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TD

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Title: Report of the questionnaire on the status of national quality regulatory frameworks

Purpose: Discussion

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Abstract: This report presents and analyzes the responses to the Questionnaire on the status of national quality measurement frameworks, approved by ITU-T Study Group 12 in September 2017 as SG12-TD347R1 and sent to all Administrations of Member States of the Union; ITU-T Sector Members; ITU-T Associates; and ITU Academia via TSB Circular 62.

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1 Introduction

WTSA Resolution 95 (Hammamet, 2016) on "ITU-T initiatives to raise awareness on best practices and policies related to service quality"[1] recognizes the importance of the operational and regulatory discussions held at the level of ITU-T Study Group 12 (SG12) on performance, quality of service (QoS) and quality of experience (QoE). The Resolution calls for further studies related to quality regulatory approaches to be conducted, as well as for capacity building initiatives to be undertaken by ITU-T in close collaboration with ITU-D.

Based on the clear directions given by Resolution 95, Brazil submitted a contribution (SG12-C148) to the September 2017 meeting of SG12 meeting, highlighting that – in order to assist developing and least developed countries in identifying bottlenecks and implementing actions to improve service quality – SG12 would first need to obtain a better picture of the maturity level of the countries' regulatory approaches toward improving service quality and their specific needs in the matter of quality measurement frameworks. Thus, the contribution proposed to send a Questionnaire to all ITU Member States to collect feedback and input on actions that would address their needs.

SG12 approved the final text of the Questionnaire (SG12-TD347R1). A web-based survey was developed at https://www.research.net/r/sg12-servicequality and announced to all Administrations of Member States of the Union; ITU-T Sector Members; ITU-T Associates; and ITU Academia via TSB Circular 62 in December 2017.

The Questionnaire is composed of four Sections, from A to D. Section A explores high-level aspects of national quality regulatory frameworks. Sections B and C aim to collect more detailed information about QoS and QoE indicators, measurement strategies, enforcement and publication approaches. Finally, Section D request countries to summarize their main issues to improve service quality, as well as how ITU could assist them in stablishing their quality regulatory frameworks.

In total, 53 countries from around the world responded to the Questionnaire, as illustrated in the map below. The high response rate can be considered a success and demonstrates the relevance of the survey for the future work of SG12.

Figure 1: Map of countries responding

Countries from all but one ITU Region answered the Questionnaire. Almost half of them are located in Africa, as can be seen in Figure 2 below. As a consequence, the results presented and discussed in

[1] http://handle.itu.int/11.1002/pub/80ee9bab-en

this report are not claimed to represent the whole world. On the other hand, they are still valuable information to identify trends and standardization gaps to be addressed by SG12 in near future.

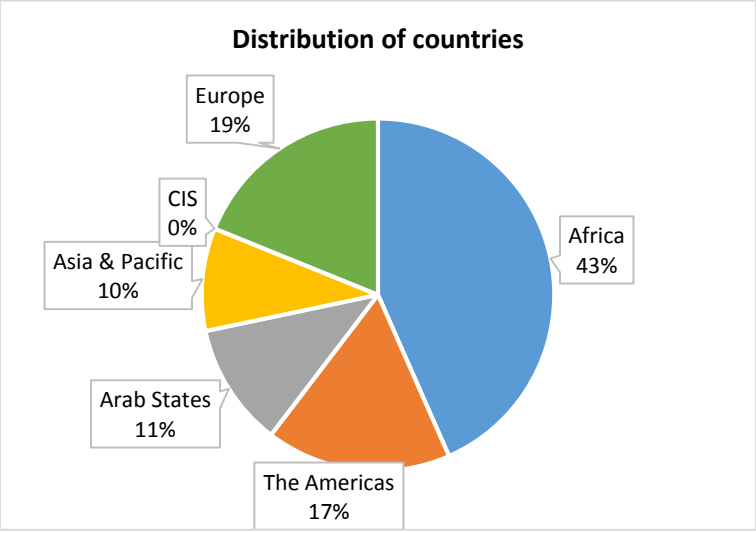

Figure 2: Questionnaire respondents – distribution by region

Readers should also be aware that most responding countries did respond to a great set of survey questions, but not all of them.

