

Study Group Questions

STUDY GROUP 1

MOD

QUESTION 1/1

Strategies and policies for the deployment of broadband in developing countries¹**1 Statement of the situation or problem**

Broadband technologies are fundamentally 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.

Rapid evolution and new business opportunities are driving rapid but uneven growth in digital technologies.² According to ITU data, 2019 marked the first full year when more than half the world began to participate in the global digital economy by logging onto the Internet. The latest ITU data show that some 49 per cent of the world's population currently remain unconnected (ITU, 2020 estimates).³

The coronavirus (COVID-19) pandemic has also restated the importance of diverse ICTs in ensuring connectivity, as illustrated by insights shared on the Reg4Covid platform.⁴

As noted in the Study Group 1 [Chairman's report](#) (Annex 8) to the TDAG virtual meetings held from 2 to 5 June 2020, and recognized in several instances and reports of study Question 1/1 for the ITU-D study period 2018-2021, the Question has to continue for the next study period, and the topics of interest to be reflected in the next study period are:

- Policies, strategies and regulatory aspects of broadband
- Broadband access technologies
- Financing and investment aspects of broadband
- COVID-19 and other pandemics on broadband networks
- Digital transformation/Infrastructure
- Co-deployment and sharing of broadband infrastructure with other infrastructure networks
- Strategies and policies for the deployment of broadband in developing countries.

¹ These include the least developed countries, small island developing states, landlocked developing countries and countries with economies in transition.

² ITU Statistics (<http://www.itu.int/ict/statistics>)

³ The State of Broadband 2019 Broadband as a Foundation for Sustainable Development, https://www.itu.int/dms_pub/itu-s/opb/pol/S-POL-BROADBAND.20-2019-PDF-E.pdf

⁴ https://reg4covid.itu.int/?page_id=59

2 Question or issue for study

2.1 Continuing topics from previous study period

- a) Policies and regulations that promote increased high-speed, high-quality broadband network connectivity in developing countries, considering trends in the various broadband access technologies, barriers for infrastructure deployment and investment, best practices on cross-border connectivity and challenges for SIDS.
- b) Effective and efficient ways to fund increased broadband access for the unserved and underserved populations in non-rural or urban areas.
- c) 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.
- d) Promoting incentives and an enabling regulatory environment for the investments required to meet the growing demand for access to the Internet generally, and bandwidth and infrastructure requirements in particular, for delivering affordable broadband services to meet development needs, including consideration of public, private and public-private partnerships for investment.
- e) Methods and strategies influencing the effective deployment of wireline and wireless, including satellite, broadband access technologies, including backhaul considerations, for unserved and underserved populations in non-rural and urban areas.
- f) Methodologies for migration planning and implementation of broadband technologies, taking into account existing networks, as appropriate.
- g) National digital policies, strategies and plans which seek to ensure that broadband is available to as wide a community of users as possible.
- h) Flexible, transparent approaches to promoting robust competition in the provision of network access (in possible collaboration with Question 4/1).
- i) Co-investment and the co-location and shared use of infrastructure, including through active infrastructure sharing (in possible collaboration with Question 4/1).
- j) Licensing approaches and business models for promoting broadband network expansion that more effectively integrate the use of terrestrial, satellite, backhaul and submarine telecommunication infrastructure (in possible collaboration with Question 4/1 and Question 5/1).
- k) Holistic universal access and service strategies and financing mechanisms, including universal service funds, for both network expansion and connectivity for unserved and underserved populations in non-rural and urban areas (in possible collaboration with Question 4/1 and Question 5/1).

2.2 New topics for this study period

- l) Strategies to enhance the QoS of the network with increased data traffic (in possible collaboration with Question 6/1).
- m) Analysis of the impact of the expected delay in the deployment of terrestrial and non-terrestrial advanced telecommunication infrastructures, caused by the COVID-19

pandemic, and the consequent economic downturn, as well as technological alternatives complementary to the existing network to accommodate increased data traffic.

- n) National digital policies, strategies and plans which seek to accelerate the deployment of advanced networks along with the promotion of e-education, e-health and telework after the COVID-19 pandemic.
- o) Co-deployment and sharing of broadband infrastructure with other infrastructure networks.

3 Expected output

Revision of the Question 1/1 Final Report for ITU-D study period 2018-2021, as appropriate.

4 Timing

Annual progress reports will be presented to Study Group 1 in 2022, 2023 and 2024. Deliverables set in Section 3 could be sent for Study Group 1 for approval on readiness without waiting for the end of study period.

5 Proposers/sponsors

ITU Telecommunication Development Sector (ITU-D) Study Group 1 proposed the continuation of this Question as modified herein.

6 Sources of input

- 1) Results of related technical progress in relevant ITU-R and ITU-T study groups.
- 2) Contributions from Member States, Sector Members and Associates and from relevant ITU-R and ITU-T study groups, and other stakeholders.
- 3) Interviews, existing reports and surveys should also be used to gather data and information for the finalization of a comprehensive set of best-practice guidelines.
- 4) Material from regional telecommunication organizations, telecommunication research centres, manufacturers and working groups should also be used, in order to avoid duplication of work.
- 5) ITU publications, reports and Recommendations on broadband access technologies.
- 6) Relevant output and information from study Questions related to ICT applications.
- 7) Relevant inputs and information from BDT programmes related to broadband and the different broadband access technologies.

7 Target audience

Target audience	Developed countries	Developing countries
Telecom policy-makers	Yes	Yes
Telecom regulators	Yes	Yes
Service providers/operators	Yes	Yes
Manufacturers	Yes	Yes
Consumers/end users	Yes	Yes
Standards-development organizations, including consortia	Yes	Yes

a) Target audience

All national telecom policy-makers, regulators, service providers and operators, especially those in developing countries, as well as manufacturers of broadband technologies.

b) Proposed methods for implementation of the results

The results of the Question are to be distributed through ITU-D interim and final reports. This will provide a means for the audience to have periodic updates of the work carried out and to provide input and/or seek clarification/more information from ITU-D Study Group 1 should they need it.

8 Proposed methods of handling the Question or issue

Close coordination is essential with ITU D programmes, and other relevant ITU D study Questions, and with ITU R and ITU T study groups.

a) How?

- 1) Within a study group:
 - Question (over a multi-year study period)
- 2) Within regular BDT activity:
 - Programmes
 - Projects
 - Expert consultants
- 3) In other ways – describe (e.g. regional, within other organizations, jointly with other organizations, etc.)

b) Why?

The Question will be addressed within a study group over a four-year study period (with submission of interim results), and will be managed by a rapporteur group. This will enable Member States and Sector Members to contribute their experiences and lessons learned with respect to policy, regulatory and technical aspects of the migration from existing networks to broadband networks.

9 Coordination and collaboration

The ITU-D study group dealing with this Question will need to coordinate with: relevant ITU-R and ITU-T study groups; the relevant outputs from other ITU-D Questions; relevant focal points in BDT

and ITU regional offices; coordinators of relevant project activities in BDT; experts and experienced organizations in this field.

10 BDT programme link

Links to BDT programmes aimed at fostering the development of telecommunication/ICT networks as well as relevant applications and services, including bridging the standardization gap.

11 Other relevant information

As may become apparent within the life of the Question.

MOD

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**

1.1 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 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.

1.2 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 transition to digital technologies and services. On these matters, ITU-D has been collaborating closely with both the ITU Radiocommunication (ITU-R) and the ITU Telecommunication Standardization Sector (ITU-T), thus avoiding duplication.

1.3 ITU had 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 11-3/2 of the 2010-2014 study period, which identifies public policies that should be applied as means for countries to be able to start the digital transition.

1.4 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.

1.5 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.

1.6 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.

1.7 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.

1.8 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.

1.9 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.

1.10 There have been developments of broadcasting systems using IP throughout the broadcasting chain, including the production, contribution and transmission parts, and these developments of IP-based technologies in these parts are progressing quite quickly.

1.11 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.

1.12 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.

1.13 Other issues to consider are the studies from other ITU Sectors, especially taking into account the decisions of the World Radiocommunication Conferences (WRC-15 and WRC-19) 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.

1.14 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 Question will continue to cover the topics in the scope of possible revision of the Question 2/1 Final Report 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 following issues:

2.1 Analysis of methods and issues for the transition from traditional digital broadcasting (sound and television) to video-centric converged service provisioning, including the deployment

¹ These include the least developed countries, small island developing states, landlocked developing countries and countries with economies in transition.

of new services and applications, such as UHD TV, AR/VR, interactive applications, for consumers/viewers in various environments (in possible collaboration with Question 2/2).

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.

2.3 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 Question 2/2 and Question 4/1, where appropriate).

2.4 Analysis of the development of broadcasting systems using IP-based technologies throughout the broadcasting chain, including the production, contribution and transmission parts.

2.5 Best practices and national experiences on spectrum-planning activities related to the implementation of video-centric converged service providers.

2.6 National experiences on interference mitigation measures in the context of the transition scenarios.

2.7 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.

2.8 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.

2.9 Costs of the transition from traditional digital broadcasting (sound and television) to video-centric converged service providers, including sharing best practices of 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 Question 4/1 and Question 2/2).

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.

3 Expected output

- a) A report reflecting the studies outlined in §§ 2.1, 2.2, 2.3 2.4, 2.5, 2.6, 2.7, 2.8, 2.9, 2.10 and 2.11 above, and possible revisions to the Report of the previous study period, as appropriate.

- b) Periodic dissemination of relevant data emanating from the organizations and groups listed in § 7 below. Periodic updates on studies taking place in the other ITU Sectors.
- c) National experiences on strategies and socio-economic aspects of the introduction of new broadcasting technologies, services and capabilities.

4 Timing

An annual progress report is expected at each study group meeting. Other deliverables, including annual deliverables and the revision of the report of the previous study period, sent for study group's approval on readiness, as appropriate.

5 Proposers/sponsors

TBD.

