

STUDY GROUP 1

QUESTION 1/1

Strategies and policies for the deployment of broadband in developing countries¹

1 Statement of the situation or problem

In September 2015, the Member States of the United Nations (UN) and the UN General Assembly formally agreed on the Sustainable Development Goals (SDGs), and set out a global agenda for development based on economic prosperity, social inclusion and environmental sustainability, known as the '2030 Agenda for Sustainable Development'.

Broadband is a key input to achieving a people-centred, inclusive and development-oriented information society, including the objectives set by Action Line C7 of the Tunis Agenda for the Information Society and the World Summit on the Information Society (WSIS) and (through them) ITU's role in achieving the SDGs. To benefit from new technologies and services, developing countries need high-speed, high-quality broadband connectivity, not just low-speed broadband. However, in order for this to happen, key framework conditions need to be met. Figures for 2016 indicate that, even though mobile telephony has become commonplace, the digital divide is shifting, too, with attention focusing on the 3.9 billion people – 53 per cent of the world's population – who were still offline at the end of 2016. ITU's Connect 2020 targets call for 60 per cent of the world's population to be online by 2020 – equivalent to bringing another 1.2 billion people online over the next four years, especially in the 48 UN-designated least developed countries (LDCs). Additionally, in developing countries, LDCs and small island developing states (SIDS), a significant percentage of the population lives in less densely populated rural and remote areas where the capital costs of connecting homes and businesses using fixed-line connectivity can be prohibitive.

It was also estimated that there would be 884 million fixed-broadband subscriptions by the end of 2016, up 8 per cent on the previous year. ITU also estimates that the overall global Internet user gender gap has widened slightly, growing from 11 per cent in 2013 to 12 per cent in 2016. Pushing basic connectivity out beyond major urban centres to more remote areas continues to prove a major challenge. Even where people have access to the Internet, access has to be accompanied by a range of relevant services and content to help improve individuals' personal awareness, education and hygiene, as well as development outcomes in health and education at the national level.

The ITU Telecommunication Development Sector (ITU-D), with active participation from Member States and Sector Members, should endeavour to continue to increase the availability of affordable broadband services by carefully analysing the regulatory, policy, technical and economic issues related to broadband deployment, adoption and use. In particular, ITU

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

members and the Telecommunication Development Bureau (BDT) must identify, escalate and address the stated needs of LDCs, SIDS and others in improving broadband deployment and use. Members will benefit from analysing the technical issues involved in deploying broadband access technologies, including integration of access network solutions with existing or future network infrastructure, as well as asymmetric measures, as appropriate, for operators with significant market power (SMP), to help foster competition on the telecommunication market.

A focus on technical, policy, economic and regulatory aspects of broadband network deployment strategies and approaches will allow members to explore experiences, lessons learned and best practices to help enhance the implementation of national broadband plans and strategies, incentivize competition and investment, and increase broadband connectivity.

Seeking to provide a collaborative study of broadband access policies, implementation and applications, the World Telecommunication Development Conference (Dubai, 2014) (WTDC-14) resolved to begin studying new Question 1/1, entitled "Policy, regulatory and technical aspects of the migration from existing networks to broadband networks in developing countries, including next-generation networks, m-services, over-the-top (OTT) services and the implementation of IPv6". During the 2014-2017 study period, the Rapporteur Group on Question 1/1 prepared the report that can be found on the [ITU website](#). The report includes country experiences and best-practice guidelines to promote affordable broadband networks, services and applications, including those that stimulate demand for broadband such as e-education, m-banking, m-commerce, mobile money transfer and OTT services. It also includes ways to promote broadband deployment through effective competition, public and private investment, inter-platform competition, broadband stimulus, and universal service funds. Examples of experiences and policies facilitating the transition from narrowband to high-speed, high-quality broadband networks, including from IPv4 to IPv6 through the deployment of IPv6, are also featured.

Surveys highlighted the members' satisfaction with the work conducted to date, and proposed some alternative ways forward. Regarding the future of Question 1/1, the results of the surveys carried out by the ITU-D study groups on the current work and the future of Question 1/1 indicate that this Question should continue, but should concentrate on migration to broadband networks.

The work should also take account of the need to build resilient, sustainable infrastructure consistent with WSIS Action Line C2 (Information and communication infrastructure) and the SDGs.

In order to combine all resources and expertise so as to develop coherent policies and strategies that integrate all the issues related to the deployment of broadband in developing countries and access to broadband connectivity, revised Question 1/1 subsumes Question 2/1 on the study of broadband access technologies, excluding OTT and m-services aspects, which are to be addressed under another revised Question.

2 Question or issue for study

- a) Policies and regulations that promote increased high-speed, high-quality broadband network connectivity in developing countries.
- b) Effective and efficient ways to fund increased broadband access for the unserved and underserved.

- c) Ways to remove practical and regulatory barriers to broadband infrastructure deployment and investment, and best practices for improving cross-border connectivity and SIDS' connectivity challenges.
- d) 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.
- e) 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.
- f) Methods to implement affordable and sustainable broadband networks, including the transition from narrowband to high-speed, high-quality networks and interconnection and interoperability features.
- g) Demand-side factors and practices to generate and increase the usage of ICT devices and services.
- h) Factors influencing the effective deployment of wireline and wireless, including satellite, broadband access technologies, including backhaul considerations.
- i) Methodologies for migration planning and implementation of broadband technologies, taking into account existing networks, as appropriate.
- j) Trends in the various broadband access technologies and deployment and regulatory considerations.
- k) National digital policies, strategies and plans which seek to ensure that broadband is available to as wide a community of users as possible.
- l) Flexible, transparent approaches to promoting robust competition in the provision of network access.
- m) Co-investment and the co-location and shared use of infrastructure, including through active infrastructure sharing.
- n) Licensing approaches and business models for covering remote and rural areas that more effectively integrate the use of terrestrial, satellite, backhaul and submarine telecommunication infrastructure.
- o) Holistic universal access and service strategies and financing mechanisms, including universal service funds, for both network expansion and connectivity for public institutions and the community, as well as demand stimulation measures, such as end-user subsidies.
- p) Policy and technological aspects of the transition from IPv4 to IPv6.
- q) Ways to manage access to networks, balancing network performance, competition and consumer benefits.
- r) Available procedures, methods and time-frames for the effective transition to IPv6.

- s) Guidelines for the adoption of, and migration strategies for, network functions virtualization (NFV) and software-defined networking (SDN).
- t) The benefits and challenges to governments, operators and regulators of developing virtualized infrastructure, including costs associated with the adoption of NFV.
- u) Case studies of successful NFV platforms and SDN deployment in developed and developing countries, including methods of choosing the infrastructure (data centre and servers) for different virtualized network features.

3 Expected output

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

- a) Strategies/national experiences/guidelines to stimulate investment in broadband networks, including private, public and public-private partnerships, financing mechanisms, universal service funding mechanisms and other ways of bridging the digital divide.
- b) National experiences to promote broadband network deployment through effective competition, public and private investment, inter-platform competition and public-private partnerships, and identification of the range of alternative successful business arrangements that have been used to meet growing demand and other changes in the market.
- c) Methods of broadband infrastructure deployment, including backhaul and backbone, and national experiences for improving cross-border connectivity and connectivity for SIDS.
- d) Strategies/national experiences/guidelines to promote public-private partnerships for investment, and business models for the deployment of broadband networks, including policy and licensing approaches, financial incentives and frameworks to promote the deployment of broadband infrastructure to improve connectivity and access in the use of ICTs for all.
- e) Guidelines for making the transition from narrowband to high-speed, high-quality broadband networks (including transition to IMT-2020 networks), taking into account interconnection and interoperability features.
- f) Case studies associated with operational and technical issues of deploying broadband networks, including backhaul considerations.
- g) Examples of removing practical and regulatory barriers to broadband infrastructure deployment.
- h) Options for the deployment of broadband access networks in developing countries, based on ITU Radiocommunication Sector (ITU-R) and ITU Telecommunication Standardization Sector (ITU-T) Recommendations and relevant regulatory considerations.
- i) National experiences for co-investment, co-location, local loop unbundling and infrastructure sharing to promote market entry, where appropriate.

