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| **TDAG Working Group on the future of Study Group Questions(TDAG-WG-futureSGQ)****4th Meeting, Virtual, 21 January 2025** | A close up of a sign  Description automatically generated |
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|  | **Document TDAG-WG-futureSGQ/23-E** |
|  | **17 January 2025** |
|  | **English only** |
| Chair, TDAG-WG-futureSGQ |
| Draft proposal of the deliverable of TDAG-WG-futureSGQ |
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| **Summary:**This document is a first draft revision of extracts from Resolution 2 annexes including the terms of reference of study Questions. As agreed in the last meeting of the TDAG-WG-futureSGQ, it aims to capture the rich discussions held into a concrete document to be refined for submission to TDAG in May 2025. Further revisions will aim to engage the widest possible set of contributions received formally and informally.**Action required:**Participants are invited to review and comment on this document as appropriate.**References:**WTDC Resolution 2 (Rev. Kigali, 2022) |

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

# Enabling environment for 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
* Consumer information, protection and rights for telecommunication/ICT services, especially for vulnerable groups
* Combating counterfeit telecommunication/ICT devices and theft of mobile telecommunication devices in the perspective of consumer protection.

# 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
* Use of telecommunications/ICTs for disaster risk reduction and management, particularly in developing countries

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**: Deployment of telecommunications/ICTs including broadband in developing countries with focus on rural and remote areas (merged previous Q1/1 with previous Q5/1)

**Question 2/1**: Strategies, policies, regulations and methods of migration to and adoption of digital technologies for broadcasting, including to provide new services for various environments

**Question B/1**: Consumer information, protection and rights (previous Q6/1 merged with parts of previous Q4/2 namely combating counterfeiting and theft of mobile devices)

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

**Question 5/1**: ICT accessibility for inclusive digital ecosystem

# Study Group 2

**Question A/2:** Enabling technologies for e-services and applications in the context of smart sustainable cities and communities,including e-health and e-education (merged previous Q1/2 with previous Q2/2)

**Question 2/2**: The use of telecommunications/ICTs for disaster risk reduction and management (Previous Q3/1 moved to SG2)

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

**Question** **B/2**: Strategies and policies concerning ICTs for the environment, [conformance and interoperability of telecommunication/ICT equipment,] and human exposure to electromagnetic fields (merge of previous [Q4/2 C&I part,] Q6/2 and Q7/2)

**Question 5/2**: Adoption of telecommunications/ICTs and improving digital skills

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** Deployment of Telecommunications/ICTs including broadband in developing countries with focus on rural and remote areas

(Note : Items from revised TOR of Q1/1 will be added, when received. Items from revised TOR of Q5/1 have been included below)

**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

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 Q4/1 and Q6/1 of 2021-2025 study period)
* Licensing approaches and business models for sustainable deployement 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 for rural users to adopt so as to fulfil their development needs (in collaboration with Q4/1 of 2021-2025 study period)
* 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 of 2021-2025 study period) 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 Q1/1 will be added, when received. Items from revised TOR of Q5/1 have been included below)

* Harnessing the complementarity of Terrestrial and Non terrestrial networks
* How Artificial intelligence can improve rural infrastructure and access
* The benefits of 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 Q5/2 of 2021-2025 study period)

**QUESTION 2/1 Strategies, policies, regulations and methods of migration to and adoption of digital technologies for broadcasting, including to provide new services for various environments**

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

**(**Items from revised TOR of Q2/1 will be added, when received. This will include the current and future needs of developing countries**)**

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.

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 transition to 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.

ITU has been working to analyse and identify best practices for the transition from analogue to digital broadcasting. It is important to emphasize the report on ITU-D Question 2/1 for the 2021-2025 study period, which identifies public policies that should be applied as means for countries to be able to start the digital transition.

It is also important to mention the Digital Terrestrial Television Broadcasting Switchover (DSO) database, which contains information on relevant events (e.g. workshops, frequency coordination meetings and seminars), publications (e.g. ITU-R and ITU-D, roadmaps and workshop presentations), websites (e.g. ITU-R and ITU-D, GE06), contacts and sources of information.

