

ITU Workshop on Telecommunication Service Quality

Collaborative Regulatory Efforts to Enhance QoS and QoE

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Linvigstone, Zambia, 12 May 2026

Regulatory Framework

Standards

- ITU –International Telecommunication Union
- ETSI – European Telecommunication Standardization Institute

Regulation

- Telecommunications - Lei nº 4/2016
- QoS Regulation – Decreto nº6/2011 de 3 de Maio
- Licence conditions

KPIs

- Objective
- Subjective

Measurement

- Drive test and OMCR

Enforcement

- Result Publication, Action Plans
- Penalties

Terça-feira, 3 de Maio de 2011

I SÉRIE — Número 17



BOLETIM DA REPÚBLICA

PUBLICAÇÃO OFICIAL DA REPÚBLICA DE MOÇAMBIQUE

5.º SUPLEMENTO

IMPRESA NACIONAL DE MOÇAMBIQUE, E.P.

AVISO

A matéria a publicar no «Boletim da República» deve ser remetida em cópia devidamente autenticada, uma por cada assunto, donde conste, além das indicações necessárias para esse efeito, o averbamento seguinte, assinado e autenticado: Para publicação no «Boletim da República».

SUMÁRIO

Conselho de Ministros:

Decreto n.º 8/2011:

Aprova o Regulamento sobre Qualidade de Serviços Públicos de Telecomunicações.

Decreto n.º 7/2011:

Cria o Conselho Nacional de Exames, Certificação e Equivalências, abreviadamente designado por CNECE.

Decreto n.º 8/2011:

Cria o Instituto de Educação Aberta e à Distância, abreviadamente designado por IEDA.

Art. 3. Compete ao Instituto Nacional das Comunicações de Moçambique (INCM) zelar pelo cumprimento do disposto no presente Decreto.

Art. 4. O presente Decreto entra em vigor 180 dias após a sua publicação.

Aprovado pelo Conselho de Ministros, aos 25 de Janeiro de 2011.

Publique-se.

O Primeiro-Ministro, Aires Bonifácio Baptista Ali.

Regulamento sobre Qualidade de Serviços Públicos de Telecomunicações

CAPÍTULO I

Disposições Gerais

ARTIGO 1

Objecto

O presente Regulamento estabelece o regime jurídico aplicável aos níveis de qualidade de serviço praticados pelos operadores e prestadores de serviços públicos de telecomunicações e define os parâmetros e as metas de qualidade para cada serviço no âmbito do presente Regulamento.