- j) Regulatory challenges and policies to leverage the rise of new technologies in the digital economy and society, including universal service funds, coverage requirements and alternative means of financing broadband access.
- k) Overview of national experiences in the transition from IPv4 to IPv6.
- l) Methods of consolidating and coordinating efforts to facilitate the transition to IPv6.
- m) Analysis of the factors affecting the adoption of features of virtual network functions in telecommunication company environments.
- n) Technical approaches and national experiences on virtual network functions and SDN to facilitate infrastructure roll-out in developing countries.
- o) Study on national experiences in the establishment of Internet traffic exchange points at national, regional and international level.
- p) Developing a national migration plan from IPv4 to IPv6, including a capacity-building plan, an awareness plan, knowledge sharing and a readiness assessment.

4 Timing

Annual progress reports to Study Group 1.

A final report and guidelines or recommendation(s) are to be submitted to Study Group 1 within four years.

Within two years, a draft report on the subjects should be submitted to Study Group 1.

5 Proposers/sponsors

There was consensus at WTDC (Buenos Aires, 2017) that broadband deployment issues are of extreme importance to all countries, particularly developing countries, and work needs to be continued on this subject under a revised Question in the next study period 2018-2021.

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

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?

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.

QUESTION 2/1

Strategies, policies, regulations and methods of migration to and adoption of digital broadcasting and implementation of new services

1 Statement of the situation or problem

1.1 The migration from analogue to digital broadcasting technologies has been completed in some countries, while others are in the process of completing the transition. The Final Report of Question 8/1 from the study period 2014-2017 indicates 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 from analogue 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 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.

1.4 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.

1.5 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, GE-06), contacts and sources of information.

1.6 In addition, the report on ITU-D Question 8/1 of the 2014-2017 study period 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.

1.7 Other issues to consider are the studies from other ITU Sectors, especially taking into account the decisions of the World Radiocommunication Conference (WRC-15) on the exploitation of the digital dividend in the future. In this regard, it is relevant to take into consideration the maintenance of study topics related to technical and economic aspects involved in the transition from analogue to digital broadcasting.

1.8 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.

2 Question or issue for study

Studies under the Question will focus on the following issues:

- 2.1 Analysis of methods and issues for the transition to digital terrestrial sound and television broadcasting, including analogue-to-digital and digital-to-digital, allowing the deployment of new services and applications for consumers.
- 2.2 National experiences on strategies and socio-economic aspects of the introduction of new broadcasting technologies, emerging services and capabilities.
- 2.3 National experiences on spectrum planning activities in preparation for the analogue switch-off.
- 2.4 National experiences on interference mitigation measures.
- 2.5 Analysis of the gradual transition to digital sound broadcasting, study cases, sharing of experiences and strategies implemented.
- 2.6 Costs of the transition to digital broadcasting and implications for the various players: broadcasters, operators, technology providers, manufacturers and distributors of receivers, and consumers, among others.
- 2.7 The use of the digital-dividend frequency bands resulting from the transition to terrestrial digital broadcasting, including technical, regulatory and economic aspects, such as:
 - a) status of the use of the digital-dividend frequency bands;
 - b) standards/Recommendations adopted or currently being studied by the other two ITU Sectors related to the topic;
 - c) sharing of the digital-dividend frequency band;
 - d) harmonization and cooperation at regional level;
 - e) the role of the digital dividend in saving financing, cost savings on the transition to digital, and best experience and practice in this regard;
 - f) use of the digital dividend to help bridge the digital divide, especially for the development of communication services for rural and remote areas;
 - g) guidelines on the transition to digital sound broadcasting, focusing on the experiences of those countries that have completed this process.

3 Expected output

- a) A report reflecting the studies outlined in §§ 2.1, 2.2, 2.3 2.4, 2.5, 2.6 and 2.7 above.
- b) Periodic dissemination of relevant data emanating from the organizations and groups listed in § 8 below. Periodic updates on studies taking place in the other ITU Sectors.

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

- 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.

5 Proposers/sponsors

Brazil, Mexico, APT.

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.
- 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.

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.

QUESTION 3/1

Emerging technologies, including cloud computing, m-services and OTTs: Challenges and opportunities, economic and policy impact for developing countries¹**1 Statement of the situation or problem**

Emerging technologies, including cloud computing, m-services and over-the-top (OTT) offerings, present new opportunities for economic development, particularly in developing countries. Cloud computing is a concept in the world of multimedia, and one towards which the world is now gradually moving, in view of the many powerful advantages it offers. This concept can be summarized as a model enabling ubiquitous, convenient, on-demand network access to a shared pool of configurable computing resources (e.g. networks, servers, storage, applications and services) that can be rapidly provisioned and released with minimal management effort or service-provider interaction.

The key characteristics of cloud computing are: broad network access, measured service, multi-tenancy, on-demand self-service, rapid elasticity and scalability, and resource pooling. For many countries, cloud computing represents a possible solution to the lack of adequate computing resources and it has achieved remarkable growth in many of the most developed countries, particularly after the adoption of this trend by mobile-telephone operators and manufacturers. Cloud computing is considered by key industry leaders to be the next technological revolution of the twenty-first century.

The main key characteristics of cloud computing are economies of scale (infrastructure sharing) and flexibility of use.

IP-based services are often offered by providers to users over an Internet connection, independent of the telecommunication network operator providing the Internet connection. These services are often referred to as "over-the-top" (OTT) offerings. Consumer demand for such offerings is rapidly growing as consumers want more of, and perceive great benefits from, these offerings. Consumers expect to be able to access legal content, applications and services and want information about their subscriptions. Such offerings create demand for broadband access and services, but are also obliging network operators to seek new business models and arrangements, particularly in developing countries.

The growth in broadband networks also leads to the development and deployment of new services and applications, such as mobile money transfer, m-banking, m-commerce and e-commerce.

In view of the importance of the topic, cloud computing is dealt with by two study groups in the ITU Telecommunication Standardization Sector (ITU-T). ITU-T Study Group 13 develops standards that detail requirements and functional architectures of the cloud-computing ecosystem, covering inter- and intra-cloud computing and technologies supporting XaaS (X as a Service). This work includes infrastructure and networking aspects of cloud-computing models,

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

as well as deployment considerations and requirements for interoperability and data portability. Study Group 13 also develops standards enabling consistent end-to-end, multi-cloud management and monitoring of services exposed by and across different service providers' domains and technologies. Study Group 13's standardization work also covers network aspects of the Internet of Things (IoT), additionally ensuring support for IoT across future networks (FN) as well as evolving next-generation networks (NGN) and mobile networks. Cloud computing in support of IoT is an integral part of this work.

ITU-T Study Group 20 is responsible for studies relating to Internet of Things (IoT) and its applications, and smart cities and communities (SCC). This includes studies relating to big data aspects of IoT and SCC, e-services and smart services for SCC.

Collaboration is therefore required between both Sectors in order to successfully deal with the challenges and opportunities facing the developing countries in terms of access to cloud computing.

2 Question or issue for study

Cloud computing

- a) Infrastructure needs for supporting and enabling access to cloud services.
- b) Strategies, policies and infrastructure investments 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.
- c) Cloud-computing trends.
- d) Features of networks that support effective access to cloud-computing services.
- e) Building and developing a sufficient group of existing frameworks to support investment in infrastructure for cloud computing, taking into consideration relevant standards recognized or under study in the other two ITU Sectors.
- f) Cost models for the adoption of cloud computing.
- g) Continued elaboration of case studies of successful cloud-computing platforms used in developed and developing countries.