There have been developments of broadcasting systems and integration with ICT networks using Internet protocol (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.

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.

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.

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.

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 countries1 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.

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

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**

**(**Items from revised TOR of Q2/1 will be added, when received**)**

1. Analysis of methods and issues for the transition from traditional digital broadcasting (sound and television) to video-centric converged service provisioning, 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 2/2).
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, emerging services and capabilities, including regulatory, economic and technical aspects, reflecting the need for massive investments to cope with the ever-growing demand for video content (in possible collaboration with Questions 2/2 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-planning activities related to the implementation of video-centric converged service providers.
6. National experiences on interference mitigation measures in the context of the transition scenarios.
7. 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.
8. 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.
9. Costs of the transition from traditional digital broadcasting (sound and television) to video-centric converged service providers, including sharing best practices on new innovative business models, derived from this transition, for the various players: broadcasters, operators, technology providers, Internet enterprises, manufacturers and distributors of receivers, and consumers, among others (in possible collaboration with Questions 4/1 and 2/2).
10. The use of the digital-dividend frequency bands resulting from the transition to terrestrial digital broadcasting (sound and television), including technical, regulatory and economic aspects, such as

a) status of the use of the digital-dividend frequency bands;

b) sharing of the digital-dividend frequency bands;

c) harmonization and cooperation at regional level;

d) the role of the digital dividend in saving financing, cost savings on the transition to digital, and best experience and practice in this regard;

e) use of the digital dividend to help bridge the digital divide, especially for the development of communication services for rural and remote areas;

f) guidelines on the transition to digital sound broadcasting, focusing on the experiences of those countries that completed the process.

**2.2 New topics for this study period**

(Initial inputs from Q2/1 via SG1 Coordinator are below for reference)

* Strategies, policies and regulation for Digital Services, in the context of audiovisual content distribution;
* New broadcasting technologies, emerging services and capabilities, including regulatory, economic and technical aspects;
* Next generation broadcasting and audiovisual content distribution systems, including IP-based technologies;
* The deployment of new services and applications for audiovisual content distribution platforms, such as UHDTV, AR/VR, interactive applications, metaverse, among others.

**QUESTION B/1 Consumer information, protection and rights** (with parts of previous Q4/2 namely combating counterfeiting and theft of mobile devices)

**(**Items from revised TOR of Q6/1 and of Q4/2 will be added, when received This will include the current and future needs of developing countries, topics to continue studying and new topics to study)

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

(Initial inputs from Q6/1 via SG1 Coordinator are below for reference)

The overarching theme for this Question would be Meaningful and sustainable Digital Transformation based on consumer trust and safety. Our mantra is that availability, accessibility and affordability must be supported by measures towards awareness and safety for connectivity to be effective in achieving the SDGs.

1. How can we gather and use consumer behavioural insights to help regulators, A. understand consumer decision-making and design better regulations to protect in the digital age? B. Engage with service providers to collaborate on consumer information, awareness and safety by design C. Educate consumers about their rights and how to navigate risks. D. Focus on children, women, and the elderly to keep them safe online and help them engage effectively with the digital world.
2. How can we identify unique requirements of skilling aimed at consumer awareness and safety in using ICT services enabled by the age of new and emerging technologies?
3. Create a toolkit on better regulatory design for consumer protection and awareness creation based on the experiences of members and workshops as the main deliverable besides the report. Focus on teaching consumers to keep their Personally Identifiable Information safe from misuse.
4. Gather evidence of the impact of good regulation (that protects consumers as a complement to digital connectivity initiatives) on enhancing the take-up of digital transformation initiatives. E.g. the success of Digital Public Infrastructure in India is based on good regulation apart from excellent technological design.
5. 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 transformation.

In the context of increasing convergence and the advent of advanced communication technologies, consumer protection remains a highly relevant subject and a moving target. The telecommunication/ICT sector is dynamic and technology and business models keep changing, giving rise to new consumer-protection issues. Further, Member States are at various stages of telecommunication/ICT penetration and adoption of new technologies, and policy/regulatory evolution, and accordingly face different challenges making exchange of information and best practices very important.