6 Sources of input

- 1) Collection of related contributions and data from Member States and ITU-D Sector Members, and those organizations and groups listed in § 9 below.
- 2) Updates and outputs of ITU-R and ITU-T study groups; relevant Recommendations and reports related to digital broadcasting.
- 3) Collection of information on the impact on developing countries of transition to digital broadcasting, re-planning and interactivity, and to the implementation of video-centric service providers across various environments.
- 4) Outputs of WTDC Resolution 9 (Rev. Buenos Aires, 2017), including relevant Recommendations, guidelines and reports.

7 Target audience

Target audience	Developed countries	Developing countries
Telecom policy-makers	Yes	Yes
Telecom regulators	Yes	Yes
Service providers/operators	Yes	Yes
Broadcasting operators	Yes	Yes
ITU-D programme	Yes	Yes

a) Target audience – Who specifically will use the output

Beneficiaries of the output are expected to be middle and higher-level managers in broadcasters, telecommunication/ICT operators and regulators worldwide.

b) Proposed methods for implementation of the results

Activities include conducting technical studies, observing best practices, and developing comprehensive reports serving the target audience's interests.

8 Proposed methods of handling the Question or issue

a) How?

- 1) Within a study group:
- Question (over a multi-year study period)
- 2) Within regular BDT activity (indicate which programmes, activities, projects, etc., will be involved in the work of the study Question):
- Programmes
 - Projects
 - Expert consultants
 - Regional offices
- 3) In other ways – describe (e.g., regional, within other organizations with expertise, jointly with other organizations, etc.)

b) Why?

To be defined in the workplan.

9 Coordination and collaboration

The ITU-D study group dealing with this Question should coordinate closely with:

- Other ITU-R and ITU-T study groups dealing with similar issues, and in particular other relevant ITU-D groups, for example the ITU-D Working Group on Gender Issues;
- The Technical Committee of the Inter-Regional Broadcasting Union;
- UNESCO and relevant international and regional broadcasting organizations, as appropriate;
- The Director of the Telecommunication Development Bureau (BDT) shall, through the appropriate BDT staff (e.g. regional directors, focal points) provide information to rapporteurs on all relevant ITU projects in different regions. This information should be provided to the meetings of the rapporteurs when the work of the programmes and regional offices is in the planning stages and when it is completed.

It is worth mentioning that it is beneficial to the membership that collaboration be incentivised with other Questions and ITU sectors in the investigation of other networks and service platforms which can be combined with broadcasting to implement new experiences in content delivery, for instance, in ITU-D Questions 1/1, 4/1 and 2/2; ITU-R SG1, SG5 and SG6; and ITU-T SG9 and SG16, each of the groups in their mandates and within their scopes of work.

10 BDT programme link

WTDC Resolutions 10 (Rev. Hyderabad, 2010), Resolution 9 (Rev. Buenos Aires, 2017), Resolution 17 (Rev. Buenos Aires, 2017) and Resolution 33 (Rev. Dubai, 2014)

Links to BDT programmes aimed at fostering the development of telecommunication/ICT networks as well as relevant applications and services, including bridging the standardization gap.

11 Other relevant information

As may become apparent within the life of the Question.

MOD

QUESTION 3/1

The use of telecommunications/ICTs for disaster risk reduction and management**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, ITU-D Study Group 2 Question 5/2 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 was on "Utilization of telecommunications/ICTs for disaster preparedness, mitigation and response".

The year 2019-20 witnessed significant disaster events in terms of numbers and fatalities. There was widespread loss of lives and property. According to the Emergency event database, during 2019 a total of 396 natural disasters were recorded with 11 755 deaths, 95 million people affected and a total of USD 103 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% of disaster events, 45% of deaths and 74% of the total affected. Floods were the deadliest type of disaster, accounting for 43.5% of deaths, followed by extreme temperatures at 25% (mainly due to heatwaves in Europe) and storms at 21.5%. Storms affected the highest number of people, accounting for 35% of the total affected, followed by floods with 33% and droughts with 31%. 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 (COVID-19) epidemic. It resulted in widespread loss of lives across the world, unemployment and huge economic loss due to lockdown in various countries.

Most developed and developing 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 the disaster communication requirements. This 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 next 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

- a) 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.
- b) 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.
- c) 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.
- d) 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.
- e) 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.
- f) Continue updating the online toolkit with relevant information and materials collected during the study period.

3 Expected output

It is proposed that succinct outputs summarizing case studies and capturing lessons learned, best practices and tools/templates will be prepared and presented to the study Question for approval:

Additionally, throughout the study period, Question 3/1 welcomes contributions on new technologies, systems and applications for disaster communications and management for mitigation, preparedness, risk reduction, response and recovery, as well as considerations to support implementation. The focus will be on both technology examples and deployment case studies of new and emerging systems and applications for disaster communications and response.

4 Timing

- 4.1 Annual progress reports should be submitted to ITU-D Study Group 1.
- 4.2 Succinct outputs/annual reports summarizing case studies and capturing lessons learned, best practices and tools/templates on the agreed themes discussed.

4.3 Draft final reports and any proposed draft Recommendations/guidelines should be submitted to ITU-D Study Group 1 within the study period.

4.4 The rapporteur group will work in close collaboration with relevant BDT programme(s), regional offices, regional initiatives and relevant ITU-D Questions, and ensure proper liaison with the ITU Radiocommunication (ITU-R) and Telecommunication Standardization (ITU-T) Sectors.

4.5 The activities of the rapporteur's group will come to an end within the study period.

5 Proposers/sponsors

The new text for this revised Question stems from the final report of ITU-D Study Group 2 for the period 2018-2021.

6 Sources of input

Contributions are expected from Member States, Sector Members and Associates, as well as inputs from relevant BDT programme(s) and relevant ITU-R and ITU-T study groups, and any relevant ITU-D Question. International and regional organizations responsible for the utilization of telecommunications/ICTs for disaster management are encouraged to provide contributions related to experiences and best practices. The intensive use of correspondence and online exchange of information is encouraged for additional sources of inputs.

7 Target audience

a) Target audience

Depending on the nature of the output, middle- to upper-level managers in operators and regulators in developed and developing countries will be the predominant users of the outputs.

Target audience	Developed countries	Developing countries
Telecom policy-makers	Yes	Yes
Telecom regulators	Yes	Yes
Service providers/operators	Yes	Yes
Manufacturers	Yes	Yes

b) Proposed methods for implementation of the results

The results of the Question are to be distributed through ITU-D reports, or as agreed during the study period in order to address the Question for study.

8 Proposed methods of handling the Question

The Question will be addressed within a study group over a four-year study period (with submission of interim results), and will be managed by a rapporteur and vice-rapporteurs. This will enable Member States and Sector Members to contribute their experiences and lessons learned with respect to emergency communications.

9 Coordination

The ITU-D study group dealing with this Question will need to coordinate with:

- Relevant ITU-D Question(s)
- Relevant BDT programme(s)
- Regional offices
- Relevant ITU-R and ITU-T study groups
- Working Group on Emergency Telecommunications (WGET)
- Relevant international, regional and scientific organizations with mandates relevant to this Question.

10 BDT programme link

–

11 Other relevant information

As may become apparent within the life of the Question.

MOD

QUESTION 4/1

Economic aspects of national telecommunications/ICTs**1 Statement of the situation or problem**

As recognized in the Final Report on study 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 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 NRAs in order to help their national markets thrive, as shown in contributions received from NRAs, policy-makers and operators alike which have been considered by the Rapporteur Group for Question 4/1 in the current study period.

At the same time, further global forces pushing towards increased digitalization, as well as national economic and global emergencies like the 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 follows the need to divide up the work on Final Reports of 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 Question 4/1 Final Report for that study period, whereas new topics could be considered under the new Question 4/1 Final Report for 2022-2025 study period.

Thus, 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 Question 4/1 Final Report for 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

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 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 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) Analysis of the economic impact of the COVID-19 pandemic on telecommunication/ICT markets.
- 7) Analysis of the contribution of telecommunications/ICTs on the economic recovery from the COVID-19 pandemic.

Economic aspects/implications of digital transformation:

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

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 Questions¹

- 1) National experiences on the contribution to the national economy in 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 incumbent operator, a railway company's optical fibre) (in possible collaboration with Question 1/1).

3 Expected output

- Revision of the Final Report for Question 4/1 for the ITU-D study period 2018-2021 on the topics set out in Section 2.1, as appropriate.
- Revision of the Question 4/1 Guidelines on cost modelling, as appropriate.
- Final Report for new Question 4/1 and other deliverables for the ITU-D study period 2022-2025, covering one/some/all of proposed new topics set out in Section 2.2.
- Joint deliverables with other ITU-D Questions on the topics set out in Section 2.3, as appropriate.
- Inputs for ITU Regional Economic Dialogues, as appropriate.
- Inputs for ITU Tariff Policies Survey, as appropriate.

4 Timing

Annual progress reports will be presented to Study Group 1 in 2022, 2023 and 2024. Deliverables set in Section 3 could be sent for Study Group 1 for approval on readiness without waiting for the end of study period.

5 Proposers/sponsors

ITU Telecommunication Development Sector (ITU-D) Study Group 1 proposed the continuation of this Question as modified herein.

¹ Topics of Section 2.3 will not be included in the Report on Question 4/1 but will be topics for joint deliverables with other ITU-D Questions

6 Sources of input

The major source of input will be the experiences of Member States and Sector Members on economic aspects on national telecommunications/ICT. Contributions from Member States and Sector Members will be essential to the successful study of the issue.

Interviews, existing reports, materials from relevant ITU events, particularly, ITU Regional Economic Dialogues, and surveys should also be used to gather data and information for expected outputs of Question. Material from regional telecommunication organizations, telecommunication research centres, manufacturers and working groups should also be used, in order to avoid duplication of work.

Contributions are expected from Member States, Sector Members, Associates and Academia, ITU-D study groups and from relevant ITU Radiocommunication Sector (ITU-R) and ITU Telecommunication Standardization Sector (ITU-T) study groups and working parties, in particular ITU-T Study Group 3 and ITU-R Working party 1B and other stakeholders.