Services applied

Technical



Fixed



Mobile



Internet



Interconnection

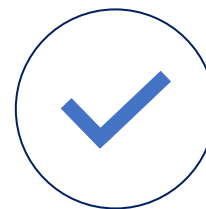


Broadband

Non Technical



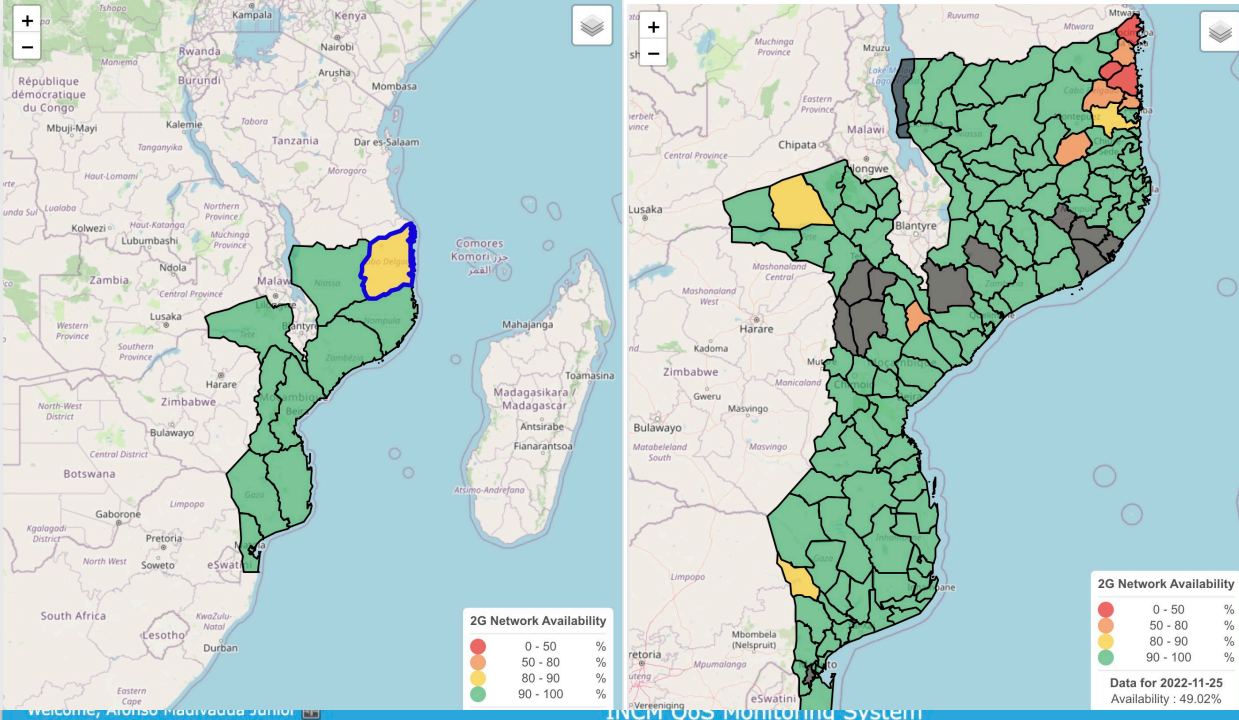
CONSUMER
SATISFACTION



CUSTOMER CARE



BILLING COMPLAINS



Welcome, **Atouso Mavivada Junior**

INEM QoS Monitoring System

Applications
RPM System

Documentation
List

Administration
Applications
Backup/Restore
CAS configuration
Monitoring
Theme
Users

My account

Customer Support

Logout

MOVITEL Gateway

VODACOM Gateway

TMCEL Gateway



Measurement Tools

Continuous monitoring :

- Collecting Pm files from operators Pm files 24h/7 days

Drive testing and walking tests

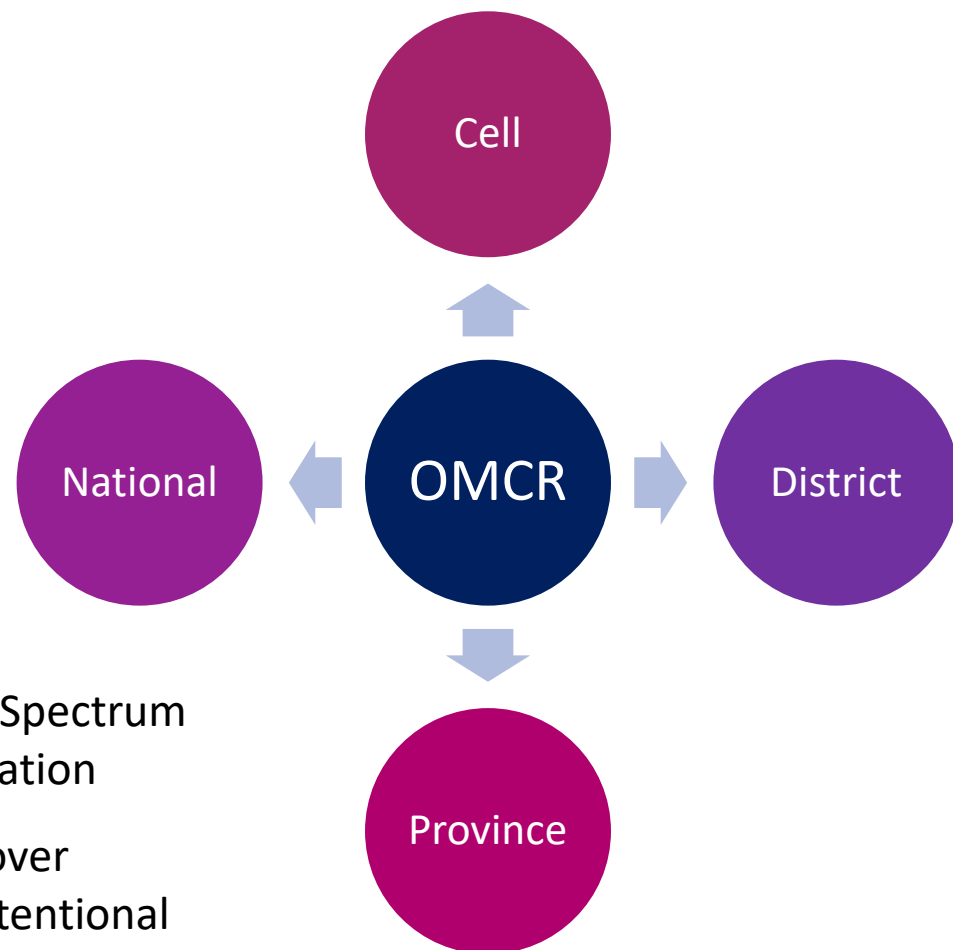
- Indoor and outdoor (voice, data and coverage)