Member States must prepare for improved collaborative regulation. Consumer protection is an important policy aspect of telecommunications/ICTs. Various models of policy and regulation, including better self-regulation by service providers and co-regulation, need to be explored.

Consumer protection is necessary to foster consumer trust, which in turn would encourage the continued uptake of new technologies in a manner that is safe, secure and respects consumer rights. The protection of vulnerable users such as new users, especially those from economically disadvantaged populations, women, children, older persons and persons with disabilities, must be given special attention

**(**relevant extracts from ToR of Q4/2 for study period 2022-2025 has been moved below**)**

1. **Counterfeit telecommunication/ICT equipment**

Counterfeit telecommunication/ICT equipment is a growing issue and socio-economic problem. It causes significant negative impact on innovation, levels of foreign direct investment, growth in the economy and levels of employment, and may also redirect resources into organized criminal networks.

1. **Mobile device theft**

Preventing and combating the use of stolen mobile devices is another issue. The theft of user-owned mobile devices may lead to the criminal use of telecommunication/ICT services and applications, resulting in economic losses for the lawful owner and user.

Implementing measures to combat counterfeit telecommunication/ICT devices and mobile device theft is a matter of urgency and high interest for developing countries.

**2. Question or issue for study**

The Question will continue to cover the topics in the scope of possible revision of the Final Report on Question 6/1 for the ITU-D study period 2018-2021, and new topics targeted at new deliverables for the ITU-D study period 2022-2025, as appropriate.

Studies under the Question will focus on the issues set out below:

1) Telecommunication/ICT policy and regulation being adopted for consumer protection by NRAs and other national, regional and international organizations to enable digital transformation, while balancing the interests of all stakeholders, including consumers and service providers. This would include institutional and regulatory mechanisms to promote cross-sectoral and cross-border collaboration along with revisiting policy and regulatory approaches, such as co-regulation and self-regulation. In particular it would include:

(i) 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.

(ii) Information sharing about policy frameworks to protect consumers, promote competition and innovation, enhance customer care, with the advent of new and emerging telecommunication/ICT technologies such as the Internet of Things (IoT), and ensure that the frameworks facilitate online communications and transactions.

2) Organizational methods and strategies being developed by public consumer protection agencies with regard to institutional/legal and regulatory mechanisms to tackle new challenges arising from rapid uptake of new telecommunication/ ICT services, including setting up of institutions, such as consumer education centres, dedicated consumer complaint-handling centres or commissions, and dedicated consumer complaint-resolution mechanisms to protect consumers effectively

3)Best practices to ensure that policies and regulations for consumer protection in telecommunications/ICTs are sustainable instruments of protection. This includes being:

(i) based on consultation and collaboration, balancing the expectations, ideas and expertise of all market stakeholders and players, including academia, industry, civil society, consumer associations, data scientists, end users and relevant government agencies from different sectors;

(ii) evidence-based, since evidence is critical for creating a sound understanding of the issues at stake and identifying the options going forward as well as assessing their impact;

(iii) outcome-based, in order to address the most pressing issues, such as market barriers and enabling synergies: policy and regulation responses to new telecommunication/ICT technologies should be grounded in the impact on consumers, societies and market players;

(iv) incentive-based, rewarding players who uphold consumer protection.

4) Institutional and policy/regulatory mechanisms/means put in place by Member States and regulators in the telecommunication/ICT sector, so that operators/ service providers publish transparent, comparable, adequate, up-to-date information on, inter alia, prices, tariffs, expenses and terms of service, including protection of personal information and contract termination, and accessing and updating telecommunication/ICT services, in order to keep consumers informed and to develop clear and simple offers, as well as best practices for consumer education. This includes:

(i) Availability of tools to test the actual speed of users' connection and best practices about consumer-protection measures related to the mandate, if applicable, of quality of service provided and communicated by telecommunication/ICT operators/service providers.