7 Target audience

All the target audiences mentioned below, with particular attention to the needs of developing countries².

Target audience	Developed countries	Developing countries
Telecom policy-makers	Yes	Yes
Telecom regulators	Yes	Yes
Service providers/operators	Yes	Yes
Manufacturers	Yes	Yes
ITU-D programme	Yes	Yes

a) Target audience – Who specifically will use the output

All national telecom policy-makers, regulators, service providers and operators, especially those in developing countries, as well as regional and international organizations.

b) Proposed methods for implementation of the results

The results of the Question are to be distributed through ITU-D interim, including through ITU regional offices, final reports and other relevant deliverables. This will provide a means for the audience to have periodic updates of the work carried out and to provide input and/or seek clarification/more information from ITU-D Study Group 1 should they need it.

8 Proposed methods of handling the Question or issue

Electronic distribution of the reports and guidelines to all Member States, Sector Members and their respective national regulatory agencies (NRAs), and ITU regional offices.

² These include the least developed countries, small island developing states, landlocked developing countries and countries with economies in transition.

Distribution of the report and guidelines at the Global Symposium for Regulators (GSR), ITU Regional Economic Dialogues and relevant Telecommunication Development Bureau (BDT), Radiocommunication Bureau (BR) and Telecommunication Standardization Bureau (TSB) seminars.

How?

- | | | |
|----|---|-------------------------------------|
| 1) | Within a study group: | |
| | – Question (over a multi-year study period) | <input checked="" type="checkbox"/> |
| 2) | Within regular BDT activity: | |
| | – Objectives 3 and 4 | <input checked="" type="checkbox"/> |
| | – Projects: regional initiatives | <input type="checkbox"/> |
| | – Expert consultants | <input checked="" type="checkbox"/> |

9 Coordination and collaboration

The ITU-D study group dealing with this Question will need to coordinate with:

- Relevant ITU-D study group Questions, particularly Question 1/1 and Question 3/1.
- Relevant ITU-T study groups, particularly Study Group 3 and its regional groups for Africa (SG3RG-AFR), Asia and Oceania (SG3RG-AO), Arab Region (SG3RG-ARB), Latin America and the Caribbean (SG3RG-LAC) and Eastern Europe, Central Asia and Transcaucasia (SG3RG-EECAT).
- Relevant ITU-R study groups and working parties, particularly Working party 1B.
- Relevant focal points in BDT and ITU regional offices.
- Experts and experienced organizations in this field.

10 BDT programme link

ITU-D Objectives 3 and 4.

11 Other relevant information

As may become apparent within the lifetime of this Question.

MOD

QUESTION 5/1

Telecommunications/information and communication technologies for rural and remote areas**1 Statement of the situation or problem**

In order to continue to contribute to achieving the objectives set by the Geneva Plan of Action of the World Summit on the Information Society (WSIS) in the era of digital transformation, and to promote attainment of the Sustainable Development Goals (SDGs) defined in September 2015, it is necessary to address the challenge of digital infrastructure development to make available the benefits of various e-services (e-education, e-health, e-government, e-agriculture, e-commerce, etc.) in the rural and remote areas of developing countries¹, including LDCs, LLDCs and SIDS, where more than half of the world's population live and people need broadband connectivity in general, including terrestrial and non-terrestrial high-speed and high-quality broadband network technologies that support the most common broadband applications required by citizens for digital equity and attainment of the SDGs.

The installation of cost-effective and sustainable digital infrastructure, through the deployment of emerging technologies such as next-generation high-speed mobile terrestrial and non-terrestrial networks and fixed-broadband wireline and wireless transmission systems suited for rural and remote areas, is an important aspect calling for further studies, and specific outcomes need to be available for the vendor community to make available broadband Internet connectivity to support up-to-date e-services for the quality of life of inhabitants in rural and remote areas.

Existing network systems are primarily designed for urban areas, where the necessary support infrastructure (adequate power, building/shelter, accessibility, skilled manpower to operate, etc.) for setting up a broadband telecommunication network is assumed to exist. Hence, current and future systems need to be more adequately adapted to specific rural requirements in order to be widely deployed.

In particular, terrestrial and non-terrestrial high-speed Internet and applications offer a new way to promote the balanced allocation of public resources. Internet has broken through time and space constraints, and delivered high-quality education, medical care and other public resources to residents in rural and remote areas, thereby promoting a more balanced allocation of public resources.

Shortage of power, difficult terrain, lack of skilled manpower, poor road access and transportation, and the difficulty of installing and maintaining networks are some of the known challenges that developing countries planning to extend ICT infrastructure to rural and isolated landlocked areas and remote islands must tackle.

More detailed studies addressing the challenges of deploying cost-effective and sustainable next-generation broadband ICT infrastructure in rural and remote areas are expected to be undertaken

¹ These include the least developed countries, small island developing states, landlocked developing countries and countries with economies in transition.

within the ITU-D study groups, taking into account the global perspective in the era of digital transformation and social innovation.

Therefore, the WSIS target "Connect villages with telecommunications/ICTs and establish community access points" should be promoted more intensively, taking into account the sharing economy, by employing emerging advanced digital broadband technologies for various e-application services to stimulate social and economic activities for improving the quality of life of inhabitants in rural and remote areas. Multipurpose community telecentres (MCT), public call offices (PCO), community access centres (CAC) and e-posts are still valid in terms of cost effectiveness for sharing of infrastructure and facilities by community residents, leading to the goal of provision of individual telecommunication access.

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. They need affordable broadband and devices for access to the Internet. Government incentives, subsidies and other financing mechanisms are necessary. Work on the effective use of Universal Service Funds and best practices is also crucial.

2 Question or issue for study

There are still many challenges to overcome for spreading terrestrial and/or non-terrestrial telecommunications/ICTs and meeting the potential for provisioning high-speed broadband in rural and remote areas. Throughout the studies conducted in the past study periods, it has been clear from the experience of many countries that technologies and strategies for rural and remote areas are various and diversified from country to country. Also, the social, economic and technological situation in rural and remote areas is rapidly moving forward to the new economy. Therefore, it is important to update the study of broadband digital connectivity for rural and remote areas and to adapt to social innovation for rural inhabitants of developing countries, including LDCs, LLDCs and SIDSs, in respect of the following items:

- 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 or building 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.
- Quality of the services provided, and the cost effectiveness, degree of sustainability in different geographies and sustainability of the techniques and solutions.
- Business models for sustainable deployment of networks and services in rural and remote areas, taking into consideration priorities based on economic and social indicators (in possible collaboration with Question 4/1).
- Financing mechanisms, including Universal Service Funds (in possible collaboration with Question 4/1).
- Integration and implementation of ICT services in rural and remote areas, including new and emerging technologies.

- Increasing availability of telecommunications/ICTs that provide enhanced connectivity at progressively lower costs, with lower energy consumption and lower levels of GHG emissions.
- General approaches for:
 - 1) Integration of Internet applications (especially smart applications for e-learning, e-health, e-agriculture, e-commerce) for rural and remote areas into national strategies (in possible collaboration with Question 2/2).
 - 2) Promotion of Internet applications such as rural e-commerce, online education and telemedicine, and full release of the important role of information technology in rural economic and social development (in possible collaboration with Question 2/2).
 - 3) Encouragement of the development of new Internet applications and digital solutions for the socio-economic development of rural and remote areas, and promotion of innovation and digital transformation for rural and remote areas (in possible collaboration with Question 5/2).
- Opportunities for and challenges to access to services in locally relevant languages for indigenous people and for people with specific needs.
- Description of evolving system requirements for rural network systems specifically addressing the identified challenges of rural deployment.
- Analysis of case studies.

During the study carried out on each of these items, the following matters should also be studied and reflected in the outputs of the Question:

- Maintenance and operational aspects to provide a quality and continuous service.
- Strategies on the integration of ICT in education in rural areas.
- Relevant localization of content for rural and remote people.
- Affordability of services/devices for rural users to adopt so as to fulfil their development needs.
- 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.

In addressing the above studies, the work under way in response to other ITU-D Questions and close coordination with relevant activities under those Questions should be taken into consideration, in particular Questions 1/1, 3/1 and 4/1 and Questions 1/2, 2/2, 4/2 and 5/2, are highly relevant. Likewise, the studies shall take into account cases related to persons with specific needs, indigenous communities, isolated and poorly served areas, LDCs, SIDS and LLDCs, and highlight their specific needs and other particular situations which need to be considered in developing broadband digital facilities for these areas.

3 Expected output

The output will be a report on the results of the work conducted for each item studied, together with a handbook, case study analysis reports, and one or more Recommendations and other

relevant materials at appropriate times, either during the course of or at the conclusion of the cycle.

Information shall be consolidated and disseminated to the membership to enable them to organize seminars and workshops for sharing best practices on the digital deployment of broadband infrastructure in rural and underserved areas.

4 Timing

The output will be generated on an annual basis. The output from the first year will be analysed and assessed in order to update the work plan for the next year, and so on.

5 Proposers/sponsors

The Question was originally approved by WTDC-94, and subsequently revised by WTDC-98, WTDC-02, WTDC-06, WTDC-10, WTDC-14 and WTDC-17.

6 Sources of input

Contributions are expected from Member States, Sector Members, Academia and Associates, as well as inputs from relevant Telecommunication Development Bureau (BDT) programmes, particularly those that have successfully implemented telecommunication/ICT projects in rural and remote areas. These contributions will enable those responsible for work on this Question to develop the most appropriate conclusions, recommendations and outputs. The intensive use of correspondence and online exchange of information, workshops and field experiences is encouraged for additional sources of inputs.

7 Target audience

Target audience	Developed countries	Developing countries
Relevant policy-makers	Yes	Yes
Telecom regulators	Yes	Yes
Rural authorities	Yes	Yes
Service providers/operators	Yes	Yes
Manufacturers, including software developers	Yes	Yes
Vendors	Yes	Yes

8 Proposed methods of handling the Question

Within ITU-D Study Group 1.