Sampling Clusters



- Urban
- Rural
- Maputo city
- Capital cities
- Touristic areas
- Main roads
- Major events
- Border areas

Free Spectrum
Allocation
Spillover
Unintentional
Roaming

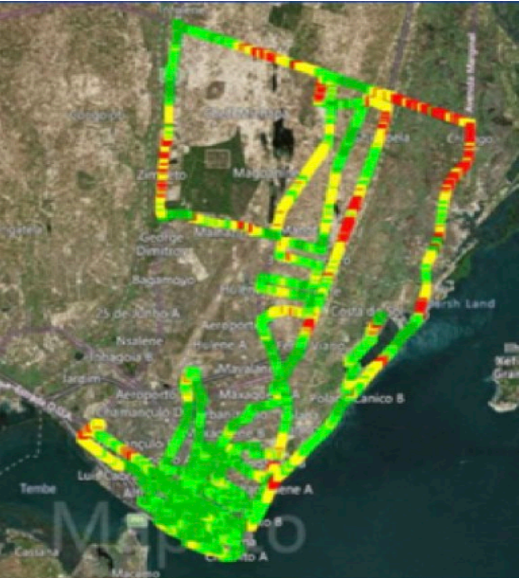


KPIs

KPI		Threshold	
Availability		99%	
Call Setup Time	< 8 s	Download Speed – 3G	≥ 3 Mbps
Voice Quality	> 3.5	Download Speed – 4G	≥ 10 Mbps
Call Setup Success Rate	≥ 98%	Latency	3G: < 90 ms 4G: < 40 ms
Call Drop Rate	≤ 2%	Covarege	4G (≥ -105 dBm) 3G (≥ -95 dBm) 2G (≥ -85 dBm)

After the Results

Coverage Improvement



Challenges

Vandalism
Electricity / Power Supply
Fiber Optic Cable Cuts
Natural Disasters



4 ViewPoints of the QoS



INTERNATIONAL TELECOMMUNICATION UNION

ITU-T

TELECOMMUNICATION
STANDARDIZATION SECTOR
OF ITU

G.1000

(11/2001)

