and millimetre-wave technologies used in the new communication systems, some pioneer studies have been conducted to evaluate RF-EMF levels. Risk communication, including the benefit of new wireless technologies for people, in particular during the pandemic, is an important method to reduce unnecessary public concerns about RF-EMF exposure. WHO and ITU constantly help the exchange of knowledge between countries and regions on the current state of the science.

1. **Question or issue for study**

(Section 2 from ToR of Q6/2 for study period 2022-2025 has been moved below, without change tracks to ease reading.)

There are a variety of issues that members will address under this study Question in the next four years. It is expected that the following steps for the study will play a major role in the future in order to meet the objective of the Question:

1. In close collaboration with the respective BDT programme(s), identify the regional needs for relevant applications for developing countries.
2. Elaborate a methodology for the implementation of the Question, in particular gathering evidence and information regarding current best practices on how ICTs can help reduce overall GHG emissions, taking into consideration progress achieved by ITU‑T and ITU‑R in this regard.
3. Consider the role of Earth observation in climate change, as determined by the implementation of Resolution 673 (Rev. WRC‑12), on the use of radiocommunication for Earth observation applications, in order to enhance the knowledge and understanding of developing countries in respect of the utilization and benefits of relevant applications in connection with climate change.
4. Develop best-practice guidelines for the implementation of relevant Recommendations adopted by ITU‑T as a result of the implementation of Resolution 73 (Rev. Geneva, 2022), both for monitoring changes in the climate and reducing the impact of climate change using the action plan in WTSA Resolution 44 (Rev. Geneva, 2022), in particular programmes 1, 2, 3 and 4 thereof.
5. Strategies to develop a responsible approach to, and comprehensive treatment of, telecommunication/ICT waste: policy and regulatory actions required in developing countries, in close collaboration with ITU‑T Study Group 5 and Question C/2.
6. The role of ICTs and cutting-edge intelligent technologies like AI in efficiently handling e-waste, and in reducing climate change-related disasters like flash floods and large-scale fires (in collaboration with Question 3/1 and Question D/2).

(Extracts from ToR of Q7/2 Section 2 for study period 2022-2025 have been moved below, without change tracks to ease reading.)

1. Collection of case studies, identification of lessons learned and best practices related to human exposure to electromagnetic fields.
2. Examine new wireless technologies, best practices in EMF management, harmonization of standards and risk communication, with priority focus on:

* Responding to EMF miscommunication
* Exposure in new EMF scenarios
* Examining the implementation of exposure limits via a broad range of country case studies, including on the ICNIRP (2020) Guidelines
* EMF aspects of new deployment methods of wireless equipment
* 5G EMF
* EMF in low-altitude airspace and drone
* AI in EMF evaluation (in collaboration with Question D/2)
* EMF in smart wearable devices.

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**QUESTION 3/2 Securing information and communication networks: Best practices for developing a culture of cybersecurity**

1. **Statement of the situation or problem**

The use of telecommunications and information and communication technologies (ICTs) has been invaluable in fostering development and social and economic growth globally. However, despite all the benefits and uses these technologies offer, there are risks and threats to security.

From personal finances to business operations, from national infrastructure to public and private services, all transactions are increasingly managed through information and communication networks, making them more vulnerable to some form of attack.

In order to build trust in the use and application of telecommunications/ICTs for appli­cations and content of all kinds, especially those having a major positive impact in eco­nomic and social areas where all players exert an effect on the protection of personal data, network security and the actual network user, close collaboration is required between national authorities, foreign authorities, industry, academia and users.

Based on the foregoing, securing information and communication networks and devel­oping a culture of cybersecurity have become key in today's world for a number of reasons, including:

1. the explosive growth in the deployment and use of ICT;
2. cybersecurity remains a matter of concern of all, and there is thus a need to assist countries, in particular developing countries[[11]](#footnote-20), to protect their telecommunication/ICT networks against cyberattacks and threats;
3. the need to endeavour to ensure the security of these globally interconnected infrastructures if the potential of the information society is to be achieved;
4. the growing recognition, at the national, regional and international levels, of the need to develop and promote best practices, standards, technical guidelines and procedures to reduce vulnerabilities of and threats to ICT networks;
5. the need for national action and regional and international cooperation to build a global culture of cybersecurity that includes national coordination, appropriate national legal infrastructures, watch, warning and recovery capabilities, government/industry partnerships and outreach to civil society and consumers;
6. the requirement for a multistakeholder approach to effectively make use of the variety of tools available to build confidence in the use of ICT networks;
7. United Nations General Assembly (UNGA) Resolution 57/239, on creation of a global culture of cybersecurity, invites Member States "to develop throughout their societies a culture of cybersecurity in the application and use of information technology";
8. UNGA Resolutions 68/167, 69/166 and 71/199, on the right to privacy in the digital age, affirm, inter alia, "that the same rights that people have offline must also be protected online, including the right to privacy";
9. best practices in cybersecurity must protect and respect the rights of privacy and freedom of expression as set forth in the relevant parts of the Universal Declaration of Human Rights, the Geneva Declaration of Principles adopted by the World Summit on the Information Society (WSIS) and other relevant international human rights instruments;
10. the WSIS Geneva Declaration of Principles indicates that "A global culture of cybersecurity needs to be promoted, developed and implemented in cooperation with all stakeholders and international expert bodies", the Geneva Plan of Action encourages sharing best practices and taking appropriate action on spam at national and international levels, and the Tunis Agenda for the Information Society reaffirms the necessity for a global culture of cybersecurity, particularly under Action Line C5 (Building confidence and security in the use of ICTs);
11. ITU was requested by WSIS (Tunis, 2005), in its agenda for implementation and follow-up, to be the lead facilitator/moderator for Action Line C5 (Building confidence and security in the use of ICTs), and relevant resolutions have been adopted by the Plenipotentiary Conference, the World Telecommunication Standardization Assembly (WTSA) and the World Telecommunication Development Conference (WTDC);
12. UNGA Resolution 70/125 adopted the outcome document of the high-level meeting of the General Assembly on the overall review of the implementation of the WSIS outcomes;
13. the WSIS+10 statement on the implementation of WSIS outcomes, and the WSIS+10 vision for WSIS beyond 2015, adopted at the ITU‑coordinated WSIS+10 high-level event (Geneva, 2014) and endorsed by the Plenipotentiary Conference (Busan, 2014), which were submitted as an input into the UNGA's overall review on the implementation of WSIS outcomes;
14. WTDC Resolution 45 (Rev. Kigali, 2022) supports the enhancement of cybersecurity among interested Member States;
15. Resolution 130 (Rev. Dubai, 2018) of the Plenipotentiary Conference resolves to continue promoting common understanding among governments and other stakeholders of building confidence and security in the use of ICTs at the national, regional and international level;
16. WTSA Resolution 50 (Rev. Geneva, 2022) highlights the need to harden and defend information and telecommunication systems from cyberthreats and cyberattacks, and continue to promote cooperation among appropriate international and regional organizations in order to enhance exchange of technical information in the field of information and telecommunication network security;
17. the conclusions and recommendations set out in the Final Report of ITU Telecommunication Development Sector (ITU-D) Study Group 2 on Question 3/2, to the effect that the activities in the current terms of reference be continued and that evolving and emerging technical threats beyond spam and malware be considered for the next study period;
18. there have been various efforts to facilitate the improvement of network security, including the work of Member States and Sector Members in standards-setting activities in the ITU Telecommunication Standardization Sector (ITU‑T) and in the development of best-practice reports in ITU‑D; by the ITU secretariat in the Global Cybersecurity Agenda (GCA); and by ITU‑D in its capacity-building activities under the relevant programme; and, in certain cases, by experts across the globe;
19. governments, service providers and end users, particularly in least developed countries (LDCs), face unique challenges in developing security policies and approaches appropriate to their circumstances;
20. reports detailing the various resources, strategies and tools available to build confidence in the use of ICT networks and the role of international cooperation in this regard are beneficial for all stakeholders;
21. spam and malware continue to be a serious concern, although evolving and emerging threats must also be studied;
22. the need for simplified test procedures at basic level for security testing of telecommunication networks to promote a security culture.
23. **Question or issues for study**
24. Promote awareness-raising for users and capacity building regarding cybersecurity (in possible collaboration with Question 5/2).
25. Update the perspectives, studies and experiences of the report on Question 3/2 for the last study period.
26. Share experiences on cybersecurity assurance practices.
27. Discuss approaches and best practices for cybersecurity incident responses.
28. Discuss approaches and best practices, and collect experiences on the implementation of national cybersecurity strategies and policies.
29. Discuss challenges and approaches for 5G cybersecurity.
30. Discuss challenges and approaches to addressing smishing and SMS incidents.
31. Discuss approaches and share experiences of computer incident response team (CIRT) national coordination for the resilience of critical infrastructure.