M-services

- a) Policies, strategies and relevant approaches in the field of m-services.
- b) Methods of development and deployment of cross-cutting services such as e-commerce, e-finance and e-governance, including money transfer, m-banking and m-commerce.
- c) Strategies for availability, access and use of mobile services and applications.
- d) Ways to promote an enabling environment among ICT stakeholders for the development and deployment of m-services.

Over-the-top

- a) Impacts of the provisioning of OTTs, including impacts on regulatory frameworks, network infrastructure, economic impacts and business models.
- b) Assessments of the competition effect on the market.

- c) Identification of policy tools to facilitate the availability of competitive OTT to consumers at the local and national levels.
- d) Identification of best practices and policies that create incentives for investment in OTTs.
- e) Continued study of issues relating to facilitating access to IP networks, thereby enabling access to OTTs.
- f) National case studies and experiences regarding legal frameworks and partnerships seeking to facilitate the development and deployment of OTT.
- g) National experiences describing the economic and business model among telecom operators and OTT providers.

3 Expected output

- a) Annual progress report on the above study items.
- b) A progress report midway through the study cycle.
- c) A final report for the Question that includes:
 - An analysis of the factors influencing effective access to support emerging technologies, including cloud computing, m-services and OTT offerings.
 - A set of guidelines, such as policy or technical approaches, among others, for facilitating infrastructure deployment, which could be delivered, *inter alia*, through training seminars in accordance with the ITU Telecommunication Development Sector (ITU-D) programme on capacity building.
 - A handbook on infrastructure and services supporting cloud computing in developing countries, including consideration of strategies and policies that could be implemented.

This handbook will be the result of study group collaboration between ITU-T Study Groups 3 and 13 and the rapporteur group dealing with this Question under ITU-D Study Group 1.

 - Draft Recommendation(s), as appropriate and if justified.

4 Timing

The interim report on this Question is expected by 2019. The final report is expected in 2021 at the end of the ITU-D study period.

5 Proposers/sponsors

Arab States; African States; United States; Mexico

6 Sources of input

- 1) Results of related technical progress in relevant ITU-T study groups, in particular Study Groups 3 and 13.
- 2) ITU publications on emerging technologies, including cloud-computing services, m-services and OTT offerings.

- 3) Relevant reports of national and/or regional organizations in developing and developed countries.
- 4) Contributions on experiences with providing access to emerging technologies, including cloud computing, m-services and OTT offerings in developed and developing countries.
- 5) Relevant inputs from service providers and manufacturers.
- 6) Relevant inputs from Telecommunication Development Bureau (BDT) programmes relating to emerging technologies, including cloud computing, m-services and OTT offerings.

7 Target audience

a) 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
ITU-D programme	Yes	Yes

b) Proposed methods for implementation of the results

The work of the rapporteur group will be conducted and publicized through the ITU-D website as well as through documents and appropriate liaison statements. The results of the work will also be used by relevant BDT programmes as components of the toolkit BDT uses when solicited by Member States and Sector Members to support their efforts to develop and deploy emerging technologies, including cloud computing, m-services and OTT offerings.

8 Proposed methods for handling the Question

The Question will be handled by a rapporteur group of ITU-D Study Group 1.

9 Coordination and collaboration

In order to coordinate effectively and avoid duplication of activities, the study should take into consideration:

- outputs from the relevant ITU-T study groups, in particular those made available by ITU-T Study Groups 3 and 13;
- the relevant outputs from ITU-D Questions;
- inputs from the relevant BDT programmes.

10 BDT programme link

The relevant programme will be the programme on network infrastructure and services.

11 Other relevant information

As may become apparent within the life of the Question.

QUESTION 4/1

Economic policies and methods of determining the costs of services related to national telecommunication/information and communication technology networks, including next-generation networks

1 Statement of the situation or problem

As recognized in the Final Report on study Question 4/1 of the previous study period, the deployment of next-generation networks (NGN) calls for changes to new accounting tools in order to strengthen and increase the benefits that the use of such networks offers end users.

Similarly, the last study period focused on various topics such as new charging methods for services provided over NGN networks, infrastructure-sharing models, consumer price evolution and impact on ICT service usage, methods of determining the cost of licences for the operation of networks and/or the provision of telecommunication services and regulatory accounting in an NGN environment.

Considering the previous study period, Question 4/1 should continue to consider that operators and service providers require access to telecommunication/information and communication technology (ICT) networks and services, including broadband infrastructure, in a converged manner.

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

The Question will cover the following main topics from national perspectives:

- 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) Different models for infrastructure sharing, including through commercially negotiated terms:
 - 2.1) For what type of infrastructure (or facilities) the provider party is free to negotiate reasonable commercial terms and conditions with a requesting party.
 - 2.2) The impact of infrastructure sharing on investment cost, local loop unbundling, provision of telecommunication/ICT services, competition and prices to consumers: case studies with quantitative analysis.

- 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, including methods encouraging the adoption and use of ICT services.
 - 3.2) Trends in prices of telecommunication/ICT services, including international mobile roaming.
- 4) Trends in the development of virtual mobile operators and their regulatory framework.

3 Expected output

Development of best practices for each of the following areas:

- a) Promoting appropriate infrastructure sharing
- b) Encouraging price/tariff reduction to consumers through competition
- c) Stimulating access to and use of these services.

4 Timing

An interim report will be presented to Study Group 1 in 2020. It is proposed that this study should be completed in 2022, when a final report will be submitted.

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

The major source of input will be the experiences of Member States and Sector Members on costing and pricing issues. Contributions from Member States and Sector Members will be essential to the successful study of the issue.

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.

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 and Associates, and from relevant ITU Radiocommunication Sector (ITU-R) and ITU Telecommunication Standardization Sector (ITU-T) study groups, in particular ITU-T Study Group 2, and ITU-D study groups, and other stakeholders.

7 Target audience

All the target audiences mentioned below, with particular attention to the needs of developing countries¹.

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 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

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

Distribution of the report and guidelines at the Global Symposium for Regulators (GSR) 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)
- 2) Within regular BDT activity:
- Objective 3
- Projects: regional initiatives
- Expert consultants

9 Coordination and collaboration

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

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

- Relevant ITU-D study group Questions, particularly Question 1/1 and Question 3/1
- Relevant ITU-T study groups, particularly Study Group 3
- Relevant focal points in BDT and ITU regional offices
- Experts and experienced organizations in this field.

10 BDT programme link

ITU-D Objective 3.

11 Other relevant information

Question 4/1 will liaise closely with ITU-T Study Group 3 and its regional groups for Africa (SG3RG-AFR), Asia and Oceania (SG3RG-AO), Arab States (SG3RG-ARB) and Latin America and the Caribbean (SG3RG-LAC), ITU-D Study Groups 1 and 2 and other international and regional organizations concerned with issues relating to costs and tariffs for telecommunication services, and the ITU-D enabling environment programme.

As may become apparent within the lifetime of this Question.

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), and to promote attainment of the Sustainable Development Goals (SDGs) defined in September 2015, it is necessary to address the challenge of infrastructure development in the rural and remote areas of developing countries¹, where more than half of the world's population live.

The installation of cost-effective and sustainable basic telecommunication infrastructure in rural and remote areas is an important aspect calling for further studies, and specific outcomes need to be available for the vendor community to develop a suitable solution to meet the challenges in rural and remote areas.

Most of the time, 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 telecommunication network is assumed to exist. Hence, current systems need to be more adequately adapted to specific rural requirements in order to be widely deployed.

Shortage of power, difficult terrain, lack of skilled manpower, access and transportation, and installation and maintenance of networks are some of the known challenges that developing countries planning to extend information and communication technologies (ICTs) to rural and isolated areas must tackle.