SERIES G: TRANSMISSION SYSTEMS AND MEDIA,
DIGITAL SYSTEMS AND NETWORKS

Quality of service and performance

**Communications quality of service: A
framework and definitions**

ITU-T Recommendation G.1000

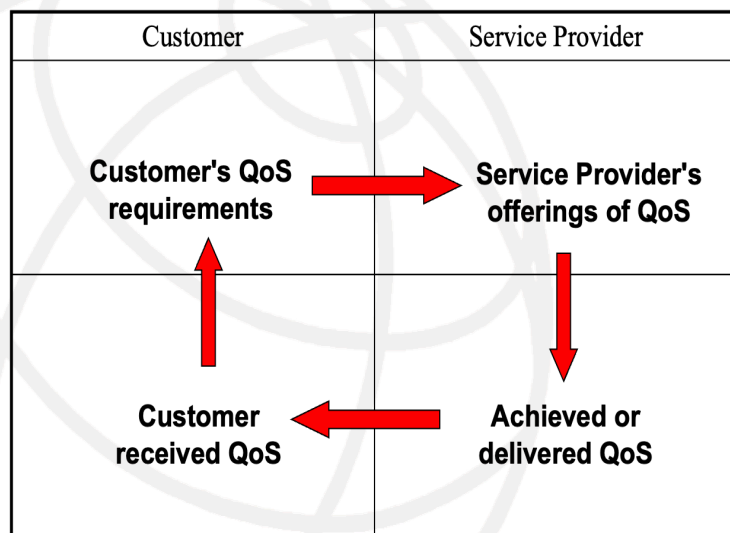
Key Insight

The recommendation emphasizes that effective QoS management happens when these four viewpoints become aligned or converge.

In practice:

- Users define expectations;
- Operators design and promise service levels;
- Networks deliver measurable performance;
- Customers judge the real experience.

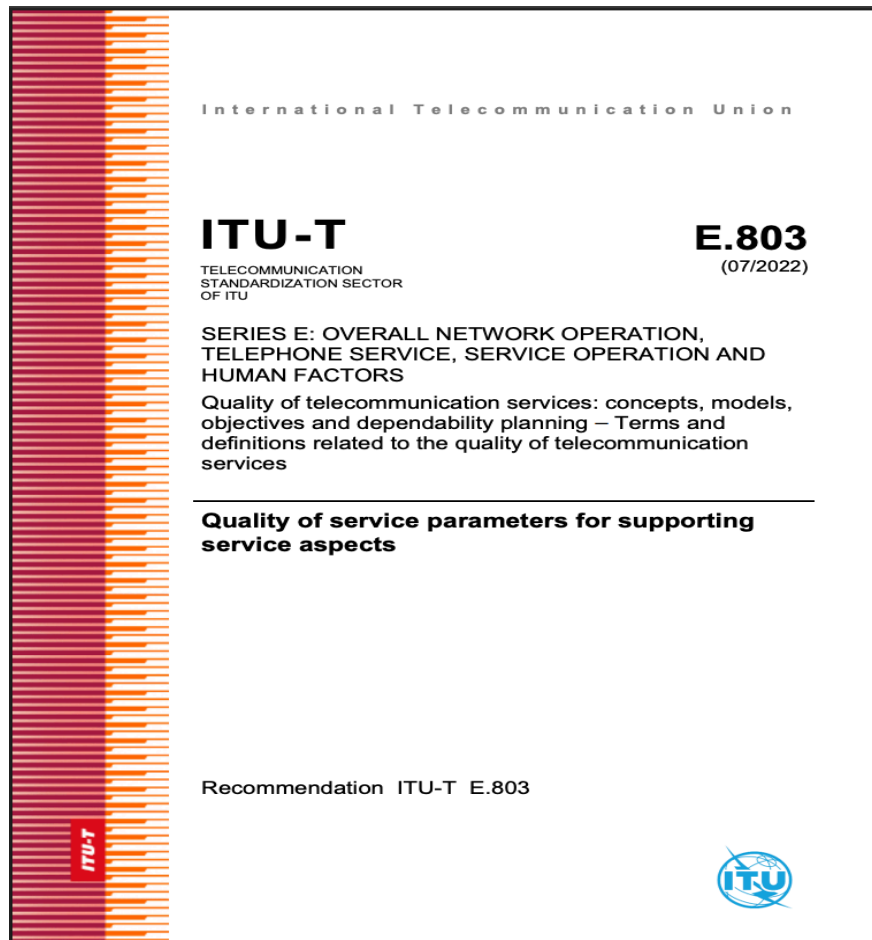
ITU-T Four Views QoS Perspective



ITU-T G.1000

Viewpoint	Description	Main Focus
1. Customer's QoS Requirements	Represents what users expect from the service in terms of reliability, speed, availability, and overall experience. These requirements are usually expressed in non-technical language.	User expectations and needs
2. QoS Offered by the Service Provider	Refers to the quality level the operator or provider promises to deliver, often through service plans, technical specifications, or SLAs.	Planned/targeted service quality
3. QoS Achieved or Delivered	Reflects the actual performance achieved by the network and delivered to users, measured through technical indicators and operational monitoring.	Real network performance
4. QoS Perceived by the Customer	Represents how users actually feel about the service experience, based on satisfaction, complaints, surveys, or real-life usage experience.	User perception and satisfaction

