International Telecommunication Union

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About the International Telecommunication Union (ITU)

The International Telecommunication Union (ITU) is the United Nations Specialized Agency for Information and Communication Technologies (ICTs)

An organization based on **public-private partnership** with **193 Member States** and over 900 members from industry, international and regional organizations and academia.

How did it all start? Why standardization?

Telegraph

- Developed in the 1830s and 1840s by Samuel Morse (1791-1872) and other inventors, the telegraph revolutionized long-distance communication.

- Transmitting electrical signals over a wire laid between stations. In addition to helping invent the telegraph, Samuel Morse developed a code (bearing his name) that assigned a set of dots and dashes to each letter of the English alphabet and allowed for the simple transmission of complex messages across telegraph lines.

- In 1844, Morse sent his first telegraph message, from Washington, D.C., to Baltimore, Maryland; by 1866, a telegraph line had been laid across the Atlantic Ocean from the U.S. to Europe. Although the

https://www.history.com/topics/inventions/telegraph#:~:text=Developed%20in%20the%201830s%20and,a%20wire%20laid%20between%20stations.

International Morse Code

A	•−	N	−•	1	•−−−−
B	−•••	O	−−−	2	••−−−
C	−•−•	P	•−−•	3	•••−−
D	−••	Q	−−•−	4	••••−
E	•	R	•−•	5	•••••
F	••−•	S	•••	6	−••••
G	−−•	T	−	7	−−•••
H	••••	U	••−	8	−−−••
I	••	V	•••−	9	−−−−•
J	•−−−	W	•−−	0	−−−−−
K	−•−	X	−••−	.	•−•−•−
L	•−••	Y	−•−−	,	−−••−−
M	−−	Z	−−••	?	••−−••

www.boxentriq.com

History of the International Telegraph Union (ITU)

- The ITU is the oldest international organization, preceded by the now defunct International Telegraph Union which drafted the earliest international standards and regulations governing international telegraph networks.

- By 1865 it was agreed that a comprehensive agreement was needed in order to create a framework that would standardize telegraphy equipment, set uniform operating instructions, and lay down common international tariff and accounting rules.

History of the International Telegraph Union (ITU)

- Meeting between 1 March and 17 May 1865, the French Government hosted delegations from 20 European states at the first International Telegraph Conference in Paris. This meeting culminated in the **International Telegraph Convention which was signed on 17 May 1865.**

- As a result of the 1865 Conference, the International Telegraph Union, the predecessor to the modern ITU, was founded as the first international standards organization. The Union was tasked with implementing basic principles for international telegraphy.

Each year 17 May is still celebrated as the World Telecommunication and Information Society Day

Wireless Telegraphy and Telephony

- Wireless Telegraphy
  - Founded in **1885** by **Marconi** by transmitting signals distances of ten miles. Consequently, the wireless **telegraph** immediately found a niche in the nautical community.

- Telephony
  - **Alexander** Graham Bell was a Scottish-born scientist and inventor best known for inventing the first working telephone in 1876 and founding the Bell Telephone Company in 1877. Bell's success came through his experiments in sound and the furthering of his family's interest in assisting the deaf with communication

A Switch Board or Telephone Exchange

https://time.com/4011936/emma-nutt/

Advances in Telephony

- Electronic Telephone Exchanges
- Digital Exchanges
- Satellite Communication
- Submarine Cables (Co-axial), Fiber

Wireless Communication

- Non-cellular communication

- Cellular Communication
  - 1G
  - 2G
  - IMT 2000 (3G)
  - IMT Advanced (4G)
  - IMT 2020 (5G)

The Radiotelegraph Union

- Another predecessor to the modern ITU, the International Radiotelegraph Union, was established in 1906 at the first International Radiotelegraph Convention in Berlin.

- The conference was attended by representatives of 29 nations and culminated in the International Radiotelegraph Convention. An annex to the convention eventually became known as radio regulations. At the conference it was also decided that the Bureau of the International Telegraph Union would also act as the conference's central administrator.

The International Telecommunication Union (ITU)

- Between 3 September and 10 December 1932, a joint conference of the International Telegraph Union and the International Radiotelegraph Union convened in order to merge the two organizations into a single entity, the International Telecommunication Union.

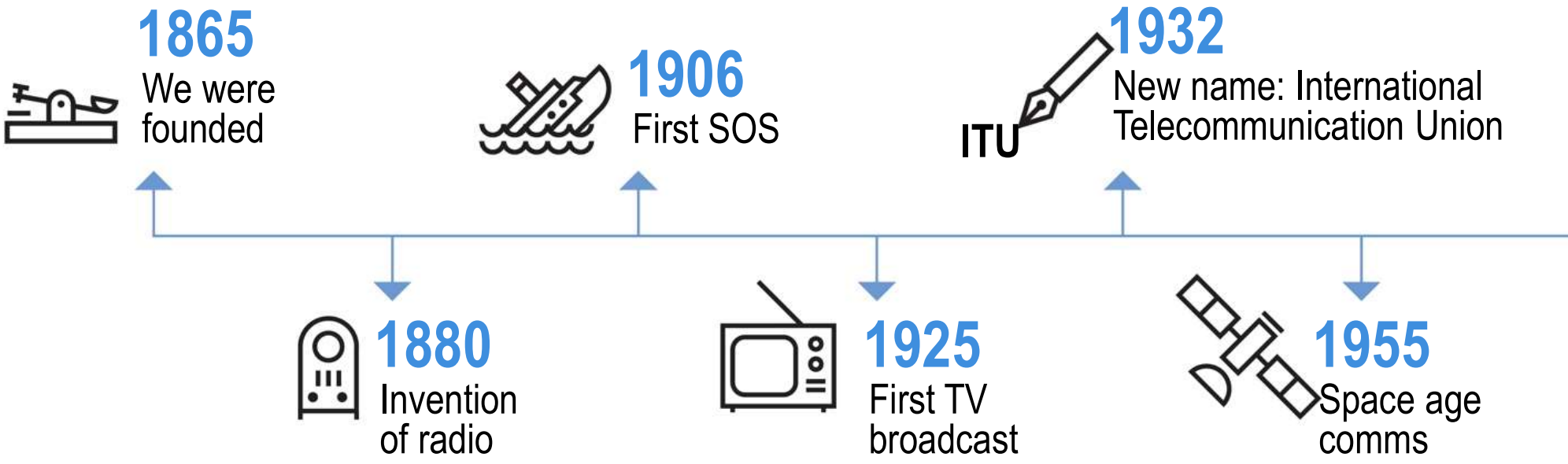
- The Conference decided that the Telegraph Convention of 1875 and the Radiotelegraph Convention of 1927 were to be combined into a single convention, the International Telecommunication Convention, embracing the three fields of telegraphy, telephony and radio.