(ii) Any transparency requirements for traffic management and zero-rating practices of telecommunication/ICT operators/service providers.

(iii) Transparency about main forms of billing, including third-party payments such as direct carrier billing, premium-rate services, mobile payment etc. and consumer-protection measures in place about third-party charges in telecommunication/ICT services bills.

5) Mechanisms/means implemented by the policy-makers and/or regulators themselves to keep consumers and users informed about the basic features, quality, security, measures to protect personal information, and rates of the various services being offered by the operators, including platforms to enable them to know and exercise their rights, to use the services properly, and to make informed decisions when contracting services.

6) Specific legal, economic and financial measures adopted by national authorities in the interests of protection of specific categories of telecommunication/ ICT users (new users, especially those from economically disadvantaged communities, older persons, persons with disabilities, women and children). This should include mechanisms to promote the creation of useful information and practical tools to be used for promoting consumer awareness to better enable consumer protection, including surrounding the use of new technologies.

7) Mechanisms/means implemented by policy-makers and regulators and operators/service providers to incentivize self-regulation or co-regulation that promotes confidence among all the actors involved, especially the consumer.

8) Means that may be adopted to foster effective consumer protection, cooperation and information-exchange among policy-makers and regulators.

**(**relevantextracts from ToR of Q4/2 for study period 2022-2025 has been moved below**)**

9) Techniques and national experiences on combating counterfeit, sub-standard, and tampered devices:

* 1. prepare and document examples of best practices on limiting counterfeit and tampered devices, for distribution;
	2. prepare guidelines, methodologies and publications to assist Member States in identifying counterfeit and tampered devices and methods of increasing public awareness and restricting trade in these devices, as well as the best ways of limiting them;
	3. study the impact of counterfeit and tampered telecommunication/ICT devices being transported to developing countries.

New topics:

1. Assessment of users’ satisfaction levels using different mechanisms giving rise to the notion of improved Quality of Experience

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

**(**Items from revised TOR of Q4/1 will be added, when received This will include the current and future needs of developing countries, topics to continue studying and new topics to study)

**1 Statement of the situation or problem**

As recognized in the Final Report on Question 4/1 for the ITU-D study period 2018-2021, 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.

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 previous study period with some expansion**

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: 1.1) Methods for determining the costs of wholesale services.

2) The impact of infrastructure-sharing (local loop unbundling, tower companies, etc.) on investment cost, provision of telecommunication/ICT services, competition and prices to consumers: case studies with quantitative analysis.

2.1) For what type of infrastructure (or facilities) is the provider party free to negotiate reasonable commercial terms and conditions with a requesting party?

2.2) Methods for determining the costs of passive and active infrastructure sharing services.

3) Consumer price evolution and impact on ICT service usage, innovation, investment and operator revenues:

3.1) New and innovative business models for services deployed in an NGN environment.

3.2) Trends, offers and prices of telecommunication/ICT services, including international mobile roaming.

3.3) Assessment of telecommunication/ICT service bundles, bonuses and their impact.

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

**2.2 New topics for next study period**

(Initial inputs from Q4/1 via SG1 Coordinator are below for reference)

* Digital Currencies,
* Economics of Metaverse,
* Digital Taxes,
* National aspects of spectrum economics (Spectrum fees and auctions),
* Social Return of Investment (SRoI).

The Question will cover the following main topics from a national perspective in the scope of developing the Final Report on new Question 4/1 or other deliverables for the 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.

4) Framework for establishing the contribution of telecommunications/ICTs to a country's GDP.

5) Economic incentives and mechanisms for bridging the digital divide.

6) Economic aspects/implications of digital transformation:

6.1) The economic value of usage of personal data (in possible collaboration with Questions 6/1 and 3/2)

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

**2.3 New topics for this study period to be addressed in collaboration with other ITU-D Questions**

1) National experiences on the contribution to the national economy of bridging the digital divide to provide accessible and affordable connectivity (in possible collaboration with Questions 1/1, 5/1 and 7/1).