QoS in Non utilization Stage

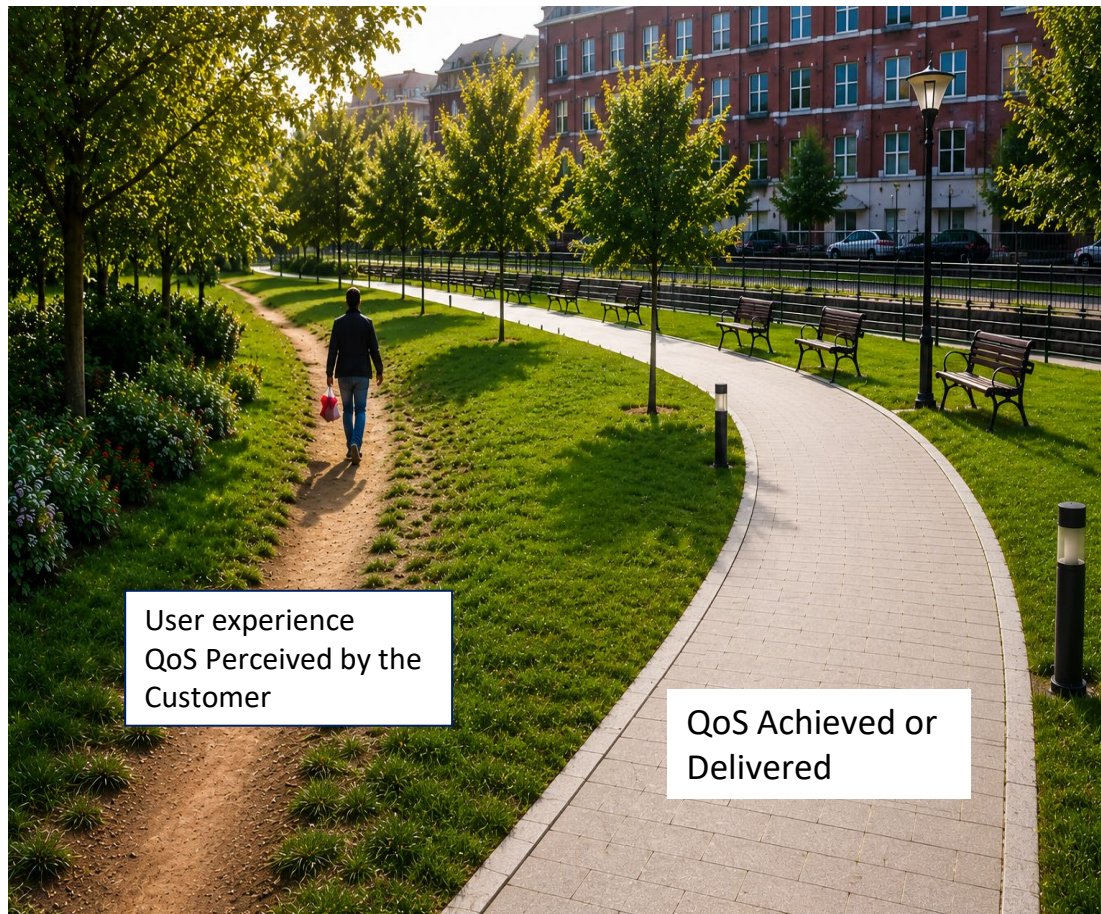


- **Modern Path = Planned Technical and Regulatory Design**
- The paved path represents:
- network planning,
- QoS targets,
- regulatory frameworks,
- investment plans,
- engineering assumptions.