New Topics:

1. Best practices for assessing cybersecurity measures and performance
2. Cybersecurity tests and measures to ensure safe and approved access of terminals (especially vulnerable IoT devices) to smart services, with special focus on critical ones.
3. Institutional/legal and regulatory mechanisms to tackle new cybersecurity challenges arising from the widespread application of AI (in collaboration with Question D/2).

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**QUESTION C/2 Availability and affordability of users’ terminals/devices, and equipment conformance and interoperability**

1. **Statement of the situation or problem**

Indicator 5.b.1 – the proportion of individuals who own a mobile telephone, by sex – is one of the seven ICT indicators agreed by the UN General Assembly to measure global progress along the Sustainable Development Goals ([A/RES/71/313](https://undocs.org/A/RES/71/313)) and is also an indicator within the ICT Development Index. Latest ITU data suggests this indicator rests at 81% of men and 75% of women worldwide, with notable disparities by geographic region and by gender ([ITU, 2023](https://www.itu.int/en/ITU-D/Statistics/Pages/SDGs-ITU-ICT-indicators.aspx)).

Several factors relate to the availability and affordability of users’ terminals/devices, across the globe. The policies and regulations adopted by ITU Member States around affordability of users’ terminals/devices, conformance and interoperability, counterfeits, and device theft, each have an influential impact on the ultimate price that consumers pay for the devices they use. In addition, barriers such as gender norms can impede also limit the availability of users’ terminals/devices and ultimately our collective attainment of the ICT-related Sustainable Development Goals.

This challenge and its related policy and regulatory levers merit study by the ITU-D membership and the provision of guidance to the ICT community.

1. **Question or issue for study**

Study Question 4/2 is expected to examine issues related to the availability and affordability of users’ terminals/devices. The work covers the following items:

1. Cataloguing/sharing national experiences and best practices of users’ terminals/devices within broadband policy and regulation, such as national broadband plans, ICT strategies, and mandates of Universal Service Funds (USFs) (in collaboration with Question A/1);
2. Cataloguing/sharing national experiences and best practices in collecting data and measuring the availability and affordability (in collaboration with Question 4/1) of user’s terminals/devices, with particular regard to disaggregation by gender and geography;
3. Cataloguing/sharing national experiences and best practices in the public provision of users’ terminals/devices, such as through schools, libraries, and other public access points;
4. Analysing of the impacts of availability and affordability (in collaboration with Question 4/1) of users’ terminals/devices in attainment of the Sustainable Development Goals;
5. Cataloguing/sharing national experiences and best practices in digital skills development with available users’ terminals/devices (in collaboration with Question D/2);
6. Cataloguing/sharing national experiences and best practices in consumer awareness of issues relevant to users’ terminals/devices, including device theft and consumer willingness and ability to pay (in possible collaboration with Question B/1);
7. Identifying/sharing innovations and developments in conformance and interoperability (C&I) best practices, including regard to ITU-T standardisation activities, BDT programmes, and national experiences;
8. Examining how capacity development can strengthen the ability of developing countries to reduce risks associated with low-quality equipment and equipment interoperability issues;
9. Sharing information regarding the establishment of mutual recognition agreements (MRAs) between countries;
10. Assessing the impact of the increase of ICT devices to the radiocommunication environment, including the Internet of Things (IoT), and providing guidelines to the ITU-D membership for ICT‑readiness related to C&I (in possible collaboration with Question B/2); and
11. Cataloguing/sharing national experiences and best practices on combating counterfeit, sub-standard, and tampered devices.