2) Different models of infrastructure-sharing, including on commercially negotiated terms (in possible collaboration with Question 1/1)

2.1) Usage and impact of alternative infrastructure from other actors (e.g. aerial optical fibre using electric poles belonging an energy company, telephone poles of an incumbent operator, a railway company's optical fibre) (in possible collaboration with Question 1/1).

**QUESTION 5/1 ICT accessibility for inclusive digital ecosystem**

(The ToR of Q7/1 for study period 2022-2025 has been moved below, it is shown without change tracks to ease reading. Items from revised TOR of Q7/1 of study period 2022-2025 will be included, when received. This will include the current and future needs of developing countries, topics to continue studying and new topics to study. As per initial inputs on Q7/1 from SG1 Coordinator, the title of the study Question has been updated)

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

The World Health Organization (WHO) estimates that one billion persons in the world live with some type of disability. According to WHO, about 80 per cent 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. Thus, it is likely that the number of persons with disabilities will continue to rise.

The inclusion in society of persons with disabilities is a policy of Member States. The objective of such policy is to bring about the necessary conditions for persons with disabilities to enjoy the same opportunities in life as the rest of the population. The disabilities policy has evolved, making urban infrastructure accessible and improving health and rehabilitation services for persons with disabilities. Moreover, the principles of equal opportunity and non-discrimination are common policies of Member States.

With respect to telecommunications, at the World Telecommunication Development Conference (Hyderabad, 2010) Member States resolved, by Resolution 20 (Rev. Hyderabad, 2010), that access to modern telecommunication/information and communication technology (ICT) facilities, services and related applications must be provided on a non discriminatory basis.

The World Summit on the Information Society (WSIS) acknowledged that special attention should be given to the needs of older persons and persons with disabilities.

The United Nations General Assembly (UNGA) High-Level Meeting on the overall review of the implementation of the WSIS outcomes acknowledged the need to address the specific ICT challenges facing children, youth, persons with disabilities, older persons, indigenous peoples, refugees and internally displaced persons, migrants and remote and rural communities.

On 13 December 2006, UNGA approved the Convention on the Rights of Persons with Disabilities (CRPD), which came into force on 3 May 2008.

The CRPD establishes basic principles, and also a State's obligations to ensure equal access to telecommunications/ICTs, including Internet, by persons with disabilities.

Resolution 175 (Rev. Dubai, 2018) of the Plenipotentiary Conference, on telecommunication/ICT accessibility for persons with disabilities and persons with specific needs, calls for the introduction of mechanisms to enhance the accessibility, compatibility and usability of telecommunication/ICT services, and encourages the development of applications enabling the use of such services by persons with disabilities and persons with specific needs on an equal basis with others.

Resolution 70 (Rev. Geneva, 2022) of the World Telecommunication Standardization Assembly, on telecommunication/ICT accessibility for persons with disabilities and persons with specific needs, resolves that the ITU Telecommunication Standardization Sector (ITUT) study groups should consider aspects of universal design, non-discriminatory standards, service regulations and measures for all persons, especially persons with disabilities.

The ITU-G3ict Model ICT Accessibility Policy Report highlights a series of elements relevant to the development of policies on public access to ICTs, mobile communications, TV and video programmes, web access and public procurement. The report also recognizes the need for flexible legislative frameworks that foster equitable access to telecommunications/ICTs for persons with disabilities in a constantly changing technological environment.

ITU-T Study Group 16 has conducted work and studies on multimedia coding, systems and applications, and Study Group 6 of the ITU Radiocommunication Sector (ITU-R) has conducted work on broadcasting services relevant to ICT accessibility for persons with disabilities.

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; and two-thirds of them are women. Several issues encountered by both disability groups and illiterate groups of people have common solutions.

It is important to gather information and data addressing many key issues relating to accessibility to telecommunications/ICTs for persons with disabilities. Therefore, a methodology should be developed to assist the information-gathering process.