- On 15 November 1947, an agreement between ITU and the newly created United Nations recognized the ITU as the specialized agency for global telecommunications. This agreement entered into force on **1 January 1949**, officially making the ITU as the specialized agency of the United Nation for Telecommuniction

- **With the passage of time ITU has now become UN specialized agency for Information Communication Technologies (ICTs)**

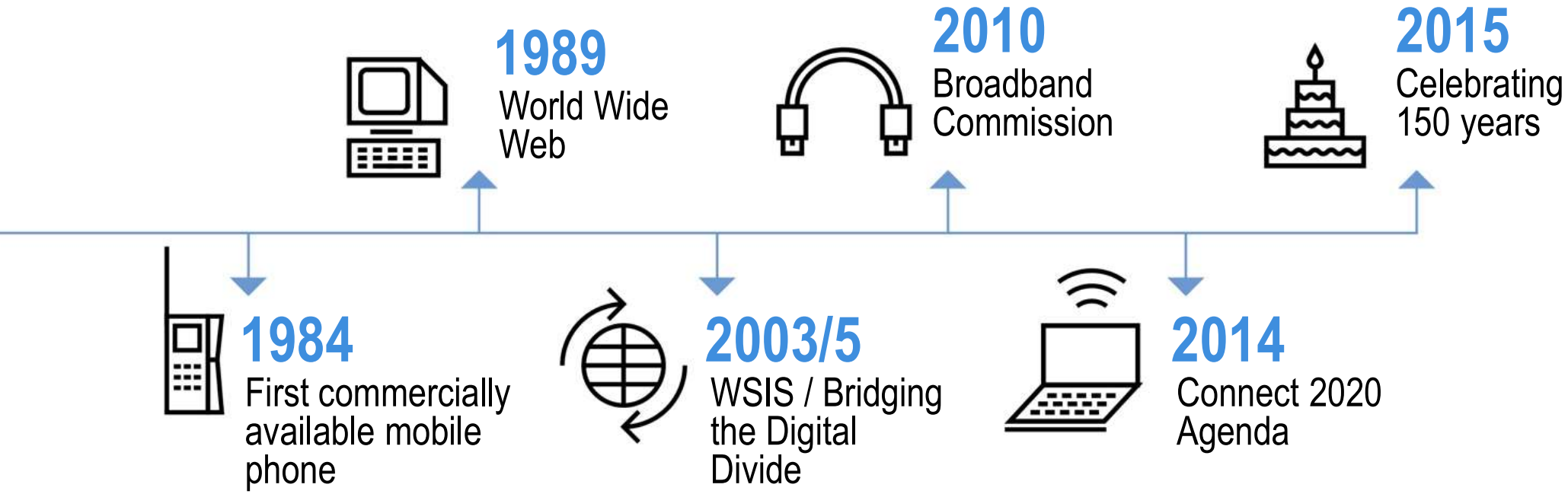
ITU at a glance: How we got here

Timeline



ITU at a glance: How we got here

Timeline



ITU: Current Structure

Meet us

What we do

'Committed to Connecting the World'

3 Sectors

193 MEMBER STATES

+700 INDUSTRY & INTERNATIONAL ORGANIZATIONS

+150 ACADEMIA MEMBERS

ITU Radiocommunication

Coordinating radio-frequency spectrum and **assigning** orbital slots for satellites