More detailed studies addressing the challenges of deploying cost-effective and sustainable ICT infrastructure in rural and remote areas are expected to be undertaken within the study groups of the ITU Telecommunication Development Sector (ITU-D), taking into account the global perspective.

Therefore, the WSIS target, "Connect villages with telecommunications/ICT and establish community access points", should be promoted more intensively, by employing emerging broadband technologies for various e-application services to stimulate social and economic activities 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.

2 Question or issue for study

There are still many challenges to spreading telecommunications/ICTs in rural and remote areas. Throughout the studies conducted in past study periods, it has been clear from the

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

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 changing rapidly. Therefore, it is important to update the study of telecommunications/ICTs for rural and remote areas and to provide best practices to other developing and developed countries, in respect of the following items:

- Techniques and sustainable solutions that can impact on the provision of telecommunications/ICTs in rural and remote areas, with emphasis on those that employ the latest technologies designed to lower infrastructure capital and operating costs, assist convergence between services and applications, and take into consideration the need to reduce greenhouse gas (GHG) emissions.
- Difficulties in creating or upgrading telecommunication infrastructure in rural areas.
- Difficulties facing fixed and mobile networks for rural deployments in developing and developed countries, and the requirements to be satisfied by such systems.
- Needs and policies, mechanisms and regulatory initiatives to reduce the digital divide by increasing broadband 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.
- Increasing availability of telecommunications/ICTs that provide enhanced connectivity at progressively lower costs, lower energy consumption and lower levels of GHG emissions.
- Experience gained in previous ITU-D study cycles in many parts of the developing world in implementing and refining major rural telecommunication programmes, as more countries respond to particular situations and domestic demand using best practices as outlined in the work of ITU-D.
- The influence of cultural, social and other factors in producing differing and often creative responses to meeting the demand for multimedia services from residents of rural and remote areas of developing and least developed countries (LDCs).
- The steady progress being made on human resources development/management issues, which are fundamental to establishing sustainable telecommunication infrastructure.
- Identifying the rapid change of technologies which could be utilized in rural and remote areas should be taken into account. Here, coordination with Question 1/1 is needed to avoid duplication.
- Opportunities for and challenges to access to services in locally relevant languages.
- 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:

- environmental sustainability in deploying the infrastructure and necessary robustness of telecom infrastructure;
- maintenance and operational aspects to provide a quality and continuous service;
- demand-side factors and practices to generate and increase the usage of ICT devices and services;
- efforts to build ICT skill sets for the deployment of broadband services;
- relevant localization of content;
- affordability of services/devices for rural users to adopt so as to fulfil their development needs;
- strategies to maintain and encourage the training of technical staff in order to guarantee the reliability of the telecommunication infrastructure;
- strategies to promote small, non-profit community operators

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, in particular Questions 1/1, 3/1 and 4/1 and Questions 2/2, 4/2 and 5/2, are highly relevant. Likewise, the studies shall take into account cases related to indigenous communities, isolated and poorly served areas, LDCs, small island developing states (SIDS) and landlocked developing countries (LLDCs), and highlight their specific needs and other particular situations which need to be considered in developing telecommunication/ICT 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 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. Brazil, India, Mexico and Japan.

6 Sources of input

Contributions are expected from Member States, Sector Members 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 and 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

Depending on the nature of the output, upper- to middle-level managers in operators and regulators in developing countries, including relevant rural authorities, are the predominant users of the output. The study outcomes will ensure adequate attention of vendors to focus on their development efforts to meet the needs of developing countries.

b) Proposed methods for implementation of the results

To be decided during the study period.

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.

QUESTION 6/1

Consumer information, protection and rights: Laws, regulation, economic bases, consumer networks

1 Statement of the situation or problem

Faced with the rapid evolution of technologies and the appearance on the market of ever more sophisticated equipment, consumers who are not telecommunication/information and communication technology (ICT) experts can find themselves at a loss. Consequently, consumer information and consumer rights have become a priority, and at the World Telecommunication Development Conference (Dubai, 2014) account was taken of the wish of Member States and Sector Members to study the protection of telecommunication/ICT consumers, and that study was included under convergence.

In the majority of meetings organized by the leading telecommunication and ICT players, the issue of consumer protection has become a constant concern, yet neither regulators, operators or service providers nor equipment manufacturers have defined or provided a specific legal basis for the legal consumer-protection instruments that need to be implemented to guarantee universal access to quality telecommunication/ICT services at low cost.

Given the pace of change in telecommunications/ICT, bodies responsible for consumer protection (regulators, public and private agencies) should regularly amend their regulatory frameworks on the basis of the right balance between the interests of operators/service providers and those of users in areas such as subscription agreements, protection of intellectual property rights and management of digital rights, without detriment to innovative models of e-commerce.

One of the key challenges for regulators is to establish a culture of security that promotes trust in telecommunication/ICT applications and services, in which there is effective enforcement of privacy and consumer protection. Therefore, it is essential to implement laws, policies and regulatory practices, and to develop transparent, effective consumer-protection mechanisms in order to build such trust and confidence.

Likewise, for these regulations to limit and prevent fraudulent, deceptive and unfair commercial practices, it is necessary to promote education and adequate dissemination of telecommunication/ICT services for all consumers to make informed choices and benefit from adequate protection and compensation mechanisms when problems arise.

Therefore, it is important for all the parties involved in consumer protection (regulators, consumer-protection bodies, policy-makers and the private sector) to participate in education and awareness-raising for consumers, including persons with disabilities, women and children.

The development of intersectoral competition with the emergence of services resulting from convergence of technologies and telecommunication/ICT services makes it even more essential to enhance transborder cooperation, and for regulators and policy-makers to improve their competences and the tools designed to protect consumers. Furthermore, the question of after-sales service, which is one criterion for consumer choice, will need to be studied.

In view of the foregoing, it is important to bear in mind that the final report on the last study period includes a status review of consumer rights relating to telecommunication services, and

existing consumer-protection challenges, including technology innovation, market competition, changing business models, regulator resources and capacities, and the needs of specific groups such as persons with disabilities, women and children, as well as the consumer-rights framework and the economic aspects of consumer protection.

These studies on consumer protection in the context of convergence should nevertheless be completed, focusing on the new challenges.

Member States and Sector Members would continue to benefit from a report and, where applicable, recommendations on the various resources, strategies and tools available to improve enforcement of their national and regional laws, rules and regulations governing consumer information, protection and rights, from the perspective of laws, regulations, economic bases and consumer-protection networks/organizations.

2 Question or issue for study

- a) Organizational methods and strategies developed by public consumer-protection agencies with regard to legislation/regulations and regulatory activities.
- b) Mechanisms/means put in place by regulators, so that operators/service providers publish transparent, comparable, adequate, up-to-date information on, *inter alia*, prices, tariffs, expenses related to contract termination, and accessing and updating telecommunication services, in order to keep consumers informed and to develop clear and simple offers, as well as best practices for consumer education.
- c) Mechanisms/means implemented by the regulators themselves to keep consumers and users informed about the basic features, quality, security and rates of the various services being offered by the operators, enabling them to know and exercise their rights, to use the services properly, and to make informed decisions when contracting services.
- d) The role of international, regional and national organizations for the protection of telecommunication/ICT consumers' rights.
- e) Any economic and financial measures adopted by national authorities in the interests of consumers of telecommunication/ICT services, in particular specific categories of users (persons with disabilities, women and children).
- f) Consumer-protection challenges associated with the provision of new convergent services (transparency of service offers, fluidity of markets, quality and availability of services, value-added services, after-sales service, procedures for dealing with consumers' complaints or concerns, etc.), as well as the policies, regulations and rules established by national regulatory agencies (NRAs) to protect consumers against possible abuses by operators/providers of these convergent services.
- g) Best practices and tools to empower users/consumers in managing their data provided to telecommunication service providers.
- h) Mechanisms to promote the creation of useful information and practical tools to be used for promoting digital literacy, especially among specific groups such as women, girls, users with disabilities and the elderly.