During the coronavirus disease (COVID-19) pandemic, the issue of digital inclusion and telecommunication/ICT accessibility has gained significant momentum around the world. It becomes very important to mainstream ICTs through the implementation of policies, regulations and communication strategies (including education, employment and health) for the socio-economic development of all people, including persons with disabilities and persons with specific needs. Accessibility principles should be implemented at the design stage of ICT applications and services to bridge the digital divide.

**2. Question or issue for study**

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

2) Accessibility of e-government and other socially relevant digital services.

3) Accessibility of new and emerging technologies.

4) Education and training for persons with disabilities and specific needs in the use of telecommunications/ICTs, and education and training of experts to assist persons with disabilities and specific needs to use telecommunications/ICTs.

5) Use of accessible telecommunications/ICTs to promote the employment of persons with disabilities to ensure inclusive and open society.

6) National experience in collecting information and statistics on telecommunication/ ICTs accessibility.

7) Mechanisms to involve persons with disabilities and persons with specific needs in the process of elaborating legal/regulatory provisions, public policy and standards related to telecommunication/ICT accessibility.

**QUESTION A/2 Enabling technologies for e-services and applications in the context of smart sustainable cities and communities, including e-health and e-education**

(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 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~~.~~

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[[5]](#footnote-6).

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.

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

**QUESTION 2/2 The use of telecommunications/ICTs for disaster risk reduction and management [Q3/1 MOVED TO SG2]**

Items from revised TOR of Q3/1 will be added, when received This will include the current and future needs of developing countries, topics to continue studying and new topics to study**)**

**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 2018 to 2021, under Question 5/2 ITU-D Study Group 2 examined the use of ICTs in disaster risk reduction with case studies, examples of technologies, applications, checklists, guidelines for exercises and drills, planning aspects, etc. Before that, during the study period 2010-2017, the focus had been on the utilization of telecommunications/ICTs for disaster preparedness, mitigation and response'.

The period 2019-2020 witnessed significant disaster events in terms of numbers and fatalities. There was widespread loss of lives and property. According to the Emergency Events Database (EM-DAT), in 2019 a total of 396 natural disasters were recorded with 11 755 deaths, 95 million people affected and a total of USD103 billion worth of economic loss across the world. The burden was not equally shared by the world, as Asia suffered the highest impact and accounted for 40 per cent of disaster events, 45 per cent of deaths and 74 per cent of the total affected. Floods were the deadliest type of disaster, accounting for 43.5 per cent of deaths, followed by extreme temperatures at 25 per cent (mainly due to heatwaves in Europe) and storms at 21.5 per cent. Storms affected the highest number of people, accounting for 35 per cent of the total affected, followed by floods with 33 per cent and droughts with 31 per cent. There have been more wildfires reported in 2019 (14) compared to the annual average number of wildfires (9) during the period 2009-2018. Similarly, a greater number of floods (194) were recorded in 2019 compared to the annual average of 149 floods during the period 2009-2018

By the end of 2019 and beginning of 2020, the world had been hit by another disaster, namely the coronavirus disease (COVID-19) pandemic. It resulted in widespread loss of lives across the world, unemployment and huge economic loss due to lockdown in various countries.

Most developed and developing1 countries recognize disaster communications as a priority and are taking steps to:

 – build national preparedness plans;

– develop early warning systems; and

– put technologies and systems in place to ensure a disaster-resilient system.

The latter system enables operational continuity and rapid restoration of networks which support disaster communication requirements. This study Question has been able to establish a baseline of information about country experiences, plans, tools, stakeholders and policies for disaster preparedness, mitigation and risk reduction, with guidelines for drills and exercises, policy guidelines, technologies related to disaster communications, etc. It will be possible for countries to incorporate these in their national emergency telecommunication plans (NETP) so as to utilize the knowledge gained by exchange of information and best practices amongst the various countries. Based on the past two years' experience, it is felt that during the next phase of study the focus should be on disaster response and recovery, as telecommunications/ICTs can help in ensuring effective response and in recovery from the disasters.

In view of the above, the focus of the study Question for the year 2022-2025 should be: ''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 like COVID-19, 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 disaster response and recovery.