ITU Standardization

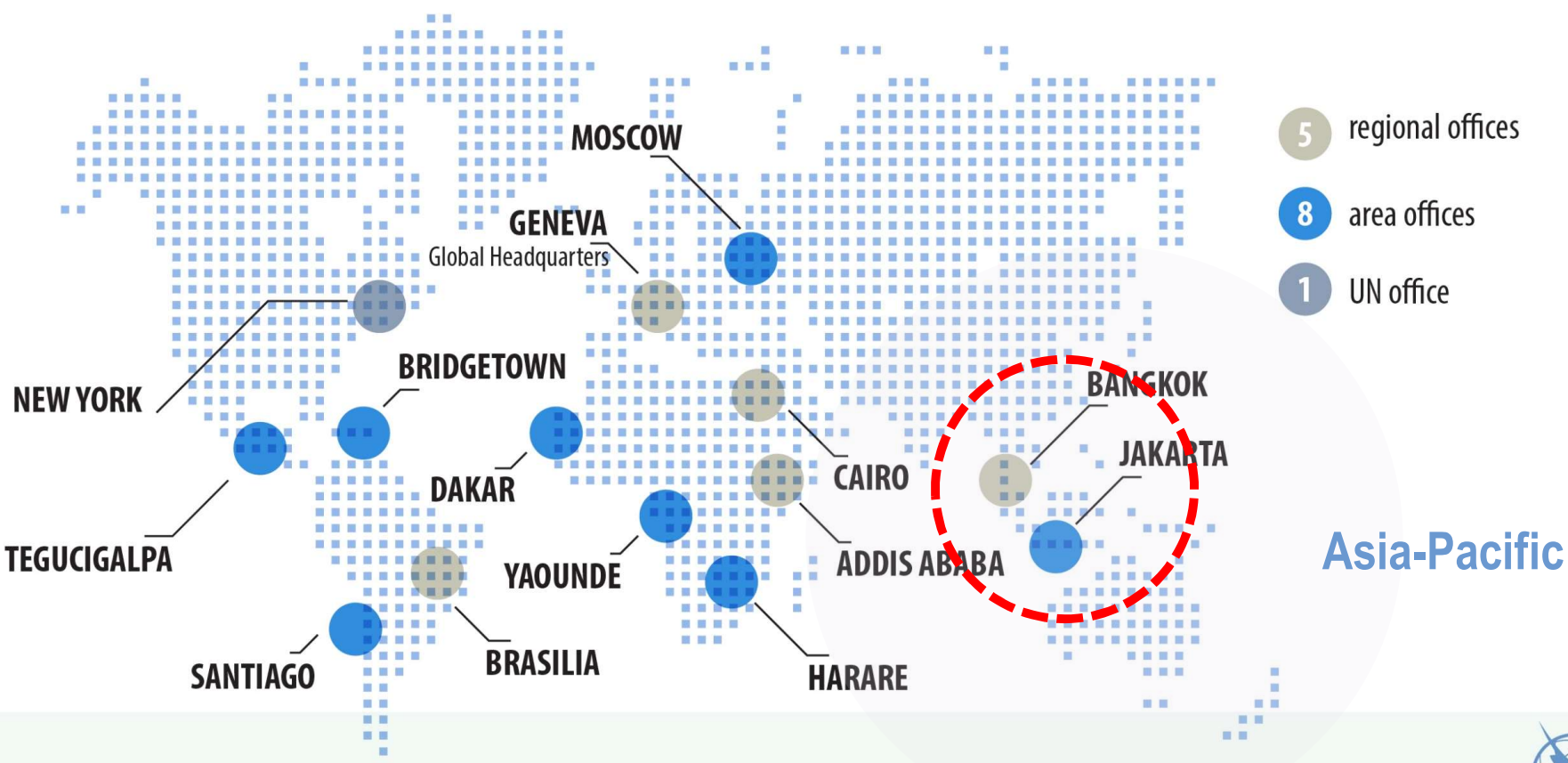
Establishing global standards

ITU Development

Bridging the digital divide

MEMBERSHIP

ITU at a glance: How we got here

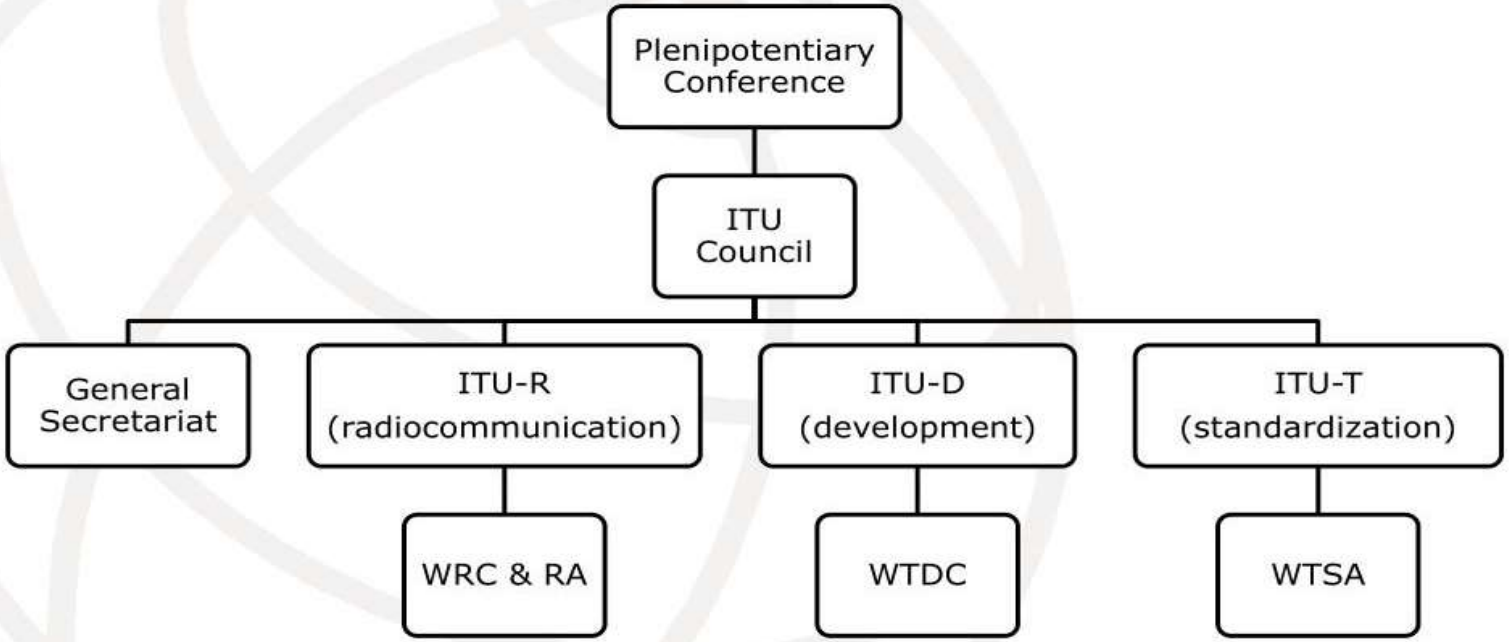


Digital transformation is key to accelerate our progress towards SDGs..

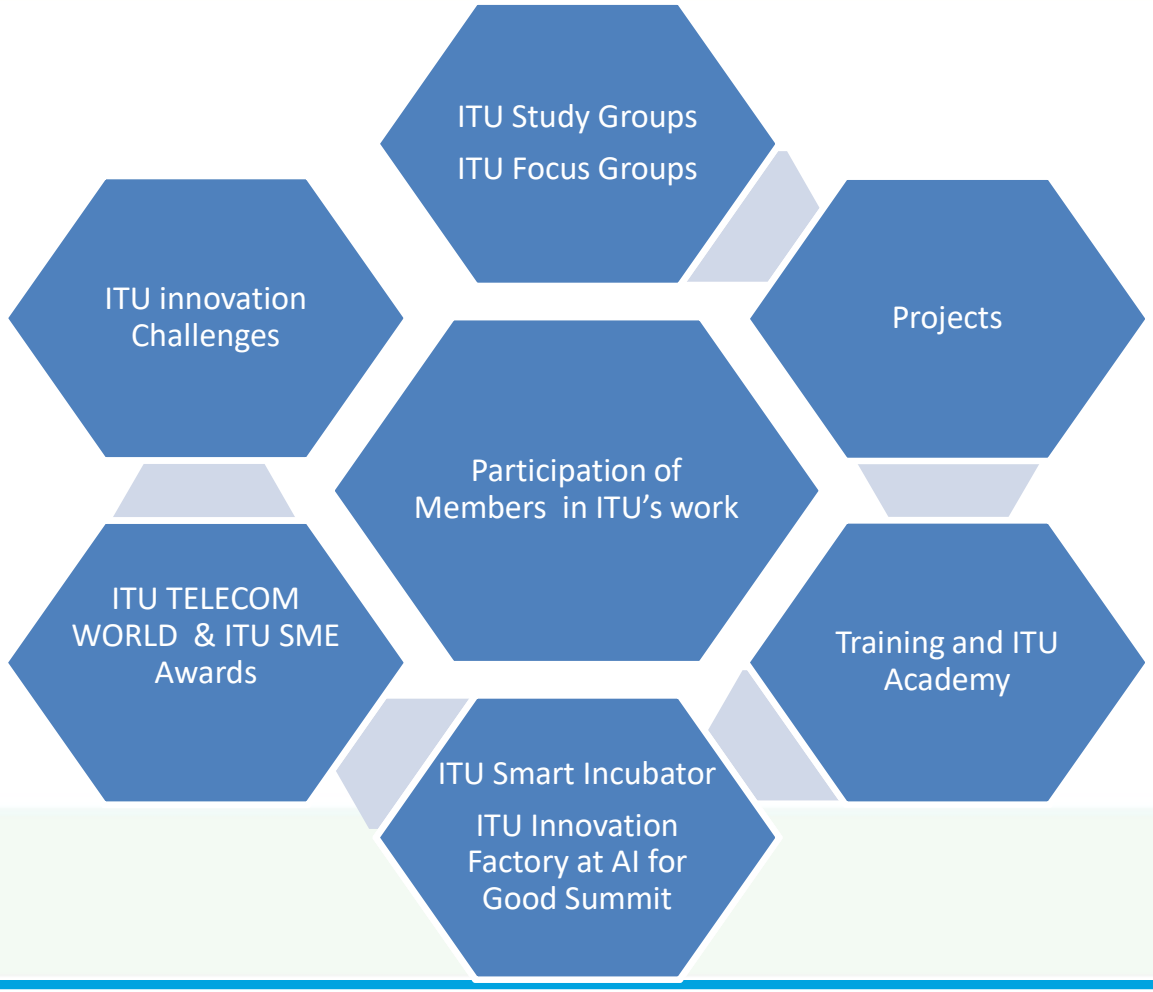
17 Sustainable Development Goals

169 Targets

ITU Structure and organization



Participation of in ITU's work



ITU Study Groups

Radiocommunication:

Manages **radio-frequency spectrum** and **satellite orbits**, ensures interference free operations of **radiocommunication systems**

6 Study Groups dealing with **231 Questions**

Standardization:

Produces **standards** and defines **tariff principles** for international telecommunication services

11 Study Groups dealing with **155 Questions**

Development:

Facilitates the **creation, development and improvement** of telecommunication and ICT

2 Study Groups dealing with **17 Questions**

Subjects of the Study Groups

- **ITU-R** study groups address issues including the efficient management and use of the radio-frequency spectrum and orbit resources, radio systems' characteristics and performance, spectrum monitoring, emergency radiocommunications for public protection and disaster relief, interference-free radiocommunications, radio and TV broadcasting, and new radio technologies.

- **ITU-T** study groups address operational aspects of ICT service provision; economic and policy issues; environment and circular economy; broadband cable and TV; conformance and interoperability; protocols and test specifications; performance, quality of service and quality of experience (QoS/QoE); future networks and cloud; transport, access and home networks; multimedia, accessibility and e-health; content delivery platforms; security; the Internet of Things; and smart cities.

- **ITU-D** study groups address the enabling environment for ICT development, considering factors including policy and regulatory frameworks and related national strategies. They also study ICT services and applications with potential to support sustainable development.

Main Objectives of the Study Groups

- **ITU-R and ITU-T** study groups both develop international technical standards known as ITU Recommendations.
- Conformance with these standards is voluntary unless such conformance is mandated by national law or regulations, or the Radio Regulations.
- **ITU-D** study groups offer a platform for ITU members to share experiences, exchange views and build consensus on appropriate strategies to address ICT development priorities, guiding associated policies, strategies, projects and ICT initiatives in ITU Member States

ITU-R Study Groups

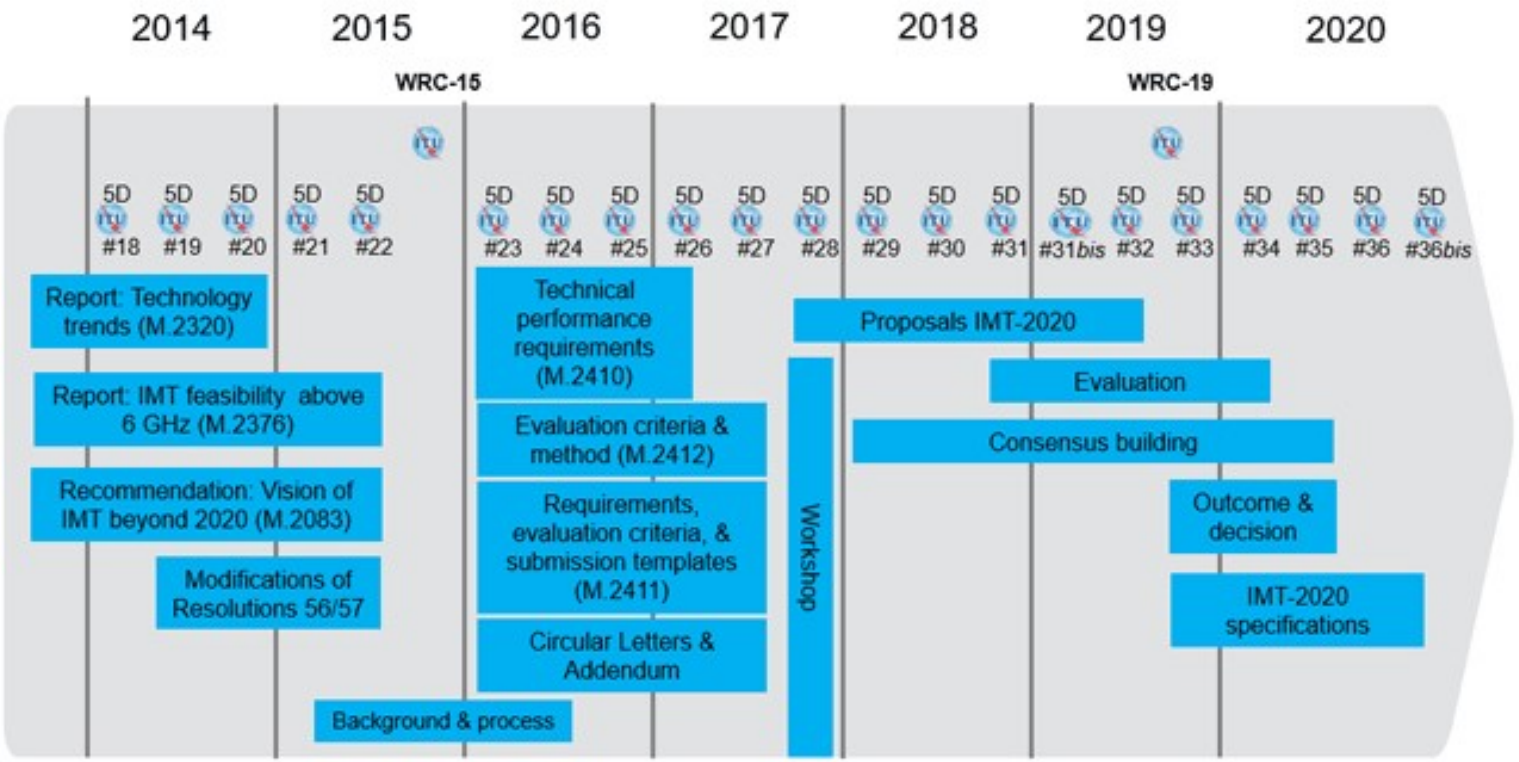
- **SG 1:Spectrum management**
- **SG 3:Radiowave propagation**
- **SG 4:Satellite services**
- **SG 5:Terrestrial services**
- **SG 6: Broadcasting service**
- **SG 7:Science services**