- i) Mechanisms and tools promoted by regulatory bodies to monitor the performance of end-user mobile network services and to assess information on basic features, quality, security and rates of the service received by consumers.
- j) Corporate best practices in favour of the consumers of telecommunication services to foster best consumer-education practices.
- k) Studies regarding approaches to supporting consumer rights and promoting consumer protection around issues such as quality, security and pricing for telecommunication/ICT services, drawing on best practices and in collaboration with study groups of the ITU Telecommunication Standardization Sector (ITU-T).
- l) Identification of best practices for national regulators and operators in the use and management of national telephone numbering resources

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 that will need to be produced to help these actors to find the tools needed for a better culture of consumer protection as regards information, awareness-raising, inclusion of consumers' fundamental rights in laws and national, regional or international regulatory texts, and consumer protection in the provision of all telecommunication/ICT services as well as the use and management of national telephone numbering resources.
- b) Organization of regional seminars on consumer protection: consumer information, protection and rights, laws, economic and financial bases, consumer networks.

4 Timing

An interim report will be presented to ITU-D Study Group 1 in 2019. It is proposed that this study should be completed in 2021, when a final report will be submitted, along with any recommendations that may be adopted during the study period.

5 Proposers/sponsors

ITU-D Study Group 1 proposed the continuation of this Question as modified herein.

6 Sources of input

- a) Contributions from Member States, Sector Members and interested regional and international organizations, such as the United Nations and its specialized agencies, the Organisation for Economic Co-operation and Development (OECD) and recognized consumer associations
- b) Surveys/interviews
- c) Regulatory information available through the Telecommunication Development Bureau (BDT)

- d) Websites of national telecommunication/ICT regulatory authorities or worldwide, regional and national governmental bodies responsible for consumer protection, and recognized consumer associations
- e) Relevant work currently being undertaken in ITU-T and the ITU Radiocommunication Sector (ITU-R)
- f) Other relevant sources.

7 Target audience

All the target audiences identified below, with particular attention to the needs of developing countries¹.

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
Manufacturers	Yes	Yes
ITU-D programme	Yes	Yes

a) Target audience – Who specifically will use the output

National telecom policy-makers, regulators, service providers and operators, as well as recognized international, regional and national bodies for the protection of telecommunication/ICT consumers.

b) Proposed methods for implementation of the results

- Electronic distribution of the report and guidelines to all Member States, Sector Members and their respective NRAs, and ITU regional offices
- Distribution of the report and guidelines at the Global Symposium for Regulators (GSR) and relevant BDT, Radiocommunication Bureau (BR) and Telecommunication Standardization Bureau (TSB) seminars.

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:
 - Objective 2

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

- Projects: Regional initiatives
- Expert consultants
- 3) In other ways – describe (e.g. regional, within other organizations, jointly with other organizations, etc.)

Together with recognized international, regional and national bodies for the protection of telecommunication/ICT consumers.

b) Why within a study group?

A study group provides the best vehicle for the widest participation by developing countries both in the work of the Question and in shaping the outcome documents (i.e. best-practice guidelines).

9 Coordination and collaboration

This Question should be coordinated with ITU-D Objective 3 and with Questions relating to persons with disabilities, persons with specific needs and telecommunication/ICT services proposed for study in the study groups.

10 BDT programme link

ITU-D Objective 3

11 Other relevant information

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QUESTION 7/1

Access to telecommunication/information and communication technology services by persons with disabilities and other persons with specific needs**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 6 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.

1.1 Accessibility standards

Accessibility standards are essential in order to make it possible for equipment and services to be usable by the broadest range of persons, to be interoperable and to provide the required quality services. ITU-T has prepared several Recommendations and documents that provide information on a wide range of accessibility standards.

It is also important to consider stakeholder participation, whereby persons with disabilities should be involved in the process of elaborating legal/regulatory provisions, public policy and standards.

1.2 Information and statistics

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.

2 Question or issue for study

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 and the use of accessible telecommunications/ICTs to promote the employment of persons with disabilities in order to empower all stakeholders in creating an inclusive environment for persons with disabilities worldwide.

3 Expected output

It is proposed that the Question for study should:

- provide 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;

- result in a report that identifies good commercial and governmental practices that will support Member States, especially developing¹ and least developed countries (LDCs), in establishing and implementing policies, legal frameworks and strategies on accessible telecommunications/ICTs for persons with disabilities and persons with specific needs

The report should:

- a) share members' good practices and case studies on how to create political will as a cornerstone for implementing national ICT accessibility policies and strategies to improve the accessibility, compatibility and usability of telecommunication/ICT services;
- b) create a roadmap of requirements that national policy-makers should incorporate in their respective legal frameworks, including a range of measures to support the implementation of accessible ICT policies and services;
- c) highlight ITU products and services available to the members to empower national stakeholders in providing, in particular, the ITU Telecommunication Development Sector (ITU-D) training on web accessibility (accessible content and accessible websites), with the aim of ensuring that public government websites are accessible to all;
- d) identify suitable promotion and dissemination mechanisms, including business models, to ensure that persons with disabilities are aware of and are able to use and be empowered by accessible telecommunications/ICTs;
- e) identify mechanisms for the use of telecommunications/ICTs to promote the employment of persons with disabilities, including telework;
- f) 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 2018-2021 study period, as a new Question.

4.1 Mid-term report expected by 2019.

4.2 Final report expected by 2020.

5 Proposers/sponsors

Mexico/CITEL, Bosnia and Herzegovina, and Mali.

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

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

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 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

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STUDY GROUP 2

QUESTION 1/2

Creating smart cities and society: Employing information and communication technologies for sustainable social and economic development

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 and software – and on sustainable development principles.

Connectivity encompasses and includes existing and traditional networks as well as new technologies. It is a key enabler and component of machine-to-machine (M2M) communication, the Internet of Things (IoT), and resulting applications and services such as e-government, traffic management and road safety.

IoT constitutes a major advance that promises to change the way people live, work, learn, move around, entertain and provide care by having access to more and better information in real time and to better learning opportunities. Moreover, IoT technologies can be used to tackle global development challenges. 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 are the things that are connected that create smart societies. 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, connected devices so that they can

deliver significant advancements in sustainability and economic and social development. This is especially important in developing countries¹.

Software development connects and enables the first two pillars, such that all three pillars working together support new services that would never have been possible before. These new services are transforming everything from energy efficiency to environmental improvements, road safety, food and water safety, manufacturing and basic government services.

It will be possible for the work carried out under this study Question to be founded on Resolutions 139 (Rev. Busan, 2014), on the use of telecommunications/ICTs to bridge the digital divide and build an inclusive information society, and 197 (Busan, 2014), on facilitating IoT to prepare for a globally connected world, of the Plenipotentiary Conference; Resolutions 44 (Rev. Hammamet, 2016), on bridging the standardization gap between developing and developed countries, and 98 (Hammamet, 2016), on enhancing the standardization of IoT and smart cities and communities (SCCs) for global development of the World Telecommunication Standardization Assembly; and Resolution ITU-R 66 (Geneva, 2015) of the Radiocommunication Assembly, on studies related to wireless systems and applications for the development of IoT.

