MAPPING AND VISUALIZATION STRATEGIES FOR THE ASSESSMENT OF CONNECTIVITY

ITU Workshop on Performance, Quality of Service and Quality of Experience

Yvonne Umutoni:

Co-Rapporteur of Q12/12 on Operational aspects of telecommunication network service quality

Bhubaneswar India , 4 – 5 December 2025

INTRODUCTION

- **E.813** provides a high-level framework for mapping and visualizing telecom connectivity.
- Supports identifying unserved and underserved areas to address the digital divide.
- Emphasizes connectivity as a multidimensional concept, not just service availability.
- Guides how to define and measure connectivity levels consistently.
- Outlines tools and visualization methods to represent connectivity status clearly.

WHAT IS CONNECTIVITY?

- **Connectivity:** Two-way access to telecommunication services related to performance and usability, as per E.813.
- **Connectivity Index:** A scalar level that represents the overall degree of connectivity, evaluated at a particular time and applicable for a specific duration and geographical area.
- **Mapping:** process of illustrating values or parameters in a geographic information system (GIS).

CONNECTIVITY DIMENSIONS

Technical

Telecom Infrastructure Access:

- Refers to the foundational elements required for telecom connectivity.

e.g: Telecom towers/masts, electricity availability, backhaul capacity (fibre or Microwave links).

Network Coverage:

-Mobile Networks: Signal Strength (RxLev for GSM, RSCP for UMTS, RSRP for LTE and SS-RSRP for NR 5G.

-Fixed wired connections (e.g.: fibre optic connection availability.

Performance /Quality of service:

- Data Internet: Download/Upload throughput, packet loss, jitter and latency.

- Voice service: Unsuccessful call ratio, dropped call ratio, call setup time, Voice MOS and Video MOS.

QoS impacts directly the user satisfaction.

Non-Technical

Affordability: e.g.:

- Reflects the cost of telecom services and devices relative to household income.

- High price of service or smartphone reduces adoption, even where infrastructure and coverage exist. A key factor toward the connectivity

Telecom Market trends & Consumer behaviour factors:

- Smartphone penetration
- Internet access penetration (fixed and mobile).
- QoS perceived by consumers (based on complaints)
- Sensitivity to tariff.: e.g: mobile / fixed internet prices

Social-Economic factors:

- Includes education level, digital skills, age distribution, language.
- Education level or digital literacy barriers affect the Usage gap (ability to use available services).

CONNECTIVITY INDEX ASSESSMENT

Practical Use cases

Accelerating Infrastructure Deployment

- Helps identify underserved and unserved areas, especially in rural and remote communities.
- Supports targeted interventions to reduce the digital divide and ensure equitable access

Resolving QoS Issues

- Highlights geographic areas with service deficiencies or inconsistent performance.
- Guides operators and regulators on where performance improvements are most needed.

CONNECTIVITY INDEX ASSESSMENT (Cont..)

Practical Use cases

Enhancing Transparency and Governance

- Helps identify coverage gaps, guide investment decisions, and shape future policy.
- Enables prioritization of regions or dimensions (e.g., skills, data and or device affordability) to improve overall connectivity

Empowering End-User Choice

- Provides users with transparent, comparable information on service availability and performance.
- Helps consumers make better-informed decisions beyond price alone.
- Strengthens user awareness of network and service quality.

Thank you for your attention