https://www.itu.int/en/ITU-R/study-groups/Pages/default.aspx

ITU-R Recommendations

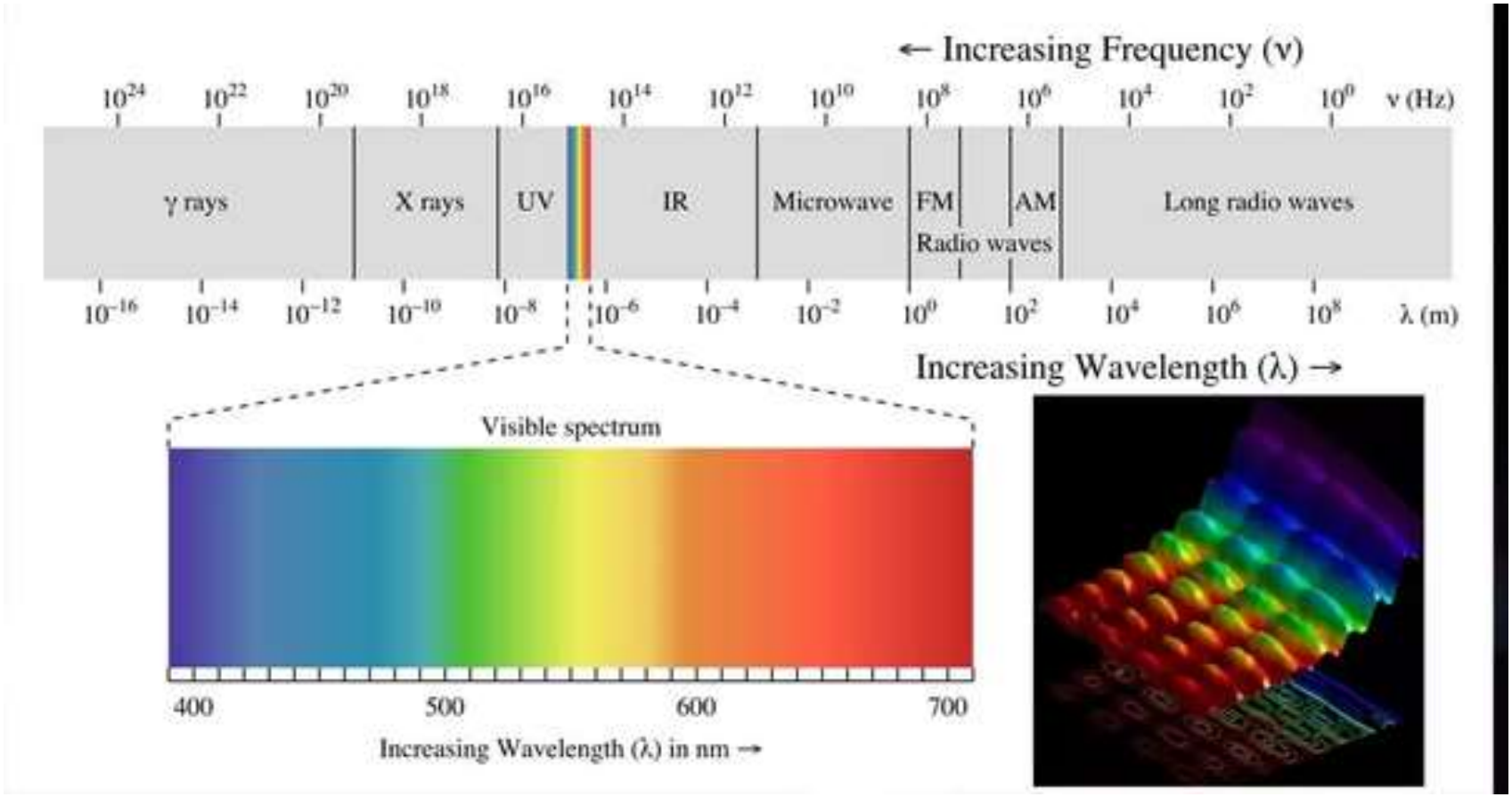
BO	Satellite delivery
BR	Recording for production, archival and play-out; film for television
BS	Broadcasting service (sound)
BT	Broadcasting service (television)
F	Fixed service
M	Mobile, radiodetermination, amateur and related satellite services
P	Radiowave propagation
RA	Radio astronomy
RS	Remote sensing systems
S	Fixed-satellite service
SA	Space applications and meteorology
SF	Frequency sharing and coordination between fixed-satellite and fixed service systems
SM	Spectrum management
SNG	Satellite news gathering
TF	Time signals and frequency standards emissions
V	Vocabulary and related subjects

WP 5D timeline for IMT-2020
Detailed specifications for the terrestrial radio interfaces



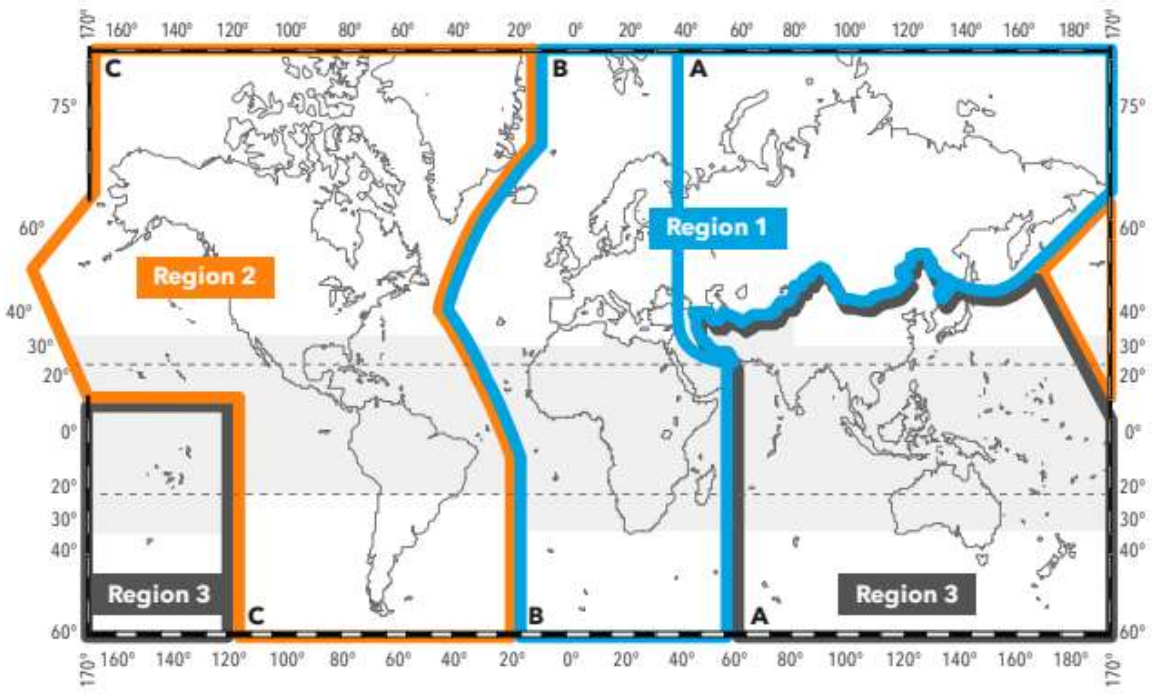
Note: Meeting #36bis is a focused meeting (technology) for finalization of Step 8 of the IMT-2020 process and completing draft new Recommendation ITU-R M.[IMT-2020.SPECS]