9 Coordination

The ITU-D study group dealing with this Question will need to coordinate with:

- Focal points of the relevant Questions in BDT
- Coordinators of relevant project and programme activities in BDT

- Regional and scientific organizations with mandates covering the subject matter of the Question
- Other relevant stakeholders (see Recommendation ITU-D 20).

As may become apparent within the life of the Question.

10 BDT programme link

WTDC Resolution 11 (Rev. Buenos Aires, 2017), Resolution 68 (Rev. Dubai, 2014) and Recommendation ITU-D 19.

Links to BDT programmes aimed at fostering the development of telecommunication/ICT networks as well as relevant applications and services, including bridging the standardization gap.

11 Other relevant information

As may become apparent within the life of the Question.

MOD

QUESTION 6/1

Consumer information, protection and rights**1 Statement of the situation or problem**

1.1 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.

1.2 The coronavirus disease (COVID-19) pandemic and widespread use of telecommunications/ICTs, underlines both the importance of digital connectivity, and also the need for sharing of best practices so as to harness the benefits of telecommunications/ICTs while protecting the interests of consumers.

1.3 There is a need to promote the responsible use of telecommunications/ICTs as well as ways of fostering consumer trust in new technologies while protecting competition and innovation.

1.4 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.

1.5 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, the elderly and persons with disabilities, must be given special attention.

2 Question or issue for study

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

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

2.2.1 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.

2.2.2 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.

2.2.3 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.

2.2.4 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.

2.2.5 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.

2.2.6 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, the elderly, 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.

2.2.7 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.

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

3 Expected output

- a) A report to Member States and Sector Members, consumer-protection organizations, operators and service providers, setting out guidelines and best practices for consumer protection in the provision of all telecommunication/ICT services, to include:
- (i) Guidelines on increasing consumer awareness.
 - (ii) Best practices on collaboration and consultation to promote multistakeholder input on policies and regulations for consumer protection.
 - (iii) Guidelines and information-sharing about policy frameworks that protect consumers, promote competition and innovation, and enhance customer care, with the advent of new and emerging telecommunication/ICT technologies such as the Internet of Things (IoT).
- b) Organization of seminars and workshops on the above topics related to consumer protection.

4 Timing

An annual progress report is expected at each study group meeting. Other deliverables, including annual deliverables, workshops and the revision of the report of the previous study period, could be sent for study group's approval on readiness, as appropriate.

5 Proposers/sponsors

TBD.

6 Sources of input

- 1) Collection of related contributions and data from Member States and ITU-D Sector Members, and those organizations and groups listed below.

- 2) Updates and outputs of ITU-R and ITU-T study groups; relevant Recommendations and reports related to consumer protection.
- 3) Collection of information on the impact on developing countries of new technologies, business models and ongoing digital transformation.
- 4) Outputs of WTDC Resolution 9 (Rev. Buenos Aires, 2017), including relevant Recommendations, guidelines and reports.

7 Target audience

Target audience	Developed countries	Developing countries
Telecom policy-makers	Yes	Yes
Telecom regulators	Yes	Yes
Telecommunication/ICT consumer-protection organizations	Yes	Yes
Service providers/operators	Yes	Yes
Broadcasting operators	Yes	Yes
ITU-D programme	Yes	Yes

a) Target audience – Who specifically will use the output

Beneficiaries of the output are expected to be consumers, telecommunication/ICT operators and policy-makers/regulators worldwide.

b) Proposed methods for implementation of the results

Activities include conducting, observing and sharing best practices, and developing comprehensive reports serving the target audience's interests.

8 Proposed methods of handling the Question or issue

a) How?

- 1) Within a study group:
 - Question (over a multi-year study period)
- 2) Within regular BDT activity (indicate which programmes, activities, projects, etc., will be involved in the work of the study Question):
 - Objective 2
 - Programmes
 - Projects
 - Expert consultants
 - Regional offices
- 3) In other ways – describe (e.g. regional, within other organizations with expertise, jointly with other organizations, etc.)

b) Why?

To be defined in the workplan.

9 Coordination and collaboration

The ITU-D study group dealing with this Question should coordinate closely with:

- Other ITU-R and ITU-T study groups dealing with similar issues, and in particular other relevant ITU-D groups, for example the ITU-D Working Group on Gender Issues and child online protection.
- Relevant international and regional organizations, as appropriate.
- The Director of the Telecommunication Development Bureau (BDT) shall, through the appropriate BDT staff (e.g. regional directors, focal points) provide information to rapporteurs on all relevant ITU projects in different regions. This information should be provided to the meetings of the rapporteurs when the work of the programmes and regional offices is in the planning stages and when it is completed.

It is worth mentioning that it is beneficial to the membership that collaboration be incentivised with other Questions and Sectors in the investigation of other networks and service platforms which can be combined with broadcasting to implement new experiences in content delivery, for instance, in ITU-D Questions 1/1, 4/1,2/2 and 5/2; ITU-R SG1, SG5 and SG6; and ITU-T SG9 and SG16, each of the groups in their mandates and within their scopes of work.

10 BDT programme link

Links to BDT programmes aimed at fostering the development of telecommunication/ICT networks as well as relevant applications and services, including bridging the digital divide.

11 Other relevant information

MOD

QUESTION 7/1

Telecommunication/ICT accessibility to enable inclusive communication, especially for persons with disabilities**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 elderly 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 elderly 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. Busan, 2014) 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. Hammamet, 2016) 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 (ITU-T) 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 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

- a) 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.
- b) Accessibility of e-government and other socially relevant digital services.
- c) Accessibility of new and emerging technologies.
- d) 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.
- e) Use of accessible telecommunications/ICTs to promote the employment of persons with disabilities to ensure inclusive and open society.
- f) National experience in collecting information and statistics on telecommunication/ICTs accessibility.
- g) Mechanisms to involve persons with disabilities and specific needs in the process of elaborating legal/regulatory provisions, public policy and standards related to telecommunication/ICTs accessibility.

3 Expected output

- a) Raising awareness among ITU members, decision-makers, persons with disabilities and persons with specific needs, and any other stakeholders, on best practices in telecommunication/ICTs accessibility.
- b) Guidelines and recommendations to assist ITU members as well as all stakeholders on accessible telecommunications/ICTs to build an inclusive society.
- c) Final report for Member States and Sector Members, operators, service providers and any other interested parties, providing guidance and best practices for the development and implementation of policies, regulatory frameworks and strategies for accessible telecommunications/ICTs for persons with disabilities and persons with specific needs.
- d) Telecommunication/ICT accessibility training to stakeholders, especially policy-makers, on how to engage all national and/or regional stakeholders and share good practices and success stories on the implementation of ICT accessibility policies, regulatory frameworks and services.
- e) Highlight ITU products and services available to the members to empower national stakeholders in ensuring telecommunication/ICT accessibility.
- f) Identify mechanisms for the use of telecommunications/ICTs to promote the employment of persons with disabilities, including telework.
- g) Identify methodologies that make it possible to compile telecommunication/ICT statistics focused on users with disabilities, in order to monitor the impact of the implementation of ICT accessibility policies, practices and technological solutions.

4 Timing

These activities should be included in the programme of activities of ITU-D Study Group 1 for the 2022-2025 study period, as a standalone Question.

5 Proposers/sponsors

6 Sources of input

The following stakeholders are encouraged to supply information for the Question: Member States, Sector Members, relevant international and regional organizations, public and private institutions and civil-society organizations involved in the design of policies and advocacy for the development of technological solutions to alleviate the difficulties faced by persons with disabilities in accessing telecommunications/ICTs.

7 Target audience

Target audience	Developed countries	Developing countries
Telecom policy-makers	Interested	Very interested
Telecom regulators	Interested	Very interested
Service providers/operators	Interested	Very interested
Manufacturers	Interested	Interested

a) Target audience

The result of the study will serve Member States, and particularly administrations of developing countries and LDCs, in designing policies and executing strategies and actions for the implementation of technological solutions that improve accessibility to telecommunications/ICTs for persons with disabilities. Moreover, it will enable Sector Members and service providers located in those countries to design and apply proven and successful commercial practices to meet the needs of persons with disabilities and facilitate their access to telecommunications/ICTs.

b) Proposed methods for implementation of the results

Authorities from Member States could consider designing policies and strategies to implement the most suitable technological solutions in the light of the characteristics of their populations and countries. In this respect, there could be short-term, medium-term and long-term action plans so as to permit implementation in phases.

The report should also be useful for administrations of Member States, Sector Members and service providers to encourage the adoption of commercial practices geared to meeting the needs of persons with disabilities and persons with specific needs.

8 Proposed methods of handling the Question or issue**a) How?**

- 1) Within a study group:
 - Question (over a multi-year study period)
- 2) Within regular BDT activity (indicate which programmes, activities, projects, etc., will be involved in the work of the study Question)
 - Programmes: Digital inclusion
 - Projects
 - Expert consultants
 - Regional offices
- 3) In other ways – describe (e.g. regional, within other organizations with expertise, jointly with other organizations, etc.): To be defined in the work plan.

b) Why?

The Question will be addressed within ITU-D Study Group 1, in close cooperation with ITU-T Study Group 16 (Question 26/16).

9 Coordination and collaboration

Coordination is recommended with relevant international and regional organizations, and with service providers that have adopted best practices to meet the needs of persons with disabilities and persons with specific needs and facilitate their access to telecommunications/ICTs.

10 BDT programme link

To be defined in the workplan.

11 Other relevant information

STUDY GROUP 2

MOD

QUESTION 1/2

Sustainable smart cities and communities**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 healthcare and education; management and control of drinking water supplies; and solving the problems facing cities and rural areas. This is the smart society. Similarly, as highlighted by the World Summit on the Information Society (WSIS), ICT 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 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 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.

It is estimated that at present over 50 per cent of IoT activity is focused on manufacturing, transport, smart cities and user applications, but that in the future all industries will be able to benefit from IoT initiatives, highlighting and enabling new business models and workflow processes.