2 Question or issue for study

- 1) Discussion of and assistance in raising awareness on methods of improving connectivity to support the smart society, including connectivity to support smart grids, smart cities and ICT applications in public administration, transport, business, education and training, health, the environment, agriculture and science.
- 2) Examination of best practices for fostering and enabling deployment and use of smart devices, including mobile devices, and the importance of the application of such devices.
- 3) Survey of methods and examples of how software, both open-source and/or proprietary, enables connectivity of smart devices, thereby supporting smart services, cities and communities.
- 4) Definition of a measurement and performance benchmark for quality-of-life indicators in smart cities, and possible regulation and communication mechanisms that can be followed for good urban governance.
- 5) Sharing of experiences and best practices in building smart cities.
- 6) Promotion of capacity building and the acquisition of knowledge on ICTs for adoption of the skills required for development of a smart society.
- 7) Promotion of policy approaches that foster the economy, investment, innovation and development of the smart society, to support integration of ICTs in public administration, transport, business, education and training, health, the environment, agriculture and science.
- 8) Encouraging cooperation between developing and developed countries in order to bridge the digital and knowledge divide through technical and financial assistance, research programmes and voluntary technology transfer on mutually agreeable terms,

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

enabling access to ICT applications in countries and regions where it has not yet been possible.

- 9) Telecommunication/ICT services for tourism that enhance economic growth in smart societies.

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 SCCs, 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 SCCs.
- 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.

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

The Question was approved for the first time by WTDC-17, on the basis of Questions 1/2 and 2/2.

6 Sources of input

- a) 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.

- b) Contributions from Member States, Sector Members, Associates, other United Nations agencies, regional groups and Telecommunication Development Bureau (BDT) coordinators.
- c) Progress of BDT initiatives with other United Nations organizations and the private sector on using ICT applications for development of the smart society.
- d) 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

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.

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 BDT unit dealing with these issues
- Relevant work in progress in the other two ITU Sectors.

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.

QUESTION 2/2

Telecommunications/information and communication technologies for e-health**1 Statement of the situation or problem**

E-health is an integrated system that employs telecommunications/information and communication technologies (ICTs) to improve healthcare delivery, in particular as a substitute for face-to-face contact between medical staff and patient. It includes many applications, such as telemedicine, electronic medical records, medical consultation at a distance, medical consultation between rural medical centres and urban hospitals, etc. E-health provides for transmission, storage and retrieval of medical information in digital form between doctors, nurses, other medical staff and patients for clinical, educational and administrative purposes, both at the local site (your workplace) and at a distance (remote workplaces). In some developing countries¹, the number of mobile phones has overtaken the number of fixed phones, and the mobile telecommunication network could be considered a more attractive platform for the introduction of e-health services.

E-health is playing a very important role in healthcare delivery in developing countries, where the acute shortage of doctors, nurses and paramedics is directly proportional to the enormous unsatisfied demand for health services. Some developing countries have already successfully implemented small pilot telemedicine projects, and they are looking forward to proceeding further by considering the development of e-health master plans, as recommended by the World Health Organization (WHO) in its Resolution WHA58.28 in May 2005, which aims, in particular, at reducing disparities with regard to medical services between urban and rural areas and pays special attention to the least developed countries (LDCs).

2 Question or issue for study

Studies under the Question will focus on the following issues:

- a) steps to assist in raising the awareness of decision-makers, including health-related ministries, regulators, telecommunication operators, donors and customers, about the role of ICTs in improving healthcare delivery in developing countries;
- b) collaboration mechanisms between the telecommunication sector and the health sector in developing countries, in order to maximize the utilization of limited resources on both sides for implementing e-health services;
- c) national experiences and best practices with the use of ICTs in e-health in developing countries;
- d) information about the conditions and social acceptance, including legal and financial issues, for managing e-health in developing countries;
- e) cooperation among developing and developed countries in the field of mobile e-health solutions and services;

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

- f) e-health activities carried out by the Telecommunication Development Bureau (BDT) in cooperation with other UN agencies, such as WHO, in the field of non-infectious disease, infectious disease, including pandemics, and mother and child in particular;
- g) in conjunction with the ITU Telecommunication Standardization Sector (ITU-T), providing suitable guidelines on collecting and managing big data for public health crises, as well as using new technologies;
- h) introducing and disseminating ITU-T standards related to e-health for developing countries;
- i) introducing and disseminating, through ICTs, health information issued by WHO or other UN agencies related to e-health and/or health hazards (for example, the health hazard of children performing burning of a field of waste).

3 Expected output

The outputs expected from this Question will include:

- a) Guidelines on how to draft the telecommunication/ICT part of an e-health master plan.
- b) Guidelines with regard to the use of mobile telecommunications for e-health solutions in developing countries.
- c) Collection and summary of the requirements and effectiveness of telecommunication infrastructure for the successful implementation of e-health applications, taking into account the environment of developing countries.
- d) Dissemination of the technical standards related to the introduction of e-health services in developing countries.
- e) Collaboration with ITU-T Study Group 16 in order to accelerate the elaboration of technical standards for e-health applications.
- f) Collaboration with the relevant BDT programme, if so requested, to support implementation of the telecommunication/ICT component of e-health projects in developing countries, including advice on best practices on how to train developing countries in the use of the telecommunication/ICT component of e-health projects.
- g) Sharing and dissemination of best practices on e-health applications in developing countries using the ITU/BDT website, in close collaboration with the relevant BDT programme.
- h) Dissemination of advanced information about new e-health applications using new technologies

4 Timing

The work undertaken by the study group can be phased over the next study period. The participation of experts from the group for the provision of assistance in the development of e-health projects in developing countries will be encouraged.

5 Proposers/sponsors

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

6 Sources of input

Inputs will be expected from Member States and Sector Members, experts in e-health applications, etc. Contributors and contacts have already been established during the 2002-2006, 2006-2010, 2010-2014 and 2014-2017 study periods, and new contacts will also be invited. This Question has supported the mobile e-health initiative for developing countries launched in 2009.

7 Target audience

Target audience	Developed countries	Developing countries
Telecom regulators	Yes	Yes
Service providers/operators	Yes	Yes
Manufacturers	Yes	Yes
ITU-D programme		
Ministries of health	Yes	Yes
Medical organizations	Yes	Yes
NGOs in the field of health	Yes	Yes

This Question aims at stimulating collaboration between the telecommunication/ICT and health communities, between developed and developing countries, and among developing countries. The experience gained from telecommunications/ICTs for e-health applications in developing countries is also expected to benefit equipment suppliers and service providers in developed countries.

a) Target audience – Who specifically will use the output

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

b) Proposed methods for implementation of the results

Within ITU-D Study Group 2. The outputs of this Question will be 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 and health communities, between developed and developing countries and among developing countries, as well as telecom regulators, manufacturers, medical organizations, NGOs and service providers.

10 BDT programme link

Programme: ICT applications and services (Output 4.2)

11 Other relevant information

The activity for the next study cycle can be based on the final report and other initiatives which resulted from Question 14-3/2 of the last study period, on mobile telecommunications for mobile e-health.

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. Dubai, 2014) supports the enhancement of cybersecurity among interested Member States;
- o) Resolution 130 (Rev. Busan, 2014) 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. Hammamet, 2016), 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) Discuss approaches to foster the confidentiality, integrity and availability of ICT systems.
- b) Discuss approaches and best practices for evaluating the impact of spam and malware within a network, as well as evolving and emerging threats, and provide the necessary input for measures and guidelines, including mitigation techniques and legislative and regulatory aspects that countries can use, taking into account existing standards and available tools.
- c) Provide information on current cybersecurity challenges that service providers, regulatory agencies and other relevant parties are facing.
- d) Continue to gather national experiences from Member States relating to cybersecurity and child online protection and to identify and examine common themes within those experiences, using that information to provide input for guidelines to assist Member States in developing effective mechanisms for security in the digital environment.
- e) Analyse the cybersecurity challenges facing emerging technologies such as Internet of Things (IoT) and artificial intelligence (AI), etc., and measures to address those challenges.
- f) Share perspectives regarding how cybersecurity supports the protection of personal data.
- g) Promote awareness-raising for users and capacity building regarding cybersecurity.
- h) Provide a compendium of relevant, ongoing cybersecurity activities being conducted by Member States, organizations, the private sector and civil society at the national, regional and international levels, in which developing countries and all sectors may participate, including information gathered under d) above.