Due to their global prevalence and their relationship with the Sustainable Development Goals, the Question should give priority to consideration of mobile phone (particularly smartphone) availability and affordability, including willingness and ability to pay, but it may also consider the availability and affordability of other users’ terminals/devices, such as personal computers.

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**QUESTION D/2 Utilisation of new emerging ICT technologies, and development of digital skills**

1. **Statement of the situation or problem**
   1. **Utilisation of new emerging ICT technologies**

With the rapid development and widespread application of new emerging ICT technologies, such as artificial intelligence (AI), achieving sustainable development goals (SDGs) and bridging the digital divide remain a vital topic. As Member States face varied challenges in these areas, fostering dialogue and collaboration is essential for effective solutions.

As a key driver of digital transformation and technological innovation, these technologies have demonstrated their potential and capability to tackle critical challenges through various use cases.

In bridging the digital divide, they foster accessibility and inclusion through innovative tools and platforms. Applications, digital infrastructure, and equitable access to technology are vital to ensuring benefits to all societal groups.

Member States can actively engage in dialogue and explore best practices to maximize the societal benefits of these technologies and build a more inclusive and sustainable future.

* 1. **Development of digital skills**

Broadband technologies are fundamentally transforming the way we live. Broadband infrastructure, applications and services offer important opportunities to boost economic growth, enhance communications, improve energy efficiency, safeguard the planet and improve people's lives. Broadband access and adoption have a significant impact on the world economy and are important to bridging the digital divide.

According to the ITU 2021 edition of Facts and Figures, an estimated 2.9 billion people – or 37 per cent of the world’s population – remain offline. In developed countries, 90 per cent of the population is online compared to 57 per cent in developing countries[[12]](#footnote-23) and 27 per cent in least developed countries (LDCs). Of the 37 per cent of people who are offline, 5 per cent cannot connect even if they wanted to due to a lack of network coverage (“coverage gap”), while 32 per cent remain offline for other reasons (“usage gap”).

Since the onset of the coronavirus disease (COVID-19) pandemic, Internet connectivity has played a vital role in allowing individuals to continue to participate in everyday social, political and economic activities as millions of people turned to remote work, distance learning, e-commerce and Internet-enabled telehealth services. Almost 70 per cent of the workforce in some countries shifted to remote work, and 94 per cent of the world's student population was affected by school closures. Unfortunately, of those affected, at least 31 per cent of school-age children are still unable to access online educational content.

Disparities are found across countries. With respect to gender, globally, only 48 per cent of women use the Internet compared to 55 per cent of men. In developing countries, women are almost 10 per cent less likely to use the Internet than men, compared to only 2 per cent less than men in developed countries. The gender gap further widens in LDCs (15 per cent women to 28 per cent men) and in LLDCs (21 per cent women to 33 per cent men). Broadband adoption directly contributes to the likelihood that a community will participate in and benefit from the digital economy.

In indigenous communities, the digital divide plays an even larger role in widening the economic, educational and social divides. Due to the sparse population in rural and remote areas where many indigenous people live combined with the challenges of broadband mapping and data collection, available information sources often provide incomplete data for Internet access and adoption. Methods to increase adoption in these areas will optimally focus on factors at the household and personal level to include price, availability of computers or other devices, content provided in local languages and digital skills.

Global stakeholders have become increasingly focused on alleviating disparities in broadband adoption by investing in approaches that address the affordability of devices and services and emphasize the importance of digital skills and digital literacy to effec­tively participate in the global economy. In a survey conducted by ITU, less than 40 per cent of the population in 40 per cent of countries surveyed had basic ICT skills, while, similarly, less than 40 per cent of the population in over 70 per cent of countries had standard ICT skills, and in over 95 per cent of countries less than 15 per cent of the population had advanced ICT skills.

There must be a significant uptake in broadband services and technologies for a com­munity to participate fully in the digital economy. As stakeholders around the world work to deploy broadband networks, it is also important to develop and execute strat­egies that enable their citizens to adopt and effectively use broadband technologies, services and devices, supported by adequate digital skills. Increasingly, stakeholders use local languages and iconography to increase computer and overall literacy. Optimally, all strategies for adoption will be studied in the context of the social, economic and cultural factors faced by individuals in urban, rural and remote areas in both developed and developing countries.