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, street lights 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 countries¹.

¹ These include the least developed countries, small island developing states, landlocked developing countries and countries with economies in transition.

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 Resolutions 139 (Rev. Dubai, 2018), 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. Geneva, 2022), on bridging the standardization gap between developing and developed countries, and 98 (Rev. Geneva, 2022), on enhancing the standardization of IoT and smart cities and communities (SC&C) for global development of the World Telecommunication Standardization Assembly; and Resolution ITU-R 66-1 (Rev. Sharm el-Sheikh, 2019) of the Radiocommunication Assembly, on studies related to wireless systems and applications for the development of IoT.

2 Question or issue for study

Based on the statement explained in Section 1 above the issue of study will revolve around the three main pillars in addition to other complementary components as follows:

- a) Consideration of smart cities and communities (SC&C) to enlarge the scope of study and include smart villages and any form of communities.
- b) Raising awareness and sharing experiences on improving connectivity and underlying infrastructure to support the smart society and potential smart services, including smart grids, public administration, transport, business, education and training, health, the environment, agriculture, tourism and science.
- c) Examination of best practices for fostering and enabling deployment and use of smart devices/terminals used for providing smart services in the city/society.
- d) Survey of methods and examples of how software and platforms, both open-source and/or proprietary, enable connectivity of smart devices/terminals and integration of data for supporting smart services, cities and communities.
- e) Studying policies and business models that ensure the involvement of different stakeholders and yield sustainable development of smart cities and communities.
- f) Discuss and share reference data management architectures that would promote and enable development of smart cities and communities.
- g) Defining performance benchmarks and assessment mechanisms for smartness in terms of quality-of-life, technical aspects and policy mechanisms.
- h) Sharing of experiences and best practices in building smart cities and choosing/providing smart services and applications.
- i) Promotion of capacity building and the acquisition of knowledge on ICTs for adoption of the skills required for development of a smart society.
- j) Encouraging city planners and city officials to participate in the study and share their experiences.

3 Expected output

The output expected from this Question will include:

- a) Guidelines on policy approaches to facilitate the development of ICT applications in society, fostering social and economic development and growth.
- b) Case studies on the application of IoT, communications and ICT applications in building SC&C, identifying the trends and best practices implemented by Member States as well as the challenges faced, in order to support sustainable development and foster smart societies in developing countries.
- c) Increasing awareness among relevant participants regarding the adoption of open-source strategies for enabling access to telecommunications, and studying the drivers for increasing the degree of preparedness to use and develop open-source software to support telecommunications in developing countries, as well as creating opportunities for cooperation between ITU members by reviewing successful partnerships.
- d) Analysis of factors affecting the efficient roll-out of connectivity to support ICT applications that enable e-government applications in SC&C.
- e) Organization of workshops, courses and seminars for the development of capacities allowing improved uptake of ICT applications and IoT.
- f) Annual progress reports, which should include case studies, and a detailed final report containing measurement analysis, information and best practices, as well as any practical experience acquired in the areas of use of telecommunications and other means of enabling ICT applications and connecting devices for development of the smart society.
- g) Development of a city's ability to respond to crises like the global pandemic through smart cities, with special emphasis on a contactless society and continuity of urban systems.

4 Timing

A preliminary report should be submitted to the study group in 2020. The studies should be concluded in 2021, by which time a final report will be submitted.

5 Proposers/sponsors

TBD

6 Sources of input

- 1) Progress on study of the Questions relevant to this issue in the ITU Telecommunication Standardization Sector (ITU-T) and ITU Radiocommunication Sector (ITU-R) study groups.
- 2) Contributions from Member States, Sector Members, Associates, other United Nations agencies, regional groups and Telecommunication Development Bureau (BDT) coordinators.
- 3) Progress of BDT initiatives with other United Nations organizations and the private sector on using ICT applications for development of the smart society.

- 4) Progress on any other relevant activity carried out by the ITU General Secretariat or BDT.

7 Target audience

Target audience	Developed countries	Developing countries
Telecom policy-makers	Yes	Yes
Telecom regulators	Yes	Yes
Service providers/operators	Yes	Yes
Manufacturers (telecommunication/ICT equipment manufacturers, automobile industry, etc.)	Yes	Yes
Corresponding ministries	Yes	Yes
BDT programmes	Yes	Yes
City planners and operational managers	Yes	Yes

a) Target audience – Who specifically will use the output

Relevant policy-makers, regulators and participants in the telecommunication/ICT and multimedia sectors, as well as manufacturers and service providers and city planners and operational managers.

b) Proposed methods for the implementation of the results

In guidelines for implementing BDT regional initiatives.

8 Proposed methods of handling the Question or issue

Within ITU-D Study Group 2.

9 Coordination and collaboration

- The relevant Questions under both ITU-D Study Groups 1 and 2. In particular joint collaboration is sought with Q1/1 (for broadband and connectivity infrastructure), Q4/1 (for business models and economics), Q2/2 (on e-services), Q3/2 (on data management and trust-related issues) and Q5/2 (on adoption of ICTs and improving digital skills).
- The relevant BDT unit dealing with the Question issues
- Relevant work in progress in the other two ITU Sectors
- Connection between the Question and other development projects carried out by ITU (e.g., BDT projects)
- Broad cooperation with other UN agencies in the relevant fields for creating a smart city or community.

10 BDT programme link

All BDT programmes are concerned by the Question as regards, in particular, aspects relating to information and communication infrastructure and technology development, ICT applications, enabling environment, digital inclusion and emergency telecommunications.

11 Other relevant information

To be identified later during the life of this new Question.

MOD

QUESTION 2/2

Enabling technologies for e-services and applications, including e-health and e-education

1 Statement of the situation or problem

In order to continue to contribute to and promote attainment of the United Nations Sustainable Development Goals (SDGs) defined in September 2015 and objectives set by the Geneva Plan of Action of the World Summit on the Information Society (WSIS) in the era of digital transformation, it is necessary to address the challenge of digital infrastructure development to make available consequent benefit in developing countries.

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 offers 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.

Increased broadband networks also lead to the development and deployment of new services and applications, such as mobile money transfer, m-banking, m-commerce and e-commerce. More importantly, in developing countries, especially in remote areas, there are few health professionals, and the United Nations goal of "minimum healthcare for all" will not be achieved by 2030 without the use of e-health technology. The coronavirus pandemic has made it more difficult to meet people in person, and the relationship between patients and medical doctors, pregnant women and midwives, and elderly people and visiting nurses has begun to change in many ways in the medical field. In addition, students at schools or universities in both urban and remote areas were not able to meet their instructors in person during the pandemic and demand increased sharply on different educational platforms and applications. Such a trend is expected to continue and even increase as it proves effective. Over-the-top applications have connected communities, families, businesses, clients and partners all around the world to stay informed, socialize, practice sport or yoga and be entertained. M-services were at the core of the pandemic response, and will continue to be essential in the years to come.

2 Question or issue for study

The scope of activities is:

- Introduce best-practice models for e-services in developing countries, including e-health and e-education.
 - Ways to promote an enabling environment among ICT stakeholders for the development and deployment of e-services and m-services.
 - Study of new e-health technologies, including combating pandemics.
 - Sharing e-health standardization with developing countries.
- Methods of development and deployment of cross-cutting m-services related to e-commerce, e-finance and e-governance, including money transfer, m-banking and m-commerce.

- Regulatory frameworks for the provision of OTTs.
- National case studies and experiences regarding legal frameworks and partnerships seeking to facilitate the development and deployment of e-services, m-services and OTTs.
- Impact of OTTs on end-user demand for the Internet.
- 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.

3 Expected output

The output will be a report on the results of the work conducted for each item studied, together with a handbook, case study analysis reports, and other relevant materials at appropriate times, either during the course of or at the conclusion of the cycle.

Information shall be consolidated and disseminated to the membership to organize/support seminars and workshops for sharing best practices on the deployment of e-services, e-education and e-health in developing countries. Specifically, study outputs may promote gender equality and greater access by women to communication technologies, as well as to employment, health and education.

4 Timing

The output will be generated on an annual basis. The output of the Question will be completed during the study cycle.

4.1 Annual progress reports should be submitted to ITU-D Study Group 2.

4.2 Draft final reports and guidelines should be submitted to ITU-D Study Group 2 within the study cycle.

4.3 The Rapporteur group will work in close collaboration with relevant BDT programmes, regional offices, regional initiatives and relevant ITU-D Questions, and ensure proper liaison with ITU-R and ITU-T Sectors.

5 Proposers/sponsors

The Question was originally approved by WTDC-94, and subsequently revised by WTDC-98, WTDC-02, WTDC-06, WTDC-10, WTDC-14 and WTDC-17.

6 Sources of input

Contributions are expected from Member States, Sector Members, Academia and Associates, as well as inputs from relevant Telecommunication Development Bureau (BDT) programs, particularly those that have successfully implemented telecommunication/ICT e-services projects in developing countries, especially in rural and remote areas. These contributions will enable those responsible for work on this Question to develop the most appropriate conclusions, recommendations and outputs. The intensive use of correspondence and online exchange of information, workshops and field experiences is encouraged for additional sources of inputs.

7 Target audience

Target audience	Developed countries	Developing countries
Relevant policy-makers	Yes	Yes
Telecom regulators	Yes	Yes
Rural authorities	Yes	Yes
Service providers/operators	Yes	Yes
Manufacturers, including software developers	Yes	Yes
Vendors	Yes	Yes

a) Target audience – Who specifically will use the output

Telecommunication/ICT, education and health communities, between developed and developing countries and among developing countries, as well as telecom regulators, manufacturers, medical and educational organizations, NGOs and service providers.

b) Proposed methods for implementation of the results

The outputs of this Question will be distributed through ITU-D reports and made available via the ITU-D website.

8 Proposed methods of handling the Question or issue

a) How?