- i) Examine specific needs of persons with disabilities, in coordination with other relevant Questions.
- j) Examine ways and means to assist developing countries, with the focus on LDCs, in regard to cybersecurity-related challenges.
- k) Foster cooperation between the players involved with a view to 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.
- l) Work in collaboration with the relevant ITU-T study groups and other standards-development organizations (SDOs), as appropriate, and taking into account information and material available in these entities.
- m) Provide guidance on measures to combat spam and malware at national, regional and international level.
- n) Collect and share information regarding regulatory policies developed and/or implemented by national competent authorities to build confidence and security in the telecommunication/ICT sector.

3 Expected output

- a) Reports to the membership on the issues identified in § 2 a) to n) 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) Educational materials for use in workshops, seminars, etc.
- c) Accumulation of knowledge, information and best practices on effective, efficient and useful measures and activities to enhance cybersecurity in developing countries resulting from ad hoc sessions, seminars and workshops.

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

- a) Member States and Sector Members
- b) Relevant ITU-T and ITU-R study group work
- c) Relevant outputs of international and regional organizations
- d) Relevant non-governmental organizations concerned with the promotion of cybersecurity and a culture of security
- e) Surveys, online resources
- f) Experts in the field of cybersecurity
- g) Global Cybersecurity Index (GCI)
- h) 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

Coordination is required with ITU-T, in particular ITU-T Study Group 17, which is responsible for building confidence and security in the use of ICTs. Coordination should also include other relevant organizations with expertise in the issue, such as FIRST, APCERT, OAS CICTE, OECD, RIRs, NGOs, M3AAWG, ISOC, GFCE and UCENET. 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

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QUESTION 4/2

Assistance to developing countries¹ for implementing conformance and interoperability programmes and combating counterfeit information and communication technology equipment and theft of mobile devices

1 Statement of the situation or problem

Question 4/2 will examine 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. Busan, 2014) and 188 (Busan, 2014) of the Plenipotentiary Conference, Resolution 47 (Rev. Buenos Aires, 2017) of the World Telecommunication Development Conference (WTDC), and Resolutions 76 (Rev. Hammamet, 2016) and 96 and 97 (Hammamet, 2016) 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 infrastructure² (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 These include the least developed countries, small island developing states, landlocked developing countries and countries with economies in transition.

² 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 countries have not yet done so because of a number of major challenges, such as the lack of appropriate/adequate infrastructure and technology development to be in a position to test or to recognize tested ICT equipment (e.g. accredited laboratories).

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.

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.

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

2 Question or issue for study

The Question is established in ITU-D Study Group 2, to examine issues related to ICT equipment and systems, a key component for spreading ICT networks, access, services and applications. The work of the Question takes into account the following 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 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.

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 improve regional integration and to contribute to bridging the standardization gap, thereby reducing the digital divide.

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 Techniques on market surveillance and maintenance of C&I regimes in order to guarantee the credibility and sustainability of the conformance assessment scheme put in place.

2.8 Assessing the impact of the increase of ICTs, including the Internet of Things (IoT), and providing guidelines to the ITU-D membership for ICT-readiness.

2.9 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.

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.

Combating counterfeit ICT equipment

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

Mobile device theft

- h) 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

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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. Material from regional telecommunication organizations, telecommunication research centres, manufacturers and working groups should also be utilized in order to avoid duplication of work.
- 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.

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.

QUESTION 5/2

Utilizing telecommunications/information and communication technologies for disaster risk reduction and management**1 Statement of the situation or problem****1.1 Context**

- a) Recent natural and man-made disasters, which remain of critical concern to Member States.
- b) The importance of telecommunications/information and communication technologies (ICTs) to support disaster mitigation, relief and response is well established.
- c) The longstanding role of ITU in supporting the use of telecommunications/ICTs for the purpose of disaster preparedness, mitigation, response and recovery
- d) The value of collaborating and sharing experiences, both regionally and globally, in order to support national and regional preparedness
- e) The excellent results of the work under ITU Telecommunication Development Sector (ITU-D) Questions 22-1/2 and 5/2 in past study periods, including the compilation of numerous case studies, the development of an online toolkit and Handbook on Emergency Telecommunications, and development the report on ICT experiences and best practices in disaster mitigation and relief and the checklist for emergency telecommunications.
- f) Over the last study period 2014–2017, ITU-D study Question 5/2 examined multiple aspects of disaster communications planning, management and response, including country case studies in disaster early warning, prediction and response, with examples of new and evolving technologies, applications, checklists and tools to support disaster management, resilience and redundancy, and disaster communications plans and frameworks that consider and prepare for all potential hazards.
- g) The evolution of new technologies for disaster early warning and prediction of disasters.

1.2 Background texts

- a) The WSIS action lines and United Nations Sustainable Development Goals (SDGs) further recognize the need to reduce the risk of disasters and build sustainable and resilient infrastructure.
- b) Resolution 34 (Rev. Buenos Aires, 2017) of the World Telecommunication Development Conference (WTDC), on the role of telecommunications/ICT in disaster preparedness, early warning, rescue, mitigation, relief and response, as well as to support humanitarian assistance.
- c) Resolution 646 (Rev. WRC-15) of the World Radiocommunication Conference (WRC), on the radiocommunication aspects of public protection and disaster relief.

- d) Resolution 136 (Rev. Busan, 2014) of the Plenipotentiary Conference, on the use of telecommunications/ICTs for monitoring and management in emergency and disaster situations, and for early warning, prevention, mitigation and relief.
- e) WRC Resolution 647 (Rev. WRC-15), on spectrum-management guidelines for emergency and disaster relief radiocommunications.
- f) The United Nations International Strategy for Disaster Reduction (UNISDR) Sendai Framework for Disaster Risk Reduction 2015-2030.

1.3 Further provisions

- a) Recommendation ITU-D 13.1, which recommends that administrations include the amateur services in their national disaster plans, reduce barriers to effective use of the amateur services for disaster communications, and develop memoranda of understanding (MoU) with amateur and disaster-relief organizations.
- b) Recommendation ITU-R M.1637, which offers guidance to facilitate the global circulation of radiocommunication equipment in emergency and disaster-relief situations.
- c) Report ITU-R M.2033, which contains information on some bands or parts thereof which have been designated for disaster-relief operations.
- d) Recommendations ITU-T E.106 (International Emergency Preference Scheme for Disaster Relief Operations) and ITU-T E.107 (Emergency Telecommunications Service (ETS) and Interconnect Framework for National Implementations of ETS Numbering), which relate to use of public telecommunications by national authorities in emergency and disaster-relief operations.
- e) Recommendation ITU-T L.392 (Disaster management for improving network resilience and recovery with movable and deployable information and communication technology (ICT) resource units), which contains an approach to improve network resilience against disasters.
- f) Recommendation ITU-T E.108 (Requirement for disaster relief mobile message service), which specifies requirements for a disaster relief mobile message service to save a victim's life.

1.4 Aspects to be considered

- a) The complementary work being undertaken by the Telecommunication Development Bureau (BDT) programme(s) and regional offices to provide assistance on disaster communications/emergency telecommunications to ITU Member States.
- b) The activities of the Intersectoral Emergency Telecommunications Team, an internal ITU secretariat mechanism to ensure coordination across all the secretariat's activities for emergency telecommunications.
- c) The role of ITU Sector Members and relevant international, regional and non-governmental organizations in providing telecommunication/ICT equipment and services, expertise and capacity-building assistance to support disaster-relief and recovery activities throughout the world, particularly through the ITU Framework for International Cooperation in Emergencies (ICE).