1. **Question or issue for study**
2. Policy, regulation, and initiative being adopted for the development of new emerging ICT technologies, such as AI, by national regulatory authorities and other national, regional and international organizations to enable the development of these technologies and digital transformation.
   1. The application of these technologies, how to empower the traditional ICT industry, and providing the best practices to the ITU members.
   2. Application of these technologies in achieving SDGs and bridging the digital divide.
   3. Approach of capacity building for these technologies.
3. Means that may be adopted to foster effective cooperation and information-exchange among policymakers and regulators.
4. Collaboration on new emerging ICT technologies with relevant ITU-D study Questions.
5. Analysis of adoption opportunities, challenges and disparities for telecommunications/ICTs, including broadband.
6. Trends in telecommunication/ICT adoption globally, including in urban, rural, remote and other areas.
7. Trends in Internet traffic and the impact on demand for high-speed broadband, including during pandemics and disasters.
8. Trends in digital skills development and training programmes.
9. Methods to promote and encourage digital literacy, training and skills development across all levels of the global socio-economic landscape to close the digital skills gap.
10. Approaches to strengthen digital-skills training for the adoption of e-services, including e‑agriculture, e-commerce, e-education and e-health.
11. Ways to encourage the adoption of telecommunications/ICT services and devices among school-aged children and youth and to teach them basic, intermediate and advanced digital skills so that they can safely participate fully in the information society.
12. Ways to encourage widespread adoption of new and emerging telecommunication/ICT services and technologies to increase fast and reliable connectivity for all, including women and individuals in developing and least developed countries (LDCs), landlocked developing countries (LLDCs), and small island developing states (SIDS).
13. Strategies and policies to improve the affordability of Internet-enabled devices, including handsets and data services to meet the growing demand for affordable Internet services and devices (in collaboration with Question 4/1).
14. The influence of cultural, social and other factors in producing unique and often creative methods of encouraging the adoption of e-services by residents of developing countries, including relevant content in local languages.

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(ToR of Q6/2 for study period 2022-2025 has been merged with Q7/2, see QB/2 above)

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(ToR of Q7/2 for study period 2022-2025 has been merged with Q6/2, see QB/2 above)

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1. These include the least developed countries, small island developing states, landlocked developing countries and countries with economies in transition. [↑](#footnote-ref-2)
2. [Meaningful connectivity](https://www.itu.int/itu-d/meetings/statistics/wp-content/uploads/sites/8/2022/04/UniversalMeaningfulDigitalConnectivityTargets2030_BackgroundPaper.pdf) is a level of connectivity that allows users to have a safe, satisfying, enriching and productive online experience at an affordable cost [↑](#footnote-ref-3)
3. <https://www.itu.int/dms_pub/itu-d/opb/tdc/D-TDC-WTDC-2022-PDF-E.pdf> [↑](#footnote-ref-4)
4. These include the least developed countries, small island developing states, landlocked developing countries and countries with economies in transition. [↑](#footnote-ref-5)
5. These include the least developed countries, small island developing states, landlocked developing countries and countries with economies in transition. [↑](#footnote-ref-6)
6. These include the least developed countries, small island developing states, landlocked developing countries and countries with economies in transition. [↑](#footnote-ref-7)
7. [jiu\_rep\_2018\_6\_english\_0.pdf](https://www.unjiu.org/sites/www.unjiu.org/files/jiu_rep_2018_6_english_0.pdf) , page 11 [↑](#footnote-ref-12)
8. ITU Training - **Smart for all: Beyond smart cities “Smart for all”, Towards building inclusive and digitally accessible environments and communities (***Available in: Arabic, English, French, Russian and Spanish)*  [↑](#footnote-ref-17)
9. These include the least developed countries, small island developing states, landlocked developing countries and countries with economies in transition. [↑](#footnote-ref-18)
10. These include the least developed countries, small island developing states, landlocked developing countries and countries with economies in transition. [↑](#footnote-ref-19)
11. These include the least developed countries, small island developing states, landlocked developing countries and countries with economies in transition. [↑](#footnote-ref-20)
12. These include the least developed countries, small island developing states, landlocked developing countries and countries with economies in transition. [↑](#footnote-ref-23)