Electromagnetic Spectrum



https://www.quora.com/What-is-the-difference-between-infrared-light-ultraviolet-light-and-visible-light

Worldwide or Regional Spectrum Harmonization



Benefits :

- Reduces the potential for **harmful interference**
- Enables interoperability and **international roaming**, allowing citizens to use the same device in different countries
- Increases economies of scale, thereby enabling **affordable devices and services**
- Supports **emergency communications**

World Radiocommunication Conferences (WRCs)

Update the Radio Regulations, the **international treaty** on the **use of radio spectrum and satellite orbits**

Brings together all stakeholders in a process that is aimed at **building consensus**

- Provides a **stable** and **predictable regulatory environment** needed **for future investments**
- Enables **new radiocommunication systems** and **applications** to **access the radio spectrum**
- Protected the operation of **existing radiocommunication services**
- Ensured the **rational, equitable, efficient and economical use** of the **radio-frequency spectrum and satellite-orbit resources**

The 11 ITU-T Study Groups

SG2 - Operational aspects

SG3 - Economic and policy issues

SG5 - Environment and circular economy

SG9 - Broadband cable and TV

SG11 - Protocols and test specifications

SG12 - Performance, QoS and QoE

SG13 - Future networks (& cloud)

- **SG15 - Transport, access and home**
- **SG16 – Multimedia**
- **SG17 – Security**
- **SG20 - IoT, smart cities & communities**

Reference: https://www.itu.int/en/ITU-T/studygroups/2017-2020/Pages/default.aspx

Series of ITU-T Recommendations

- A : Organization of the work of ITU-T
- D : Tariff and accounting principles and international telecommunication/ICT economic and policy issues
- E : Overall network operation, telephone service, service operation and human factors
- F : Non-telephone telecommunication services
- G : Transmission systems and media, digital systems and networks
- H : Audiovisual and multimedia systems
- I : Integrated services digital network
- J : Cable networks and transmission of television, sound programme and other multimedia signals
- K : Protection against interference
- L : Environment and ICTs, climate change, e-waste, energy efficiency; construction, installation and protection of cables and other elements of outside plant
- M : Telecommunication management, including TMN and network maintenance

Series of ITU-T Recommendations

- N : Maintenance: international sound programme and television-transmission circuits
- O : Specifications of measuring equipment
- P : Telephone transmission quality, telephone installations, local line networks
- Q : Switching and signalling, and associated measurements and tests
- R : Telegraph transmission
- S : Telegraph services terminal equipment
- T : Terminals for telematic services
- U : Telegraph switching
- V : Data communication over the telephone network
- X : Data networks, open system communications and security
- Y : Global information infrastructure, Internet protocol aspects, next-generation networks, Internet of Things and smart cities
- Z : Languages and general software aspects for telecommunication systems

Example: ITU-T Study Group and Recommendations

ITU-T Study Group 20: Internet of things (IoT) and smart cities and

Responsible for studies relating to IoT and its applications, and smart cities and communities (SC&C).

It includes studies relating to Big data aspects of IoT and SC&C, e-services and smart services for SC&C

Lead study group on

- Internet of things (IoT) and its applications
- Smart Cities and Communities (SC&C), including its e-services and smart services
- IoT identification

ITU-T SG20 Structure

WP1/20	Questions
Q1/20	End to end connectivity, networks, interoperability, infrastructures and Big Data aspects related to IoT and SC&C
Q2/20	Requirements, capabilities, and use cases across verticals
Q3/20	Architectures, management, protocols and Quality of Service
Q4/20	e/Smart services, applications and supporting platforms
WP2/20	
Q5/20	Research and emerging technologies, terminology and definitions
Q6/20	Security, privacy, trust and identification
Q7/20	Evaluation and assessment of Smart Sustainable Cities and Communities

Some ITU-T Y series Recommendations

- Y.1000-Y.1999: Internet Protocol aspects
- Y.3500-Y.3599: Cloud Computing
- Y.3000-Y.3699: Big Data
- Y.4000-Y.4999: Internet of Things and smart cities and Communities

https://www.itu.int/en/ITU-T/publications/Pages/recs.aspx

ITU-D Study Groups

- SG1: Enabling environment for the development of telecommunications/ICTs

- SG2: ICT services and applications for the promotion of sustainable development

"Meaningful Connectivity
for
Digital Transformation"

ITU-D: Thematic Areas

- Networks and Digital Infrastructure
- Policy and Regulations
- Digital Services and Applications
- Digital Innovation Ecosystem
- Emergency Communication
- Cybersecurity
- Capacity Building
- Digital Inclusion
- Statistics
- Environment

Partnerships

- Impact Partnerships Overview
- Be He@lthy Be Mobile
- Big Data for Measuring the Information Society
- Connecting Every School to the Internet (GIGA)
- Decent Jobs and Skills for Youth
- Boosting decent jobs and enhancing skills for youth in Africa's digital economy
- Digital cooperation webinars
- Digital Transformation Centres (DTC) Initiative

Partnerships

- E-Waste Coalition
- Financial Inclusion Global Initiative (FIGI)
- Girls Can Code Initiative (GCC)
- Global Partnership for Gender Equality in the Digital Age (EQUALS)
- International Center of Digital Innovation (I-CODI)
- Partnership on Measuring ICT for Development
- Policy and Regulation Initiative for Digital Africa (PRIDA)
- Smart Villages

ITU in Asia-Pacific

Digital Inclusion and Capacity Development

ITU Asia-Pacific Region

Who are we?