The anonymized raw data with all the answers to the Questionnaire can found at https://itu.int/en/ITU-T/studygroups/2017-2020/12/Documents/SG12-Res95-Questionnaire-Rawdata-20181121.xlsx.

Following this brief introduction, this report is organized as follows: The next chapter presents a summary of the key findings from the Questionnaire to be considered by SG12. Chapter 3 analyses the responses to the questions included in the Section A of the Questionnaire. Chapter 4 addresses Sections B and C of the Questionnaire, while Chapter 5 looks at Section D. Finally, having presented and discussed all the survey results, Chapter 6 provides the main conclusions of this initiative.

2 Key findings

Based on the answers to the Questionnaire, which are presented in detail in Chapters 3, 4 and 5, the following list summarizes the key findings to be considered by SG12 in its future work:

a) Most countries (77%) have a quality regulatory framework or established obligations. This confirms the relevance of the theme in the regulatory agenda of many countries;

b) Most countries provide to their consumers options to present their complaints, in addition to the operators' call centers;

c) Although half of countries answered that their consumers are regularly informed by the operators regarding the prices of the offers, only 11% indicated that consumers are informed about quality;

d) National quality regulatory frameworks are mostly focused in voice and broadband services. Only a few of the countries responding address Pay-TV in their quality regulation;

e) Countries focus less on QoE than they do on traditional QoS;

f) More than 80% of countries define QoS regulatory indicators to track the quality of telecommunication networks. For example, while 28 countries answered they regulate the QoS of mobile voice service, only 11 regulate QoE;

g) Only one country among 31 who have quality indicators defined does not establish minimum/maximum targets to be achieved by operators;

h) Most countries use the geographical breakdown and the operator's number of subscribers as the main criteria to differentiate QoS targets. Nevertheless, other interesting criteria, such as competition, the operator's size and technology are well represented in the Questionnaire responses, what makes this aspect worthy to be further explored. Indeed, guidance on how to define differentiation criteria, as well as related use cases would represent interesting areas of study;

i) 22% of the countries among the 23 who answered the corresponding question do not request operators to notify the customers in cases of service interruption;

j) Questionnaire results show that drive tests and operators' reports are still the most widely used strategies to measure QoS of mobile voice and broadband services. However, it can be seen that newer measurement approaches, like the use of probes and crowdsourcing are also well adopted, mainly for mobile broadband measurement;

k) Most countries measure the QoS of mobile networks yearly, while the fixed networks are mostly measured by month. However, no reasons could be identified for such difference. The criteria to be considered by regulators for choosing the periodicity to measure QoS parameters in mobile and fixed networks would deserve further study and discussion in SG12;

l) Governments are mostly the ones in charge of performing the QoS measurements, followed by operators. However, a growing number of countries opt to designate a third-party entity to measure QoS, especially for mobile networks;

m) Almost 80% among the 30 countries who answered the corresponding question affirm that their regulators set the measurement methodologies without any interaction with operators;

n) Most of the 32 countries who answered the corresponding question do not have a statistical framework to measure the QoS at a national level;

o) 63% among the 24 countries who answered the corresponding question do not differentiate between perceived quality and consumer satisfaction models in their regulatory frameworks. Such lack of understanding of the differences between the two assessment

models should alert ITU on the necessity of providing further international references, as well as capacity building initiatives on QoE concepts and proper measurement techniques;

p) Approximately 60% among the 31 countries who responded the corresponding question are not using surveys to measure QoE. This result highlights the importance to stress through SG12 documents that QoE assessment is a subjective approach;

q) The traditional enforcement approach to sanction operators not meeting minimum/maximum QoS/QoE thresholds is still the most common one. However, a wide range of different enforcement approaches are being used. This suggests a need for international references that provide further insight on the specific situations in which a particular enforcement approach should be considered. Such initiative would help countries to decide what strategy to put in place, thus improving the efficiency of the quality regulatory framework;

r) Although more than 70% among the 32 countries who answered the corresponding question confirmed that they publish QoS results, the same cannot be seen for QoE. As per the responses, only 33% among the 30 countries who answered are publishing QoE results. This finding should be further explored by SG12 to understand why countries would measure QoE and decide to not publish the measurement results. The finding also reinforces the need for more international references on QoE regulatory frameworks, which not only clarify the concept and its measurement techniques, but also describe the benefits of publishing the results of QoE measurements;