- 1) Within a study group:
 - Question (over a multi-year study period)
- 2) Within regular BDT activity (indicate which programmes, activities, projects, etc., will be involved in the work of the study Question):
 - Programmes: ICT applications and services
 - Projects
 - Expert consultants
 - Regional offices
- 3) In other ways – describe (e.g. regional, within other organizations with expertise, jointly with other organizations, etc.)

b) Why?

To take into account the ongoing/planned programmes/regional initiatives and optimize resources.

9 Coordination and collaboration

Coordination between the telecommunication/ICT, education and health communities, between developed and developing countries and among developing countries, as well as telecom regulators, manufacturers, medical organizations, NGOs and service providers. Collaboration with other study group Questions will also be explored, especially Q5/1 (rural communications), Q1/2

(smart cities and communities), and Q5/2 (ICT adoption and digital skills) with possible joint deliverables.

10 BDT programme link

WTDC Resolution 11 (Rev. Buenos Aires, 2017), Resolution 68 (Rev. Dubai, 2014) and Recommendation ITU-D 19.

Links to BDT program aimed at fostering the development of telecommunication/ICT for health and education as well as relevant applications and services.

11 Other relevant information

As may become apparent within the life of the Question.

MOD

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, national infrastructure and 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:

- a) the explosive growth in the deployment and use of ICT;
- b) cybersecurity remains a matter of concern of all, and there is thus a need to assist countries, in particular developing countries¹, to protect their telecommunication/ICT networks against cyberattacks and threats;
- c) the need to endeavour to ensure the security of these globally interconnected infrastructures if the potential of the information society is to be achieved;
- d) 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;
- e) 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;
- f) 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;
- g) 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";

¹ These include the least developed countries, small island developing states, landlocked developing countries and countries with economies in transition.

- h) 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";
- i) 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;
- j) the 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);
- k) 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);
- l) 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;
- m) 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;
- n) WTDC Resolution 45 (Rev. Kigali, 2022) supports the enhancement of cybersecurity among interested Member States;
- o) 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;
- p) 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;
- q) the conclusions and recommendations set out in ITU Telecommunication Development Sector (ITU-D) Study Group 2's final report 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;

- r) 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;
- s) 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;
- t) 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;
- u) spam and malware continue to be a serious concern, although evolving and emerging threats must also be studied;
- v) the need for simplified test procedures at basic level for security testing of telecommunication networks to promote a security culture.

2 Question or issues for study

- a) Promote awareness-raising for users and capacity building regarding cybersecurity (with possible collaboration with Question 5/2).
- b) Update the perspectives, studies and experiences of the report for Question 3/2 for the last study period.
- c) Share experiences on cybersecurity assurance practices.
- d) Discuss approaches and best practices for cybersecurity incident responses.
- e) Discuss approaches and best practices, and collect experiences on the implementation of national cybersecurity strategies and policies.
- f) Discuss challenges and approaches for 5G cybersecurity.
- g) Discuss challenges and approaches to addressing smishing and SMS incidents.
- h) Discuss approaches and share experiences of CSIRT/CIRT national coordination for the resilience of critical infrastructure.

3 Expected output

- a) Reports to the membership on the issues identified in § 2 a) to h) above. The reports in question will reflect that secure information and communication networks are integral to building the information society and to ensuring the economic and social development of all nations. They will also provide contributions that assist countries in formulating guidelines to address cybersecurity challenges.

Cybersecurity challenges include potential unauthorized access to, destruction of and modification of information transmitted on ICT networks, as well as countering and combating spam and malware. However, the consequences of such challenges can be mitigated by increasing awareness of cybersecurity issues, establishing effective public-private partnerships and sharing successful best practices employed by policy-makers and businesses, and through collaboration with other stakeholders.

In addition, a culture of cybersecurity can promote trust and confidence in these networks, stimulate secure usage, ensure protection of data, including personal data, while enhancing access and trade, and enabling nations to achieve the economic and social development benefits of the information society more effectively.

- b) Holding ad hoc sessions, seminars and workshops to share knowledge, information and best practices concerning effective, efficient and useful measures and activities to enhance cybersecurity, increase confidence and protect data and networks, taking into consideration existing and potential risks for ICTs, using outcomes of the study, to be collocated as far as possible with meetings of ITU-D Study Group 2 or of the rapporteur group for the Question.

4 Timing

This study is proposed to last four years, with preliminary status reports to be delivered on progress made after 12, 24 and 36 months.

5 Proposers/sponsors

ITU-D Study Group 2, Arab States, Inter-American proposal, Japan, and the Islamic Republic of Iran.

6 Sources of input

- 1) Member States and Sector Members
- 2) Relevant ITU-T and ITU-R study group work
- 3) Relevant outputs of international and regional organizations
- 4) Relevant non-governmental organizations concerned with the promotion of cybersecurity and a culture of security
- 5) Surveys, online resources
- 6) Experts in the field of cybersecurity
- 7) Global Cybersecurity Index (GCI)
- 8) Other sources, as appropriate

7 Target audience

Target audience	Developed countries	Developing countries
Telecom policy-makers	Yes	Yes
Telecom regulators	Yes	Yes
Service providers/operators	Yes	Yes
Manufacturers	Yes	Yes
Academia	Yes	Yes

a) Target audience

National policy-makers and Sector Members, and other stakeholders involved in or responsible for cybersecurity activities, especially those from developing countries.

b) Proposed methods for implementation of the results

The study programme focuses on gathering information and best practices. It is intended to be informative in nature and can be used to raise awareness of cybersecurity issues in Member States and Sector Members and to draw attention to the information, tools and best practices available, the results of which may be used in conjunction with BDT-organized ad hoc sessions, seminars and workshops.

8 Proposed methods of handling the Question or issue

The Question will be addressed within a study group over a four-year study period (with submission of interim results), and will be managed by a rapporteur and vice-rapporteurs. This will enable Member States and Sector Members to contribute their experiences and lessons learned with respect to cybersecurity.

9 Coordination and collaboration

The relevant questions under both ITU-D Study groups 1 and 2. In particular joint collaboration is sought with Q6/1 (on evaluation the impact of spam and malware from the consumer protection perspective as well as on awareness-raising for users and capacity building) and Q7/1 (on specific needs of persons with disabilities).

ITU-T, in particular ITU-T Study Group 17, which is responsible for building confidence and security in the use of ICTs.

Coordination with other relevant organizations and agencies. Given the existing level of technical expertise on the issue in these groups, they should be given the opportunity to comment and provide input on all documents (questionnaires, interim reports, draft final reports, etc.) before the documents are submitted to the full ITU-D study group for comment and approval

10 BDT programme link

The BDT programme under Objective 2 shall facilitate exchange of information and make use of the output, as appropriate, to satisfy programme goals and the needs of Member States.

11 Other relevant information

MOD

QUESTION 4/2

Telecommunication/ICT equipment: Conformance and interoperability, combating counterfeiting and theft of mobile devices

1 Statement of the situation or problem

The coronavirus disease (COVID-19) brought new challenges and opportunities to conformance and interoperability (C&I) structures that merit study by the ITU-D membership and the provision of guidance to the ICT community.

Question 4/2's extended terms of reference will include the following three items:

i) Conformance and interoperability (C&I)

Inclusion of an ITU Telecommunication Development Sector (ITU-D) study group Question on this matter provides an effective way to further the aims of Resolutions 177 (Rev. Dubai, 2018) and 188 (Rev. Dubai, 2018) of the Plenipotentiary Conference, Resolution 47 (Rev. Kigali, 2022) of the World Telecommunication Development Conference (WTDC), and Resolutions 76, 96 and 97 (Rev. Geneva, 2022) of the World Telecommunication Standardization Assembly (WTSA).

According to the Buenos Aires Declaration, widespread C&I of telecommunication/ICT equipment and systems allow increased market opportunities as well as the reliability and integration of world trade, which can be achieved through programmes, policies and decisions.

Member States and ITU-D Sector Members can assist and guide each other by conducting studies, building tools to bridge the standardization gap, and navigating issues related to matters raised in the above-mentioned resolutions. ITU-D can harness the energy of its membership to examine these important issues.

In this regard, 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.

The Question will ultimately contribute to international community's effort to achieve the Sustainable Development Goals (SDGs), especially the targets on infrastructure¹ (namely 9.1, 9.a, 9.b, and 9.c), by adopting an eco-friendly set of harmonized standards, since C&I regime instruments enable countries to better control and authenticate products.

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.

¹ SDG 9: <https://sustainabledevelopment.un.org/sdg9>

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 countries² 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).

The availability of high-quality, high-performing products will accelerate widespread deployment of infrastructure, technologies and associated services, allowing people to access the information society regardless of their location or chosen device, and contributing to implementing the SDGs.

Also, simplifying the conformity assessment process will facilitate the homologation of products destined for telecommunications, will give legal certainty to users on compliance in the products they acquire, and will promote adoption of the best technological standards and measures to protect intellectual property.

Considering the role of C&I in a hyperconnected world where billions of people and objects connect with each other, Question 4/2 will give additional focus on:

- New technologies and their impact in national C&I frameworks;
- Efforts to manage the increasing number of devices sharing the same limited resources;
- Measures to cover cost related to conformity procedures and controls of ICT products to allow only approved products to access markets;
- Reassessment of how harmonization of procedures and collaboration can be achieved under this scenario, considering:
 - Robust C&I frameworks: Making sure every country has or is part of a robust C&I framework with minimal costs (e.g. agreements on the shared use of national C&I infrastructure, such as testing facilities and certificates of conformity);
 - Collaboration: Effective tools/aspects of MRAs that need to be adapted to improve existing collaboration agreements or develop new ones.

In addition, this will contribute to raising the quality standards of services, making them more efficient, for the benefit of the population.

ii) 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.

iii) 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.

² These include the least developed countries, small island developing states, landlocked developing countries and countries with economies in transition.