However, ITU-T E.803 recognizes that service quality is broader than technical KPIs alone. The Recommendation explicitly highlights supporting service aspects such as:

- pricing transparency,
- complaint resolution,
- technical support accessibility,
- customer perception,
- commercial support efficiency,
- integrity of contractual information.
- This means:
- A technically compliant network may still fail from the customer's perspective.

What real matter?



- **Natural Path = Real User Experience (QoE)**
- The pedestrian walking on the informal dirt path symbolizes:
- the actual behaviour of users,
- perceived quality,
- real frustrations,
- adaptation to service shortcomings.

This path emerges because the planned system does not fully respond to:

- affordability concerns,
- outages,
- customer care inefficiencies,
- billing disputes,
- lack of trust,
- infrastructure failures.

ANSWER: USER EXPERIENCE

Collaborative Regulation

FROM USER EXPERIENCE TO SMART DESIGN

Stakeholder engagement aligns real needs with technical design to deliver better quality and satisfaction for all.

BEFORE: PERCEPTION GAP

- Fiber cuts
Frequent outages
- Power outages
Network downtime
- Theft & vandalism
Infrastructure damage
- Billing issues
Errors and disputes
- Price issues
Unaffordable for users
- Customer care issues
Slow or no resolution

Users take the informal path when their needs and expectations are not met.

STAKEHOLDER ENGAGEMENT

- Listen & Understand
Collect real insights from users, operators and other stakeholders
- Collaborate & Co-create
Align priorities and co-develop solutions
- Act & Communicate
Implement actions and keep stakeholders informed
- Monitor & Improve
Use data to evaluate results and drive continuous improvement

AFTER: IMPROVED EXPERIENCE

- Resilient network
Fewer outages
- Reliable power
Energy backup solutions
- Secure infrastructure
Protected assets
- Accurate billing
Transparent & fair
- Affordable pricing
Value for money
- Responsive support
Quick & effective care

When needs are met, users stay on the right path.



USERS
Share real experience
(Crowdsourcing)



REGULATOR
Analyzes data,
aligns interests and
sets the right rules



OPERATORS
Invest, optimize and
improve the network
and services



OUTCOME
Better quality,
higher satisfaction,
stronger trust



COLLABORATIVE REGULATION: Data-driven decisions. Shared responsibility. Better outcomes for everyone.