s) Most of the countries publish QoS and QoE measurement results on the regulator's website. However, other approaches like the use of social media and other popular websites are also represented in the responses;

t) Yearly publication of QoS and QoE measurement results is the most common approach, although the countries' choices vary greatly among other publication periods;

u) The countries' main issues to provide acceptable service quality to consumers are mostly related to the lack of a quality legal/regulatory framework, lack of consumer awareness and empowerment, lack of basic facilities (e.g., electricity, security, costs) and lack of trained human resources;

v) The main recommendations for ITU action as suggested by countries with the goal to assist them in improving service quality and keeping consumers informed were i) capacity-building / development programs; ii) direct support/consultancy; iii) organization of seminars and workshops; and iv) organized and publicly available set of national regulatory frameworks and benchmarking measurement practices;

w) The main topics to be addressed by international standards in the field of service quality are regulatory definitions, targets, enforcement and measurement strategies.

3 Analysis of the responses to Section A

This section presents and discusses the countries' responses to Section A of the Questionnaire. This section mainly covers high-level aspects of national regulatory frameworks, as well as the consumer protection ecosystem.

The Questionnaire starts by asking whether countries have a quality regulatory framework or any obligations established. As can be seen in Figure 3, the majority of the respondents, 77%, have a quality regulatory framework or established obligations, what confirms the relevance of the theme in the regulatory agenda of many countries.

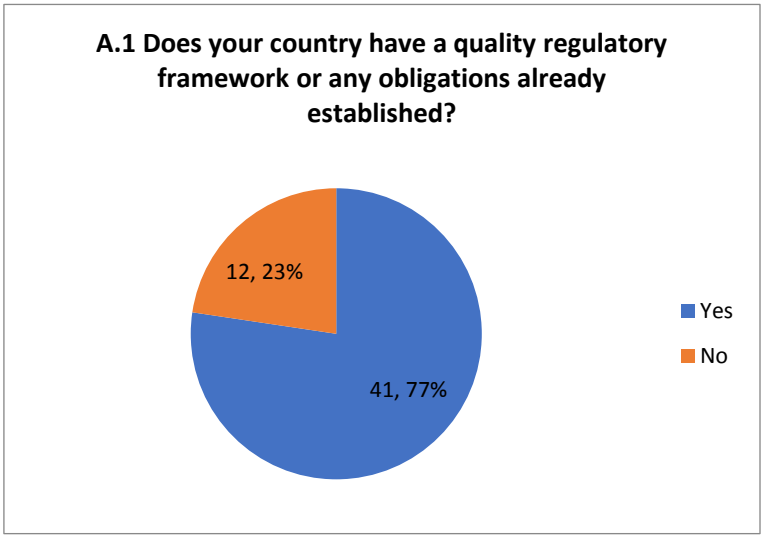

Figure 3

Those who have a quality regulatory framework are asked to list the relevant rules and resolutions as well as the links to access them online. Many respondents provided links to their quality regulatory framework (see Table 1).

Country	A.1.1 List the relevant rules and resolutions as well as the links to access them online
Argentina	Information and Communication Technologies' Quality of Services Regulation. https://www.enacom.gob.ar/multimedia/normativas/2018/res580MM.pdf Telecommunications Quality of Services Regulation. https://www.enacom.gob.ar/multimedia/normativas/2013/Resolucion-5_13-julio.pdf
Bahrain	2. The provisions of this Regulation shall apply to all Licensed Operators in the Kingdom of Bahrain, provided such Licensed Operators: (a) offer a Monitored Service to mass market Subscribers; and (a) serve at least one thousand (1,000) Subscribers for such Monitored Service. (b) Notwithstanding the provisions of Article 2(a) of this Regulation, all Licensed Providers that offer Telecommunications Services shall be subject to the Outage and Maintenance notification requirements set forth in this Regulation. (c) The Licensed Operators subject to this Regulation shall undertake the necessary changes to their operation systems and processes, if needed, to ensure compliance with the provisions of this Regulation and any associated determinations issued by the Authority from time to time in relation to this Regulation.
Brazil	Pay TV Services Quality Regulations: http://www.anatel.gov.br/legislacao/resolucoes/2005/141-resolucao-411 Fixed Telephony Quality Regulations: http://www.anatel.gov.br/legislacao/resolucoes/2012/440-resolucao-605 Fixed Broadband Internet Access Quality Regulations: http://www.anatel.gov.br/legislacao/resolucoes/2011/57-resolucao-574 Mobile Services, including mobile broadband Quality Regulations: http://www.anatel.gov.br/legislacao/resolucoes/2011/68-resolucao-575