38 Member States

74 ITU-D Sector Members and Associates

47 Academia

Least Developed Countries (12)

Afghanistan
Bangladesh
Bhutan
Cambodia
Lao, PDR
Nepal
Myanmar
Timor Leste

Small Islands Developing States (12)

Kiribati
Solomon Is.
Tuvalu
Vanuatu
Fiji
Maldives
Marshall Islands
Micronesia
Nauru
Tonga
PNG
Samoa

Land Locked Developing Countries (5)

Mongolia
Nepal
Afghanistan
Bhutan
Lao, PDR

Low-Income States (10)

D.P.R. Korea
India
Indonesia
Mongolia
Pakistan
Philippines
Sri Lanka
Vietnam
Myanmar
Cambodia

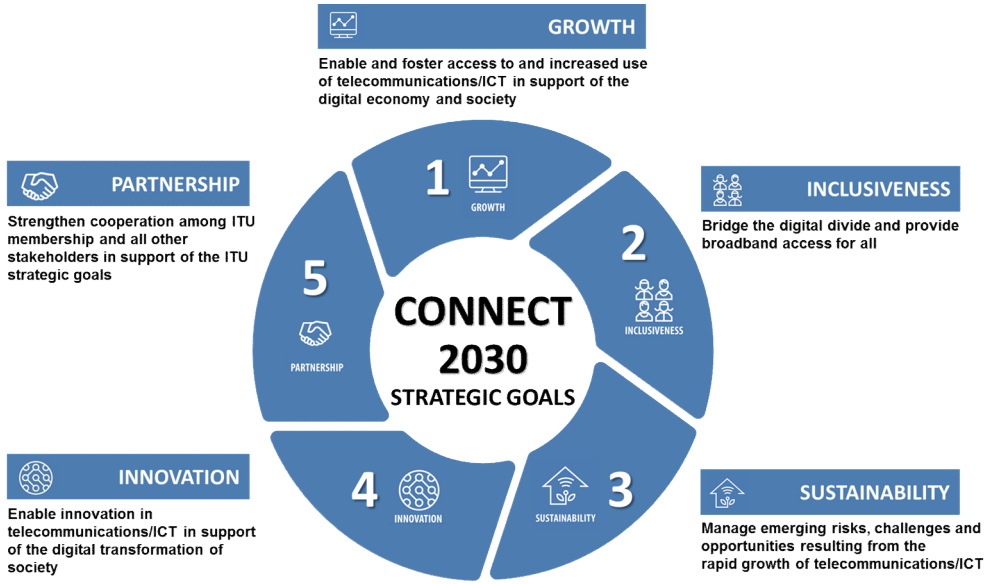
The Rest (10)

Australia
Brunei
China/Hong Kong
Iran
Japan
Malaysia
New Zealand
R.O. Korea
Singapore
Thailand

6 out of 10 of ASEAN countries are amongst the LDCs, LLDCs and low-income states

ITU and the SDGs: ITU Strategic Goals & Connect 2030 Agenda

Our Strategy



.. aligned to accelerate digital transformation and realize and inclusive digital society

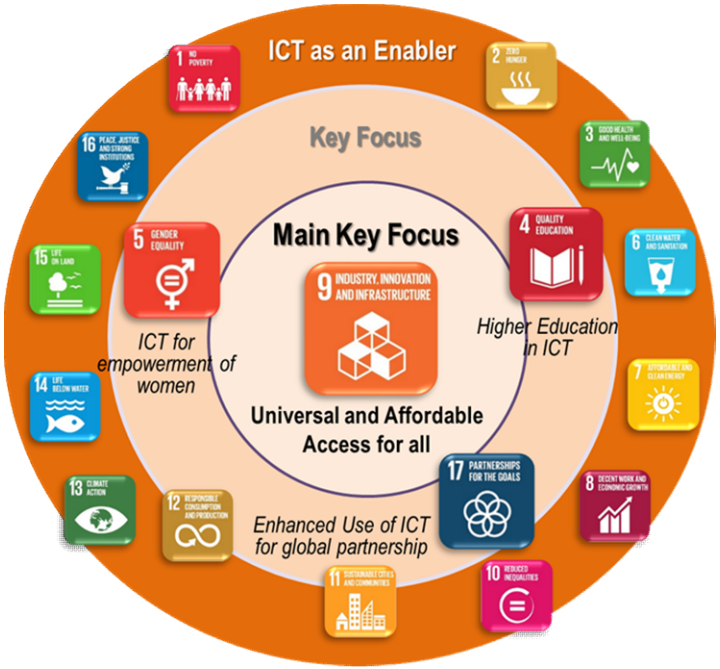
- International cooperation and agreement on telecom/ICTs
- Modern and secure telecommunication/ ICT Infrastructure
- Enabling environment
- Inclusive digital society

4 GLOBAL PRIORITIES

5 REGIONAL PRIORITIES

- ASP RI 1 Addressing special needs of LDCs, SIDS (incl. PIC), LLDCs
- ASP RI 2 Digital economy and inclusive digital society
- ASP RI 3 Digital infrastructure
- ASP RI 4 Policy & Regulation
- ASP RI 5 Security & Resilience

ITU and the SDGs: We need to accelerate our efforts



"The report demonstrates that progress is being made in some critical areas … Notwithstanding that progress, this report identifies many areas that need urgent collective attention"

- Coverage of mobile-cellular signals and mobile-broadband Internet has expanded rapidly
- 96 per cent of the world's population lived within reach of a mobile-cellular signal
- 90 per cent of people could access the Internet through a third generation (3G) or higher-quality network.
- Not all are able to take advantage of them.
- The cost remains too high for disadvantaged and at-risk population groups.

Broadband services are still not affordable in developing countries

Advocacy Targets | *Broadband is vital for achieving Sustainable Development Goals (SDGs)*

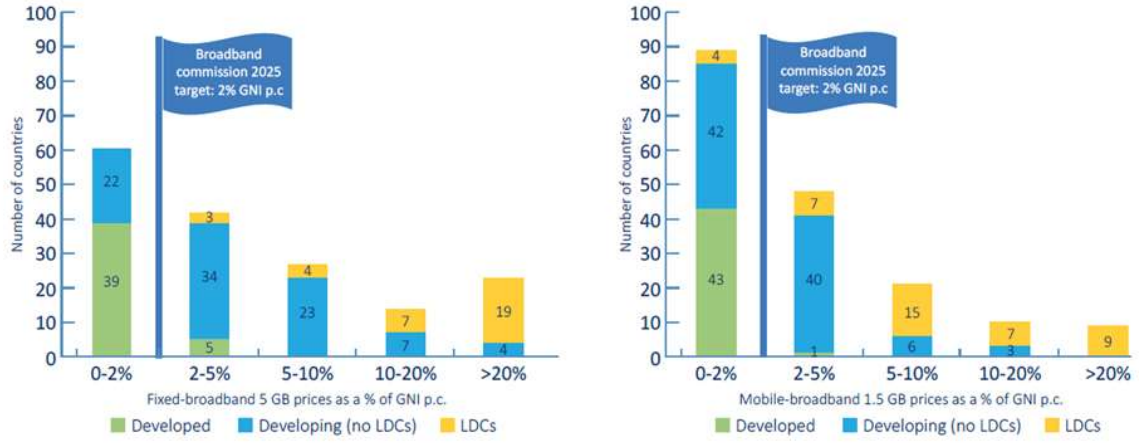
1 **Availability**

2 **Affordability**

3 **Gender**

Broadband still expensive in LDCs

Broadband prices as a percentage of GNI p.c., 2019



- By 2025 that entry-level broadband services should correspond to less than 2 per cent of monthly (GNI) per capita.
- Affordability remains a challenge in many countries, especially LDCs.