Operational & Infrastructure Dimension

Operators

- Network improvements
- Redundancy
- Resilience investments

Infrastructure Support & Public Services

Utilities & Municipalities

- Coordination on fiber protection
- Power reliability
- Infrastructure access

Regulatory & Governance Dimension

Regulator

- Evidence-based oversight
- Facilitation
- Coordination
- Accountability

User Experience & Community Engagement

Users and Communities

- Crowdsourcing feedback
- Reporting faults
- Identifying real pain points

STAKEHOLDER ENGAGEMENT

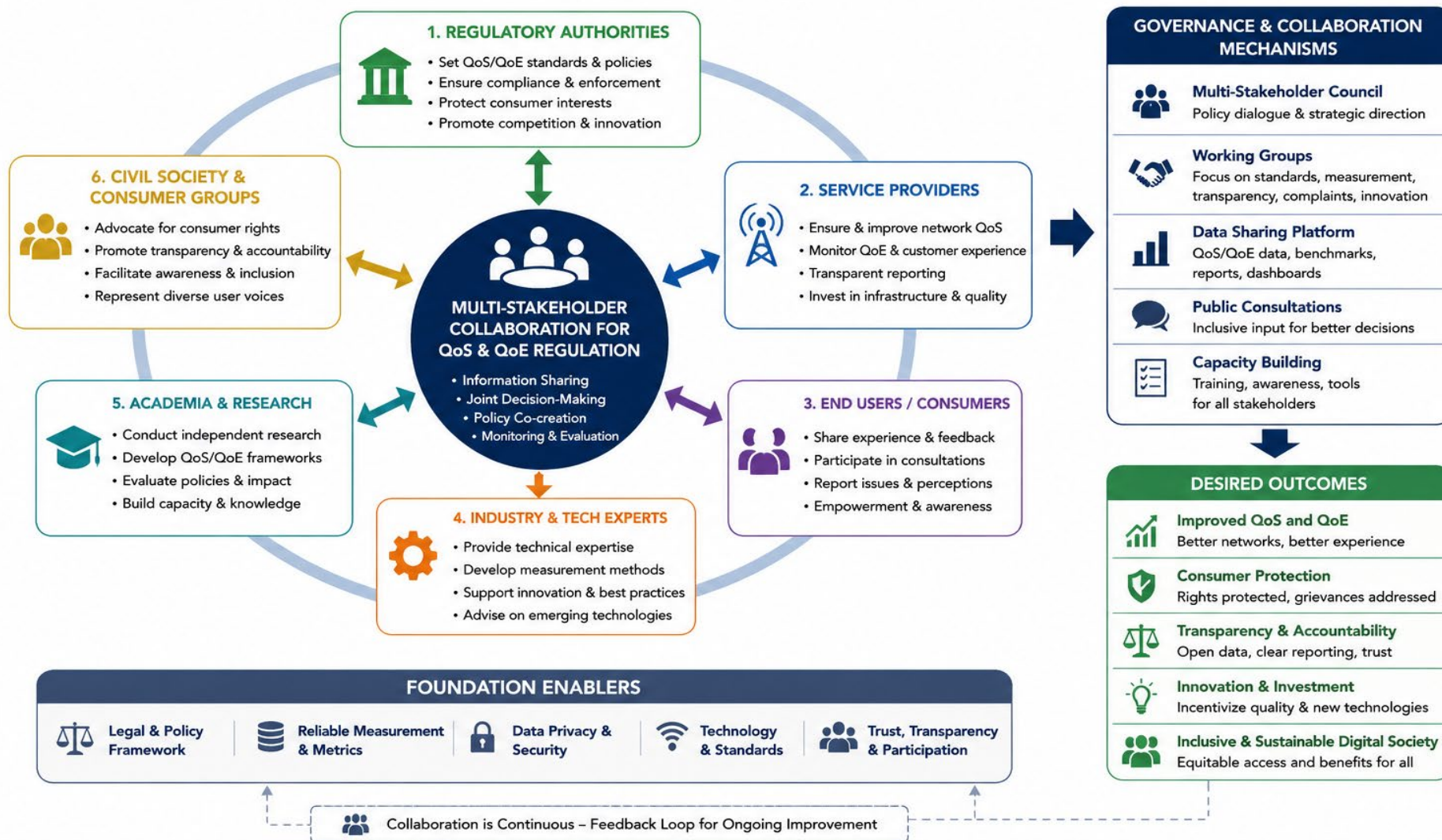


Collaborative regulation is achieved by combining technical QoS monitoring with real user experience, stakeholder engagement, crowdsourcing, resilience measures, transparent billing, efficient complaint management, and coordinated infrastructure governance.

Through continuous feedback and shared responsibility, the planned system evolves to reflect real user needs, reducing the gap between expected and perceived quality.

Multi-Stakeholder Structure for Collaborative QoS and QoE Regulation

Shared Responsibility. Collaborative Governance. Better Quality for All.



- Regulator
- Operators Industry Ecosystem
- Utilities & Public Bodies
- Academia & Research
- Users & Civil Society
- Standardisation Bodies & International Partners

A collaborative regulatory approach to improving **Quality of Service (QoS)** and **Quality of Experience (QoE)** requires continuous engagement between the regulator, operators, consumers, utilities, municipalities and other public institutions. The objective is to reduce the gap between the **network as technically planned** and the **service as actually experienced by users**.

regulatory coordination;
enforcement actions;
resilience measures;
outage management;
infrastructure sharing;
customer care improvements;
billing transparency initiatives;
fibre protection coordination;
backup power strategies;
natural disaster management strategies.

To Achieve

improved network availability;
better user experience;
reduced outage duration;
faster complaint resolution;
stronger infrastructure resilience;
improved consumer trust;
more efficient regulatory interventions;
better alignment between QoS and QoE.

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