- d) The ongoing work of the United Nations Emergency Telecommunications Cluster and the Working Group on Emergency Telecommunications (WGET), in which ITU participates, to facilitate the use of telecommunications/ICTs in the service of humanitarian assistance.
- e) The ongoing work of the International Maritime Organization (IMO), the International Civil Aviation Organization (ICAO) and ITU related to search and rescue and distress alerting that may be applicable to disaster communications management frameworks.
- f) Publications, workshops and forums facilitated by ITU's work on the utilization of telecommunications/ICTs for disaster preparedness, mitigation, response and recovery, including emergency communications, provide information to enhance the preparedness, mitigation and relief capacities of ITU Member States.
- g) Developing countries¹ continue to require support in developing disaster communications management expertise.
- h) ITU-D Objective 2, in coordination with the regional offices and ITU-D Study Group 2, can continue to assist and guide developing countries in building comprehensive disaster-management plans, setting up early-warning centres, addressing climate-change adaptation, and promoting regional and international cooperation at the time of disasters through coordinated efforts.
- i) Ongoing or planned telecommunication/ICT development projects can often be leveraged to address emergency communications requirements and to support relief and recovery operations.
- j) There is a need for additional information on the effective use of telecommunications/ICTs for disaster preparedness, mitigation, response and recovery, including consideration of how existing systems and infrastructures can be integrated into disaster-management frameworks, how to facilitate rapid deployment of systems and services following a disaster, and how to help ensure redundancies and resiliency of networks and infrastructures from the effects of natural disasters.

2 Question or issue for study

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

2.2 Continue gathering national experiences and case studies in disaster preparedness, mitigation and response, and in the development of national disaster communications plans, and examine common themes between them.

2.3 Examine the role that administrations and Sector Members and other expert organizations and stakeholders share in collaboratively addressing disaster management and the effective use of telecommunications/ICTs.

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

- 2.4 Examine the implementation of early-warning systems, and related disaster risk reduction and response actions, including safety confirmations in the event of a disaster.
- 2.5 Examine emergency communications planning, implementation and analysis of disaster communications exercises and drills.
- 2.6 Examine the enabling environment for more resilient communications networks and for the deployment of emergency communications systems, which includes, but is not limited to, emergency response, preparedness and recovery.
- 2.7 Develop best practices for the elaboration 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, working in coordination with the relevant BDT programmes, regional offices and other partners.
- 2.8 Continue updating the online toolkit with relevant information and materials collected during the study period.

3 Expected output

The expected output will be a report or reports on the results of the work conducted for each step above, together with one or more Recommendations, as appropriate. Outputs may also include regular updates to the online toolkit, and the development of any additional tools or guidelines to support the implementation of telecommunications/ICTs for use in disaster preparedness, mitigation, response and recovery.

In order to facilitate discussion and to provide more timely outputs for the benefit of Member States, consideration may be given, when developing the work plan, to focusing on certain topics each year of the study period, while maintaining flexibility based on contributions received.

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 annually, on an agreed theme. Examples could include, but are not limited to:

- Best practices and country experiences in planning, exercising and deploying early-warning systems for disaster risk reduction, including safety confirmation. The output will consider developed- and developing-country experiences in deploying early-warning systems and offer good practices and implementation guidance on establishing early-warning systems.
- Guidelines for preparing and conducting disaster communications exercises and drills and for assessing and updating plans, policies, and procedures based on lessons learned.
- Best practices regarding the enabling policy environment for the deployment of emergency communications systems. The discussion will address regulatory and policy barriers that exist for the implementation of resilient emergency communications systems, and identify best practices that enable early warning, continuity of communications and more effective response and recovery.
- Seminars and workshops to share knowledge, information and best practices, featuring subject-matter experts, administrations and Sector Members who are able to share

expertise and experiences related to the theme from a national and/or regional/global perspective, and collection of case studies related to the theme.

- A summary of contributions received describing new technologies, systems and applications for emergency communications and considerations to support their implementation. The focus will be on both technology examples and also deployment case studies of new and emerging systems and applications for emergency communications and response.

4 Timing

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

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 2 within four years.

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 four years.

5 Proposers/sponsors

The new text for this revised Question stems from the final report of ITU-D Study Group 2 for 2014-2017.

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

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11 Other relevant information

As may become apparent within the life of the Question.

QUESTION 6/2

Information and communication technologies and the environment

1 Statement of the situation or problem

1.1 ICT 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.

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. Hammamet, 2016) 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 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.

The consequences of not carrying out proper recycling or disposal are environmental problems of large magnitude, especially for developing countries.

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

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. Hammamet, 2016), both for monitoring changes in the climate and reducing the impact of climate change using the action plan in WTSA Resolution 44 (Rev. Dubai, 2012), 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.

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 and seminars for the developing countries, 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:

- a) Relevant BDT programmes, and particularly ICT initiatives successfully implemented for climate change and to address e-waste.
- b) Regional needs as identified by workshops on the subject.
- c) Regional and/or national action plans and/or national experiences in ICTs and climate change or e-waste.
- d) 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).
- e) 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
- 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.

QUESTION 7/2

Strategies and policies concerning human exposure to electromagnetic fields

1 Statement of the situation or problem

The deployment of different sources of electromagnetic fields (EMF) to cater for the telecommunication and information and communication technology (ICT) needs of urban and rural communities has developed very rapidly over the past years. This has been due to strong competition, ongoing cellular penetration and traffic growth, increased usage of data services, quality of service (QoS) requirements, network coverage and capacity extension, and the introduction of new technologies.

This development has prompted concern as to the possible effects of prolonged exposure to emissions on people's health.

This concern on the part of populations is growing, aggravated by the feeling that they are not being kept informed in regard to the process for deploying these installations in their vicinity. As a consequence of rapid technological development in the field of telecommunications, many complaints have been received by operators and government bodies responsible for radiocommunications/ICTs.

Thus, since the continued development of radiocommunications requires trust on the part of populations, the work carried out in study groups of the ITU Radiocommunication Sector (ITU-R), specifically under new Question 1/239, and in Study Group 5 of the ITU Telecommunication Standardization Sector (ITU-T) under Resolution 72 (Rev. Hammamet, 2016) of the World Telecommunication Standardization Assembly (WTSA), on measurement and assessment concerns related to human exposure to EMF, as well as Resolution 176 (Rev. Busan, 2014) of the Plenipotentiary Conference, on human exposure to and measurement of EMF, should be complemented by studies on the different regulatory and communication mechanisms developed by countries to make populations more knowledgeable, aware and informed and thus facilitate the deployment and operation of radiocommunication systems.

2 Question or issue for study

The following subjects should be studied:

- a) Compilation and analysis of the regulatory policies concerning human exposure to EMF that are being considered or implemented for authorizing the installation of radiocommunication sites.
- b) Description of the strategies or methods for raising populations' awareness and knowledge of, and providing them with more information on, the effects of EMF from radiocommunication systems.
- c) Proposed guidelines and best practices on this matter.
- d) Information on the international (mainly in WHO, ICNIRP and IEEE) activities, including updated limits of exposure levels.

- e) Challenges and opportunities of developing technical regulations on the limits for maximum exposure to non-ionizing electromagnetic radiation from radio base stations and specific absorption rate levels in wireless devices.

3 Expected output

A report to the membership presenting guidelines to assist Member States in resolving similar problems faced by regulatory bodies. The report will provide material for workshops and seminars to share experiences on the establishment of limits for maximum exposure to non-ionizing electromagnetic radiation from radio base stations.

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

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

7 Target audience

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

Target audience	Developed countries	Developing countries ¹
Telecom/ICT decision-makers, local authorities	Yes	Yes
Telecom/ICT regulators	Yes	Yes
Service providers/operators	Yes	Yes
Constructors/equipment provider	Yes	Yes

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

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 ICT for climate change, and ITU-T Study Group 5.

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.

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.