	Consumer satisfaction and Consumer´s Perceived Quality Surveys: http://www.anatel.gov.br/legislacao/resolucoes/2015/829-resolucao-654
Burkina Faso	Loi N°061-2008/AN du 27 novembre 2008 https://www.arcep.bf/lois/
Canada	Telecom Regulatory Policy CRTC 2009-304 Follow-up to Telecom Decision 2008-105 – Retail quality of service regime in non-forborne markets for ILECs with over 25,000 NAS https://crtc.gc.ca/eng/archive/2009/2009-304.htm (paragraph 15) The Commission therefore determines that a retail [quality of service (Q of S)] regime based on specific indicators and performance standards remains appropriate in non-forborne areas for [incumbent local exchange carriers (ILECs)] with more than 25,000 [network access services (NAS)]. (paragraph 38) . In light of the above, the Commission determines that the retail Q of S regime in non-forborne areas, for ILECs with more than 25,000 NAS, will include the following indicators and standards: Indicator Standard 1.2A Installation Appointments Met – Urban 90% or more 1.2B Installation Appointments Met – Rural 90% or more 1.2C Installation Appointments Met – Community* 90% or more 2.1A Out-of-Service Trouble Reports Cleared within 24 Hours – Urban 80% or more 2.1B Out-of-Service Trouble Reports Cleared within 48 Hours – Rural 80% or more 2.1C Out-of-Service Trouble Reports Cleared "Remote" within 5 Working Days – Community* 90% or more 2.2A Repair Appointments Met – Urban 90% or more 2.2B Repair Appointments Met – Rural 90% or more 2.2C Repair Appointments Met – Community* 90% or more *Community-level reporting applies only to Northwestel.
Costa Rica	1. Quality of Service Regulatory framework: http://www.imprentanacional.go.cr/pub/2017/02/17/ALCA36_17_02_2017.pdf, starting at page 49. 2. Thresholds of KPIs: http://www.pgrweb.go.cr/scij/Busqueda/Normativa/Normas/nrm_texto_completo.aspx?param1=NRTC&nValor1=1&nValor2=84229&nValor3=108604&strTipM=TC. 3. Measurement methodologies: will be publish on January 2018.
Czech Republic	https://www.ctu.eu/data-traffic-management-parameters-measuring-quality
Equatorial Guinea	General Telecommunications Law LGT-7/2005 Regulation of integral quality of service of the electronic communications services available to the public in general http://www.ortelge.org/
Ghana	http://nca.org.gh
Greece	http://www.eett.gr/opencms/export/sites/default/EETT/Consumer/QualityIndicators/LegalFramework/2417_B_2011.pdf (available in Greek, only)
Jordan	http://trc.gov.jo/Pages/viewpage.aspx?pageID=847
Lesotho	Lesotho Communications Authority (Quality of Service) Rules 2016 https://www.lca.org.ls/legislation/
Madagascar	Law 2005-023 dated 17/10/2005 Decree 2014-1650 dated 21/10/2014 Decree 2014-1651 dated 21/10/2014 http://www.artec.mg/#services
Mali	Operators licenses
Mexico	Mobile Quality of service guidelines "Acuerdo mediante el cual el Pleno del Instituto Federal de Telecomunicaciones aprueba y emite los lineamientos que fijan los índices y parámetros de calidad a que deberán sujetarse los prestadores del servicio móvil y se abroga el Plan Técnico Fundamental de Calidad del Servicio Local Móvil publicado el 30 de agosto de 2011, así como la metodología de mediciones del Plan Técnico Fundamental de Calidad del Servicio Local Móvil publicada el 27 de junio de 2012." http://www.dof.gob.mx/DOFmobile/nota_detalle_popup.php?codigo=5510754
Namibia	1. Communications Act (https://www.cran.na/images/docs/Acts/Communications_Act_8_of_2009.pdf) 2. Regulations Prescribing Quality of Service (https://www.cran.na/images/docs/Regulations/QUALITY_OF_SERVICE_REGULATIONS.pdf)