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) 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 natural and man-made disaster and/or emergency situations, including pandemics, working in coordination with the relevant BDT programmes, regional offices and other partners.

6) Continue updating the online toolkit with relevant information and materials collected during the study period.

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

**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[[6]](#footnote-7), 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.

**QUESTION B/2 Strategies and policies concerning ICTs for the environment, [conformance and interoperability of telecommunication/ICT equipment] 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[[7]](#footnote-8) (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 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.

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. **Conformance & interoperability of telecommunication/ICT equipment**

(Extracts from ToR of Q4/2 for study period 2022-2025, Section 1.i) on conformance and interoperability have been moved below. They are shown without change tracks to ease reading.)

To facilitate safe usage of products and services anywhere in the world, regardless of who is the manufacturer or service provider, it is crucial that products and services be developed in accordance with relevant international standards, regulations and other specifications, and that their compliance be tested.

Conformity assessment increases the probability of interoperability, i.e. equipment built by different manufacturers being capable of communicating successfully. In addition, it helps to ensure that products and services are delivered according to expectations. Conformity assessment builds consumer trust and confidence in tested products and consequently strengthens the business environment and, thanks to interoperability, the economy benefits from business stability, scalability and cost reduction of systems, equipment and tariffs.

To increase the benefits of C&I, many countries have adopted harmonized C&I regimes at both national and bilateral/multilateral level. However, some developing countries have not yet done so because of a number of major challenges, such as the lack of appropriate/adequate infrastructure and technology development to be in a position to test or to recognize tested ICT equipment (e.g. accredited laboratories).**]**

* 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.

**[**(A reduced version from Section 2 from ToR of Q4/2 on C&I for study period 2022-2025 is proposed below.)

1. Addressing Conformance and Interoperability (C&I) challenges:
* Identifying and assessing challenges, priorities, and problems with applying ITU T Recommendations relevant to C&I
* Identifying critical issues and best practices related to C&I
* Examining how knowledge transfer and capacity development can reduce risks of low-quality equipment and interoperability issues
* Elaborating a methodology for implementing C&I, in particular to create C&I programmes
* Promoting harmonization of C&I regimes to improve ICT resilience and contribute to reducing the digital divide
* Providing information on establishing and managing mutual recognition agreements (MRAs)
* Assessing the impact of increased ICT devices on the radiocommunication environment, including IoT
* Addressing future C&I challenges, such as posed by new technologies and regulatory aspects
* Prioritizing device/type-approval to balance user confidence and regulatory measures
* Exploring how new technologies can enhance the international C&I framework and trade in and use of ICT devices.**]**

(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.

(ToR of Q4/2 for study period 2022-2025 has been merged with Q6/1 (counterfeit and theft parts, see QB/1 above), **[**and with Q6/2 and Q7/2 (C&I part, see QB/2 above)**]**)

**QUESTION 5/2 Adoption of telecommunications/ICTs and improving digital skills**

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

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[[8]](#footnote-11) 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. Analysis of adoption opportunities, challenges and disparities for telecommunications/ICTs, including broadband.
3. Trends in telecommunication/ICT adoption globally, including in urban, rural, remote and other areas.
4. Trends in Internet traffic and the impact on demand for high-speed broadband, including during pandemics and disasters.
5. Trends in digital skills development and training programmes.
6. 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.
7. Approaches to strengthen digital-skills training for the adoption of e-services, including e‑agriculture, e-commerce, e-education and e-health.
8. 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.
9. 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).
10. 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).
11. 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.

(ToR of Q6/2 for study period 2022-2025 has been merged with [Q4/2 (C&I part) and] Q7/2, see QB/2 above)

(ToR of Q7/2 for study period 2022-2025 has been merged with [Q4/2 (C&I part) and] Q6/2, see QB/2 above)

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. These include the least developed countries, small island developing states, landlocked developing countries and countries with economies in transition. [↑](#footnote-ref-8)
8. These include the least developed countries, small island developing states, landlocked developing countries and countries with economies in transition. [↑](#footnote-ref-11)