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

Question 4/2 is expected to examine issues related to ICT equipment and systems, a key component for spreading ICT networks, access, services and applications. The work covers the below items:

- 2.1 In close collaboration with the relevant Telecommunication Development Bureau (BDT) programme(s), identifying and assessing the challenges, priorities and problems for countries, subregions or regions with respect to the application of ITU Telecommunication Standardization Sector (ITU-T) Recommendations and approaches to meeting the need for confidence in the conformity of equipment with ITU-T Recommendations.
- 2.2 Identifying critical/priority issues related to C&I in countries, subregions or regions, and related best practices.
- 2.3 Examining how information transfer, know-how, training and institutional and human capacity development can strengthen the ability of developing countries to reduce risks associated with low-quality equipment and equipment interoperability issues. Examining effective information-sharing systems and best practices to assist in this work (in possible collaboration with Question 6/1 and Question 5/2).
- 2.4 Elaborating a methodology for the implementation of this Question, in particular gathering evidence and information regarding current best practices being adopted to create C&I programmes, taking into consideration progress achieved by all the ITU Sectors in this regard.
- 2.5 Techniques designed to promote harmonization of C&I regimes, to establish administrative procedures (e.g. market surveillance) to increase resilience on ICT devices, to improve local and regional integration and to contribute to bridging the standardization gap, thereby reducing the digital divide, considering the current scenario of hyperconnected societies.
- 2.6 Information regarding the establishment of mutual recognition agreements (MRAs) between countries. Guidance on concepts and procedures to establish and manage MRAs.
- 2.7 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 6/2 and Question 7/2).
- 2.8 Techniques and national experiences on combating counterfeit, sub-standard, and tampered devices:
 - prepare and document examples of best practices on limiting counterfeit and tampered devices, for distribution;
 - 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;
 - study the impact of counterfeit and tampered telecommunication/ICT devices being transported to developing countries.

- 2.9 Future challenges for C&I, such as:
- new technologies outpacing regulation/testing procedures;
 - regulatory aspects for open and interoperability adoption related to 5G (in possible collaboration with Question 1/1 on broadband infrastructure);
 - smart objects' communication paradigms (in possible collaboration with Question 1/2 on smart objects and IoT);
 - software modifications to ICT devices after homologation and their impacts to existing C&I frameworks (in possible collaboration with Question 3/2);
 - effective harmonization of procedures and technical collaboration, etc.
- 2.10 How to prioritize device/type-approval while achieving a good balance between providing confidence to the user (e.g. through homologation) and applicable regulatory measures by the responsible authorities.
- 2.11 C&I challenges and opportunities during the COVID-19 pandemic.
- 2.12 Ways in which new technologies can help to improve the international C&I framework and trade in and use of ICT devices.

3 Expected outputs

In the ITU-D study period 2018-2021, studies of various issues related to C&I, combating counterfeit ICT equipment and theft of mobile devices are to be reported. Outputs are to be prepared in three separate components.

Specifically, the following outputs are envisaged:

C&I programmes

- a) Review of guidelines and best practices on technical, legal and regulatory aspects of a C&I regime.
- b) Feasibility studies regarding the establishment of laboratories in different C&I domains.
- c) Guidance on the framework and procedures for establishing technical collaboration on C&I and sharing of resources.
- d) Questionnaire to collect and update the database of current status of C&I regimes established at national, regional or global levels.
- e) Development of a methodology for assessing the status of C&I regimes in place in the regions (or subregions).
- f) Experience-sharing and case study reports on implementation of C&I programmes focusing on efficient and affordable methods to improve the level of conformity.
- g) Additional topics for the study period extension:
 - Future challenges to C&I facing new technologies, open and collaborative C&I frameworks;
 - C&I Challenges and opportunities from COVID-19;
 - Ways in which new technologies can help to improve the international C&I framework and trade in and use of ICT devices.

Combating counterfeit ICT equipment

- h) Best practices and guidelines, including methodologies to combat counterfeit ICT equipment.

Mobile device theft

- i) Experience-sharing and case-study reports on combating mobile device theft.

4 Timing

- 4.1 Annual progress reports will be submitted to ITU-D Study Group 2.
- 4.2 A final report will be submitted to ITU-D Study Group 2.

5 Proposers/sponsors

–

6 Sources of input

- 1) Member States, Sector Members and relevant experts.
- 2) A questionnaire covering relevant C&I matters.
- 3) Examination of regulations, policies and practices in countries that have created systems to manage these matters.
- 4) Other relevant international organizations.
- 5) Interviews, existing reports and surveys should also be used to gather data and information for the finalization of a comprehensive set of best-practice guidelines for administering C&I information.
- 6) Material from regional telecommunication organizations, telecommunication research centres, manufacturers and working groups should also be utilized in order to avoid duplication of work.
- 7) Close cooperation with ITU-T study groups, in particular Study Group 11 and the Joint Coordination Activity on C&I testing, and with other organizations (e.g. ILAC, IAF, ISO, IEC) involved in C&I activities and other actions within ITU-D is required and extremely important.

7 Target audience

Target audience	Developed countries	Developing countries
Telecom policy-makers	Yes	Yes
Telecom regulators	Yes	Yes
Service providers/operators	Yes	Yes
Manufacturers	Yes	Yes
Consumers/end-users	Yes	Yes
Standards-development organizations, including consortia	Yes	Yes
Testing laboratories	Yes	Yes
Certification bodies	Yes	Yes

a) Target audience

Depending on the nature of the output, policy- and decision-makers, middle to upper-level managers in operators, laboratories, standards-development organizations (SDOs), certification bodies, market-research agencies, regulators and ministries in developed, developing and least developed countries (LDCs) will be the predominant users of the output. Compliance managers at equipment manufacturers and system integrators could also use the output for information.

b) Proposed methods for implementation of the results

The results of the Question are to be distributed through ITU-D interim and final reports. This will provide a means for the audience to have periodic updates of the work carried out and to provide input and/or seek clarification/more information from ITU-D Study Group 2 should they need it.

We will use virtual meetings to advance the work due to the COVID-19 restrictions.

8 Proposed methods of handling the Question or issue

The Question will be addressed within a study group over a four-year study period (with submission of interim results), and will be managed by a rapporteur and vice-rapporteurs. This will enable Member States and Sector Members to contribute their experiences and lessons learned with respect to conformity assessment, type-approval and interoperability, testing laboratories, recognition of testing reports, as well as combating counterfeit devices.

9 Coordination

9.1 The ITU-D study group dealing with this Question will need to coordinate with:

- Relevant ITU-T study groups, particularly Study Group 11
- Relevant focal points in BDT and ITU regional offices
- Coordinators of relevant project activities in BDT
- SDOs
- Conformity-assessment bodies (including testing organizations and laboratories, accreditation organizations, etc.) and industry consortia
- Consumers/end users
- Experts in this field

10 BDT programme link

- a) WTDC Resolution 47 (Rev. Buenos Aires, 2017)
- b) WTSA Resolution 76 (Rev. Hammamet, 2016)
- c) Resolution 123 (Rev. Busan, 2014) of the Plenipotentiary Conference
- d) ITU C&I Programme

Links to BDT programmes aimed at human capacity development and assistance to operators in developing countries and LDCs, programmes that deal with technical assistance and programmes concerning C&I.

11 Other relevant information

As may become apparent within the life of the Question.

ADD

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 latest ITU data, global Internet usage stands at 51 percent. In developed countries, 87 per cent of the population is online compared to 44 per cent in developing countries and 19 per cent in least developed countries (LDCs). Significantly, an estimated 3.7 billion people or nearly half of the world's population is not online. Of those, only 15 per cent remain offline due to a lack of network infrastructure, while the other 85 per cent remain offline because of an 'adoption' gap, i.e. they are covered by a mobile broadband network but are not yet using broadband services or technology.

Since the onset of the coronavirus disease (COVID-19), 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 the 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.

2 Question or issue for study

- a) Analysis of adoption opportunities, challenges and disparities for telecommunications/ICTs, including broadband.
- b) Trends in telecommunication/ICT adoption globally, including in urban, rural, remote and other areas.
- c) Trends in Internet traffic and the impact on demand for high-speed broadband, including during pandemics and disasters.
- d) Trends in digital skills development and training programmes.
- e) 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.
- f) Approaches to strengthen digital skills training for the adoption of e-services, including e-agriculture, e-commerce, e-education and e-health.
- g) 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.
- h) 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).
- i) 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).
- j) 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.

3 Expected output

Reports, best-practice guidelines, workshops, case studies and recommendations, as appropriate, that address the issues for study and the following expected outputs:

- a) Policies, strategies and national experiences to stimulate adoption of telecommunication/ICT technologies, services and devices, including for broadband.
- b) Methods and guidelines for telecommunication/ICT adoption specific to social, cultural and economic environments (in collaboration with Question 4/1.
- c) Policies, strategies and national experiences to develop and promote digital skills, including training individuals at basic, standard and advanced levels.
- d) Methods, guidelines and case studies for lifelong skills training on new and emerging telecommunication/ICT services and technologies for people of all ages and socio-economic backgrounds.
- e) Policies, strategies and case studies promoting telecommunication/ICT adoption and skills development in indigenous communities, for women and for individuals in developing countries, LDCs and SIDS.

4 Timing

Annual progress reports will be presented to Study Group 2 in 2022, 2023 and 2024. Interim deliverables set in Section 3 could be sent for Study Group 2 for approval on readiness without waiting for the end of study period.

5 Proposers/sponsors

The United States proposes the adoption of this new question.

6 Sources of input

- 1) Contributions from Member States, Sector Members and Associates, and from relevant ITU-R and ITU-T study groups, and other stakeholders.
- 2) Results of related technical progress in relevant ITU-R and ITU-T study groups.
- 3) Interviews, workshops, existing reports and surveys should also be used to gather data and information for the finalization of a comprehensive set of best-practice guidelines.
- 4) Material from regional telecommunication/ICT organizations, telecommunication/ICT research centers, manufacturers and working groups should also be used, in order to avoid duplication of work.
- 5) ITU publications, reports and Recommendations on broadband deployment, digital inclusion and skills.
- 6) Relevant output and information from study Questions related to ICT applications.
- 7) Relevant inputs and information from BDT programmes related to broadband and the different broadband access technologies.