	3. Regulations Regarding License Conditions for Telecommunications Service Licensees (https://www.cran.na/images/docs/Regulations/5037-Gen_N304-308.pdf)
Peru	RESOLUCION DE CONSEJO DIRECTIVO Nº 123-2014-CD-OSIPTEL and modifications, available at: https://www.osiptel.gob.pe/repositorioaps/data/1/1/1/par/reglamento-calidad-servicios-publicos-telecom/Res123-2014-CD-OSIPTEL-II.pdf
Portugal	Electronic Communications Law (Law no. 5/2004, of 10 February https://www.anacom.pt/render.jsp?contentId=975162 Concerning universal service QoS regarding connection to a public communications network at a fixed location and provision of a telephone service through that connection and public payphones please see ANACOM decision of 7 February 2012 https://www.anacom.pt/streaming/final_decision_USP_07february2012.pdf?contentId=1122782&field=ATTACHED_FILE Concerning universal service QoS for the provision of a comprehensive telephone directory and of a comprehensive telephone directory enquiry service please see ANACOM decision of 30 January 2015 https://www.anacom.pt/streaming/Decisao30janeiro2015_sobre_as_listas.pdf?contentId=1346680&field=ATTACHED_FILE (only available in Portuguese).
Senegal	The télécommunications code http://www.artp.sn
Serbia	Rulebook on quality parameters for publicly available electronic communication services and monitoring of electronic communication activity http://www.ratel.rs/upload/documents/Regulativa/Pravilnici/Telekomunikacije/Rulebook%20on%20quality%20parameters%20for%20publicly%20available%20electronic%20communication%20services.pdf
Switzerland	Only universal services from incumbent is quality checked: https://www.bakom.admin.ch/bakom/en/homepage/telecommunication/the-universal-service-with-regard-to-telecommunications/the-content-of-the-universal-service.html
Togo	Arrête portant définition des indicateurs de qualité des services mobiles 2G et 3G et leurs seuils : http://artp.tg/Download/Telecommunication/Arrete/Arrete_021_Portant_definition_des_indicateurs_de_qualite_des_services_mobiles_2G_et_3G_et_leurs_seuils.pdf
Tunisia	http://www.intt.tn/upload/files/D%C3%A9cision%20QoS.pdf http://www.intt.tn/upload/files/D%C3%A9cision%20QoS%20Internet%20fixe.pdf
Ukraine	Law of Ukraine “On Telecommunications” http://zakon0.rada.gov.ua/laws/show/1280-15 Provision on the Quality of Telecommunication Services http://zakon5.rada.gov.ua/laws/show/z0429-10 Basic Requirements for the Agreement on the Provision of Telecommunication Services http://zakon0.rada.gov.ua/laws/show/z2150-12 Rules for Provision and Receiving of Telecommunication Services http://zakon3.rada.gov.ua/laws/show/295-2012-%D0%BF Orders of the Administration of Communication and Radio Frequencies of Ukraine: “On the establishment of quality levels of fixed telephony services” http://zakon0.rada.gov.ua/laws/show/z0220-10; “On the establishment of quality levels of mobile communication services” http://zakon0.rada.gov.ua/laws/show/z0277-10; “On approval of quality indicators for data, internet access and their levels” http://zakon3.rada.gov.ua/laws/show/z0135-13
Zambia	the can be obtained via the following email info@zicta.zm

Table 1

Moreover, respondents are asked how they define quality, and what high-level approaches are being used to assess it (see Table 2).