BROADBAND COMMISSION FOR SUSTAINABLE DEVELOPMENT

Collaboration with India

E-Waste
- Face to face awareness workshop on E-waste (2019)

Network and infrastructure
- Assessment of Common Service Centre (2013)
- Next Generation Networks assessment : Case Study 2013

Emergency Communication
- Case studies on Emergency communication for marginalized communities 2015

Policy and Regulation
- Regulators' Roundtable and ITP (2014 , 2017)
- Consumer Protection and Quality of Service

Digital Services
- Block chain Training for NITI (2020)
- Digital Financial Services Training for NITI (2019)

Digital Inclusion
- ICT for empowerment of women , 2014

Regional Forums

- Online web Dialogue "Digital Transformation for Digital Economies @COVID-19 South Asia" (2020)
- Host for ITU WTSA (2020)
- Digital Skills Capacity Building Training (2019)
- ITU-TRAI Training on Emerging Trends in Broadcasting, (2019)
- Regulators' Roundtable and International Training Program (2017)
- Financial Inclusion Global initiative (FIGI) Symposia (2017)
- Smart Sustainable Cities (2015)
- ITU-T Focus Group Bridging the Gap :Innovations to Standards 2013

- Council Member
- ITU South Asia, Area Office and Innovation Centre
- ITU COE (ALTTC)

ASP COE Trainings (2019)

Capacity building (2019)

- Non CoE
  - Digital Skills
  - Emerging Trends in Broadcasting
- CoE
  - Faculty of ICT, Ministry of ICT, Iran (2007-2014), ALTTC (2015-2018), ALTTC and IOT Academy (Iran) (2019-2022)

- 10 trainings (8 ALTTC, 2 IOT Academy), 250 participants

	Training topics (face to face)	CoE	Dates	Venue	Training fees	Number
1	Evolution and Emerging Trends of Broadband Access Technologies	ALTTC	20-24 May	Ghaziabad, India	275	19
2	Information Security Internal Audit	ALTTC	27-31 May	Ghaziabad, India	275	60
3	Broadband Network Security: Issues & Challenges	ALTTC	26-30 Aug	Ghaziabad, India	275	10
4	Cyber Security for Enterprises	ALTTC	10-15 Oct	Ghaziabad, India	275	18
5	IoT applications and IoT Security Aspects (report awaited)	ALTTC	9-13 Dec	Ghaziabad, India	275	30
6	Cyber Network Defense and Cyber Laws	ALTTC	16-20 Dec	Ghaziabad, India	275	15
	Online Trainings	CoE	Dates	Training fees	Number	
1	IOT Security Challenges and Solutions	IOT Academy	26 Aug-6 Sep	125	59	
2	Next Generation Broadband Network: Design, Implementation and Applications	ALTTC	25 Nov - 20 Dec	100	5	
3	IOT: Technologies aspects and implementation	ALTTC	16-27 Dec	100	1	
4	Building IOT Solutions for Energy and Water Resource Management*	IOT Academy	16-27 Dec	125	42	
					107	

THANK YOU

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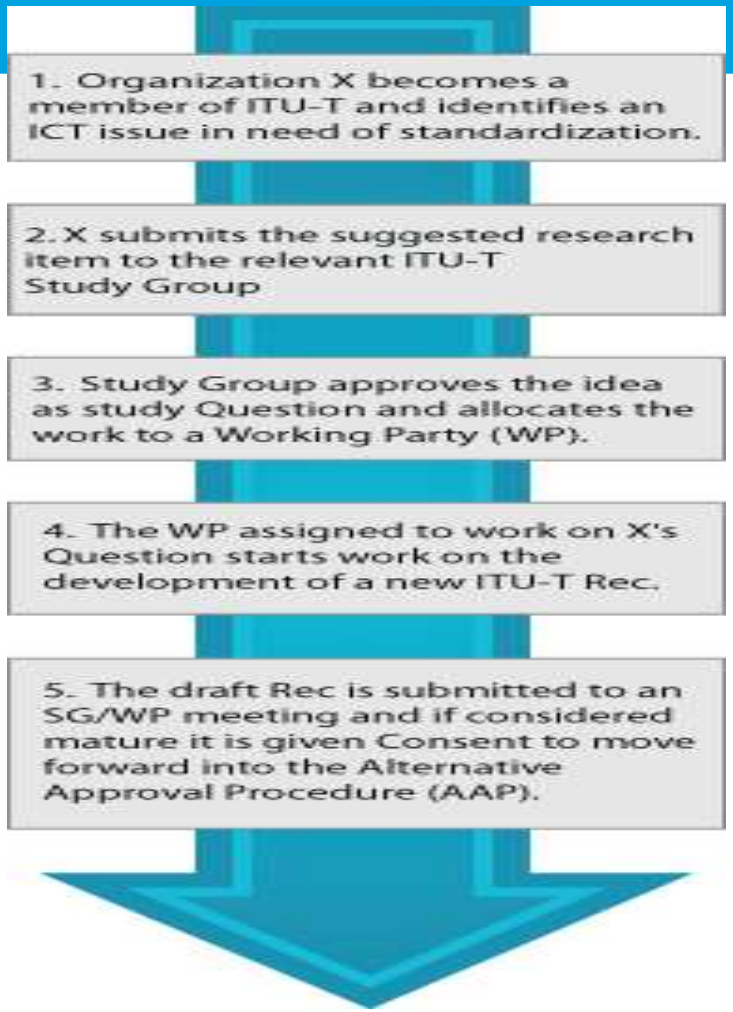
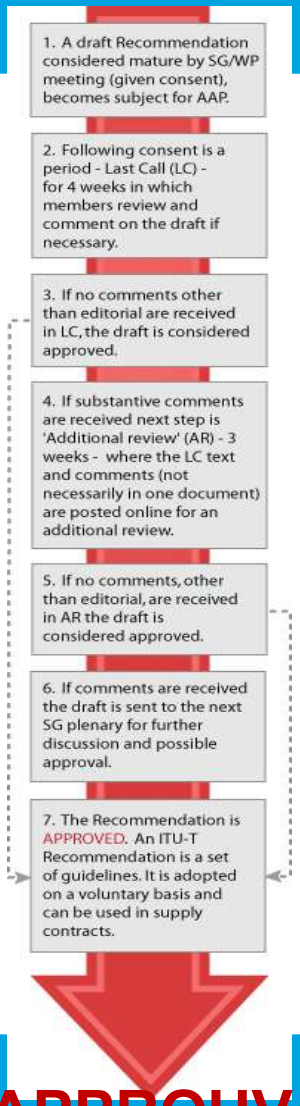
THE ITU-T STANDARDIZATION PROCESS



ITU-T STANDARDS ELABORATION PROCESS



ITU-T STANDARDS APPROUVAL PROCESS