7 Target audience

Target audience	Developed countries	Developing countries
Telecom/ICT policy-makers	Yes	Yes
Telecom regulators	Yes	Yes
Service providers/operators	Yes	Yes

Additional stakeholders as appropriate	Yes	Yes
Manufacturers	Yes	Yes
Consumers/end users	Yes	Yes
Standards-development organizations, including consortia	Yes	Yes

a) Target audience

All national telecom/ICT policy-makers, regulators, service providers and operators, especially those in developing countries, as well as broadband providers and non-governmental or civil society organizations supporting broadband adoption and connectivity.

b) Proposed methods for implementation of the results

The results of the Question are to be distributed through ITU-D interim and final reports. This will provide a means for the audience to have periodic updates of the work carried out and to provide input and/or seek clarification/more information from ITU-D Study Group 2 should they need it.

8 Proposed methods of handling the Question or issue

Close coordination is essential with ITU-D programmes, and other relevant ITU-D study Questions, and with ITU-R and ITU-T study groups.

1. How?

- 1) Within a study group:
 - Question (over a multi-year study period)
- 2) Within regular BDT activity:
 - Programmes
 - Projects
 - Expert consultants
- 3) In other ways – describe (e.g. regional, within other organizations, jointly with other organizations, etc.)

b) Why?

The Question will be addressed within a study group over a four-year study period (with submission of interim results), and will be managed by a rapporteur group. This will enable Member States and Sector Members to contribute their experiences and lessons learned with respect to policy, regulatory and technical aspects of the migration from existing networks to broadband networks.

9 Coordination and collaboration

The ITU-D study group dealing with this Question will need to coordinate with: relevant ITU-R and ITU-T study groups; the relevant outputs from other ITU-D Questions; relevant focal points in BDT and ITU regional offices; coordinators of relevant project activities in BDT; experts and experienced organizations in this field.

10 BDT programme link

Links to BDT programmes aimed at promoting broadband adoption and affordability, digital inclusion and digital skills.

11 Other relevant information

As may become apparent within the life of the Question.

MOD

QUESTION 6/2

ICTs for the environment**1 Statement of the situation or problem****1.1 ICTs and climate change**

The issue of climate change has emerged as a global concern and requires global collaboration by all concerned, in particular the developing countries¹ (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 (ICTs) can monitor climate change and reduce overall global greenhouse gas (GHG) emissions. The focus of this 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 environment 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 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.

1.2 Telecommunication/ICT waste material

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

¹ These include the least developed countries, small island developing states, landlocked developing countries and countries with economies in transition.

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, proving a major challenge to even obtain correct 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.

2 Question or issue for study

There are a variety of issues that members will address under this 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 this Question:

- a) In close collaboration with the respective BDT programme(s), identify the regional needs for relevant applications for developing countries.
- b) Elaborate a methodology for the implementation of this 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.
- c) Consider the role of Earth observation in climate change, as determined by the implementation of Resolution 673 (Rev. WRC-12), on radiocommunication use 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.
- d) 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.

- e) 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.
- f) Consider the role of ICTs towards a greener world post-COVID-19.

3 Expected outputs

The output will be a report or reports on the results of the work concluded for each step identified above, taking into account the specific needs of developing countries.

Other outputs could be the organization of workshops in relation with the relevant ITU-D programme and in consultation with the relevant ITU-T and ITU-R study groups.

4 Timing

The output will be generated on an annual basis. The output for the first year will be analysed and assessed in order to update the work for the next year, and so on. An interim report will be produced by 2019. The final report is due by the end of 2021.

5 Proposers/sponsors

The Question was approved by WTDC-17.

6 Sources of input

Contributions are expected from:

Member States, Sector Members and Associates, as well as inputs from:

- 1) Relevant BDT programmes, and particularly ICT initiatives successfully implemented for climate change and to address e-waste.
- 2) Regional needs as identified by workshops on the subject.
- 3) Regional and/or national action plans and/or national experiences in ICTs and climate change or e-waste.
- 4) Progress achieved by ITU-T and ITU-R study groups in this domain, in particular the results of the Joint Coordination Activity on ICTs and climate change (JCA-ICTCC).
- 5) Progress achieved by the United Nations Intergovernmental Panel on Climate Change (IPCC) and other similar initiative(s).

7 Target audience

Target audience	Developed countries	Developing countries
Telecom policy-makers	Yes	Yes
Telecom regulators	Yes	Yes
Service providers/operators	Yes	Yes
Manufacturers	Yes	Yes

- a) **Target audience – Who specifically will use the output**

The output of this Question will be used by both developed and developing countries, and in particular the least developed countries (LDCs), small island developing states (SIDS), landlocked countries (LLDCs) and countries with economies in transition.

b) Proposed methods for implementation of the results

A set of guidelines and recommendations about strategies for a responsible and comprehensive approach to the treatment of waste related to telecommunications/ICTs: policy and regulatory actions required in developing countries and LDCs.

This guide could be implemented by the developing countries and LDCs, as well as operators and manufacturers, in establishing actions for responsible and integral treatment of waste related to telecommunications/ICTs.

8 Proposed methods of handling the Question or issue

Close coordination is essential with ITU-D programmes, and other relevant ITU-D study Questions, and with ITU-R and ITU-T study groups.

a) How?

- 1) Within a study group:
 - Question (over a multi-year study period)
- 2) Within regular BDT activity:
 - Programmes
 - Projects
 - Expert consultants
- 3) In other ways – describe (e.g. regional, within other organizations, jointly with other organizations, etc.)

b) Why?

To ensure that the work and output of this study Question is not duplicated and that there is better collaboration among BDT, the other ITU Sectors, Sector Members and other United Nations agencies.

To elaborate the set of guidelines, it would be necessary to have the experience of different countries, operators and manufacturers, as well as different organizations concerned with the topic which could provide information.

9 Coordination and collaboration

- Regular ITU-D activities
- Other study group Questions or issues, in particular with Questions 1/1, 2/2,5/2 and 7/2 to address environment issues
- Regional organizations, as appropriate
- Work in progress in the other ITU Sectors.

10 BDT programme link

Output 4.4.

11 Other relevant information

To be determined during the implementation of this Question.

MOD

QUESTION 7/2

Strategies and policies concerning human exposure to electromagnetic fields**1 Statement of the situation or problem**

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, ITU-D Study Group 2 Question 7/2 has studied science-based policies, guidelines, national experiences and assessments of human exposure to RF-EMF. New versions of EMF standards have also been published in 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 the pandemic and people, 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.

2 Question or issue for study

The study theme will encompass workshops featuring subject-matter experts, administrations and Sector Members who can share expertise and experiences related to the theme; collection of case studies and input contributions related to the theme; and interactive discussions to allow the Question to compare experiences and identify lessons learned and best practices. Additionally, throughout the study cycle, the Question will continue to examine new wireless technologies, best-practice of EMF management, harmonization of the standards as well as risk communication, with the priority on:

- Responding to EMF miscommunication
- Exposure at new EMF scenarios
- Examine the implementation of exposure limits via a broad range of country case studies, including on the ICNIRP (2020) Guidelines
- EMF issue of new deployment methods of wireless equipment.

3 Expected output

It is proposed that succinct outputs summarizing case studies and capturing lessons learned, best practices and tools/templates will be prepared and presented to the study Question for approval.

Additionally, throughout the study cycle, Question 7/2 welcomes contributions that describe new technologies, best practices of EMF management, harmonization of the standards as well as risk communication.

4 Timing

A provisional report is to be presented to Study Group 2 in 2019. It is proposed that the study be completed in 2021, at which date a final report containing guidelines will be submitted.

5 Proposers/sponsors

ITU membership.

6 Sources of input

- 1) Member States, Sector Members, Associates and Academia
- 2) Regional organizations
- 3) Expert ITU Sectors and Groups
- 4) World Health Organization (WHO)
- 5) International Commission on Non-Ionizing Radiation Protection (ICNIRP)
- 6) Institute of Electrical and Electronics Engineers (IEEE)
- 7) Telecommunication Development Bureau (BDT) focal points.

7 Target audience

a) Target audience – Who specifically will use the input?

Target audience	Developed countries	Developing countries¹
Telecom/ICT decision-makers, local authorities	Yes	Yes
Telecom/ICT regulators	Yes	Yes
Service providers/operators	Yes	Yes
Constructors/equipment provider	Yes	Yes

b) Proposed methods for implementation of the results

The results of the Question are to be distributed through ITU-D reports, or as agreed during the study period in order to address the Question for study.

8 Proposed methods of handling the Question or issue

Close coordination is essential with ITU-D programmes, as well as with other relevant ITU-D study Questions and ITU-R study groups dealing with spectrum matters including RF technologies, ICT for climate change, and ITU-T Study Group 5.

a) How?

¹ These include the least developed countries, small island developing states, landlocked developing countries and countries with economies in transition.

- | | | |
|----|--|-------------------------------------|
| 1) | Within a study group: | |
| | – Question (over a multi-year study period) | <input checked="" type="checkbox"/> |
| 2) | Within regular BDT activity: | |
| | – Programmes | <input checked="" type="checkbox"/> |
| | – Projects | <input checked="" type="checkbox"/> |
| | – Expert consultants | <input checked="" type="checkbox"/> |
| 3) | In other ways – describe (e.g. regional, within other organizations, jointly with other organizations, etc.) | <input type="checkbox"/> |

b) Why?

To ensure that the work and output of this study Question is not duplicated and that there is better collaboration among BDT, the other ITU Sectors, Sector Members and other United Nations agencies.

9 Coordination and collaboration

The ITU-D study group dealing with this Question will need to coordinate with:

- Relevant ITU-D Question(s)
- Relevant BDT programme(s)
- Regional offices
- Relevant ITU-R and ITU-T study groups
- Relevant international, regional and scientific organizations with mandates relevant to this Question.

10 BDT programme link

Objective 2, Output 2.1.

11 Other relevant information

To be defined in the work plan.