Country	A.1.2 What is the definition of quality in your regulatory framework?	A.1.3 What approaches are used?		
		Operational QoS/QoE indicators	Consumer Satisfaction Surveys	Quality reports
Argentina	Quality: Global effect of the characteristics of the ICT Service and the network that jointly determine the degree of network performance and the satisfaction of the Users.	X		X
Bahrain	The purpose of this Regulation is to set out a framework for measuring, reporting, monitoring, auditing and enforcing the Quality of Service of Telecommunications Services in the Kingdom of Bahrain.	X		X
Brazil	The regulations do not explicitly define Quality.	X	X	X
Burkina Faso	All the characteristics of a telecommunication service that allows it to satisfy the explicit needs and implicit needs of the service user. It correspond to E.800 definition	X	X	X
Canada	Please see response to question A.1.1	X		X
Chad		X		X
China			X	
Comoros	Ability to transport under the right conditions in a form of traffic in terms of availability, speed, transmission delay, rate loss of packet	X	X	X
Costa Rica	Quality: the totality of the characteristics of an entity that determine its capacity to satisfy explicit and implicit needs. Reference: Recommendation ITU-T E.800.	X	X	X
Czech Republic	Compliance of the EU Regulation 2015/2120	X		
Equatorial Guinea	quality of service (QoS): global effect of the performance of a service, which determines the degree of satisfaction of users (ITU-T Rec. E.800)	X	X	X
Ghana	Quality is defined in my regulatory framework as better service delivery to subscribers by the telcos.	X	X	X
Greece	The framework has definition only for Quality Indicator "The measure of a set of parameters defined in this regulatory framework, through which is valued part or elements of the quality of a provided electronic service "	X		
Haiti		X		
Japan				X
Jordan	Not Defined as a word	X		X
Lesotho	Quality not defined, but "quality of service" defined as "the collective effect of service performances, which determines the degree of meeting set standards."	X		X
Madagascar	Quality =To satisfy the customers' requests	X		X
Mali	Quality of service: The set of characteristics of a telecommunication service that enables it to meet the explicit needs and the implicit needs of the service user.	X		X
Mexico	The Telecommunications and Broadcasting Law establishes: Quality: All characteristics of a telecommunications and broadcasting service that determine its capacity to satisfy the explicit and implicit needs of the service user, and whose parameters shall be regularly defined and updated by the Institute.	X	X	X
Namibia		X		X

Country	A.1.2 What is the definition of quality in your regulatory framework?	A.1.3 What approaches are used?		
		Operational QoS/QoE indicators	Consumer Satisfaction Surveys	Quality reports
Peru	According to our Telecommunications Rule, Quality of Service is defined as the grade of satisfaction of the users regarding the service receive, considering the combined effect of the following aspects: logistics, ease of use of the service, availability, integrity and reliability.	X		
Portugal	Within universal service, Electronic Communications Law establishes that universal service providers shall make available to end-users as well as to the NRA, appropriate and up-to-date information on their performance in the provision of the universal service, based on quality service parameters, definitions and measurement methods previously established.	X		X
Senegal	Provide a good quality of service in term of success rate with a good MOS score	X		X
Serbia		X	X	X
Sudan		X	X	X
Switzerland	Make sure the universal service rules are applied in terms of quality of service according to the regulatory document.			X
Togo			X	X
Tunisia		X	X	X
Ukraine	Quality of telecommunication services is a set of indicators that characterize the consumer properties of telecommunication services and determine its ability to meet the declared, established and custom customer service needs (Provision on the Quality of Telecommunication Services). Testing of the quality of telecommunication services - the process of executing a set of operations and rules for measuring service quality parameters and calculating telecommunications service quality indicators in accordance with the established methodology (Provision on the Quality of Telecommunication Services). Parameter of the quality of telecommunication service is the quantitative characteristic of a service received as a result of measurement, survey or reporting (Provision on the Quality of Telecommunication Services). The indicator of the quality of telecommunication services is the quantitative characteristic of the service obtained by calculating from the quality parameters and determines the result of the activity of the operator, provider of telecommunications services and customer service (Provision on the Quality of Telecommunication Services).			X
Zambia	"quality" means the totality of characteristics of an entity that bear on its ability to satisfy stated and implied needs (ISO 8402)	X	X	X

Table 2

Firstly, it can been seen that most countries have their own definition of quality and just few referred to the current ITU-T definition, provided in Recommendation ITU-T E.800. However, the definitions are quite similar in focusing on the provision of a good service that meets users' needs. Secondly, it can be understood that most countries relate to the term quality more as quality of service, i.e., the objective aspect of the overall concept of quality. This conclusion highlights the need to reaffirm the objective and subjective nature of the quality assessment.

Furthermore, Table 2 shows that most countries use more than one approach to assess quality. It is possible to see that the majority of countries use two approaches (29%), mainly operational QoS/QoE

indicators and quality reports. As both approaches are quite complementary, such result appears reasonable. Also, it can be seen that 20% of respondents are using consumer satisfaction surveys to measure quality directly from the users' perspective (see Figures 4 and 5).

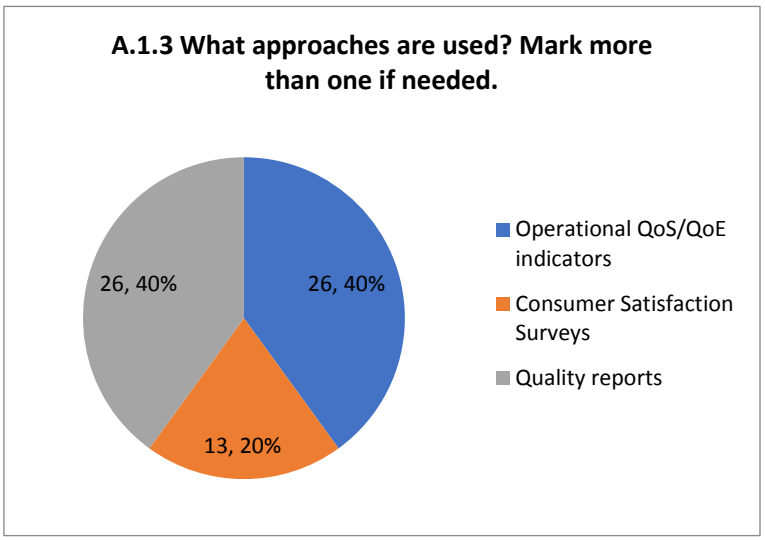

Figure 4

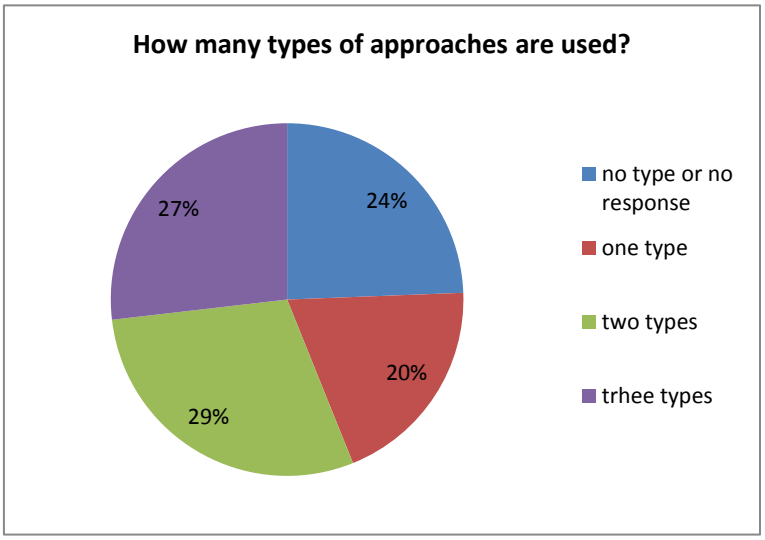

Figure 5

Complimentarily, still in question A.1.3, Portugal answered that in its case there are no objectives/targets generally imposed to the fixed telephone providers, but only for the universal service provider. Also, it mentions that its regulation only obliges providers to measure some QoS parameters according to the harmonized methodology defined in the regulation. Moreover, Argentina informed that they use apps for the measurement of network parameters and compare the results with those provided by the operators. Finally, Senegal said that they use drive test, and Tunisia uses the regulator's mobile app to measure quality. Such approaches will be analyzed further in the next Chapter of this report.

Question A.2 tried to understand if countries have specific procedures to complaints settlement. The answers show that the majority of the respondents have such procedures defined in their quality regulatory framework, as can be seen in Figure 6.

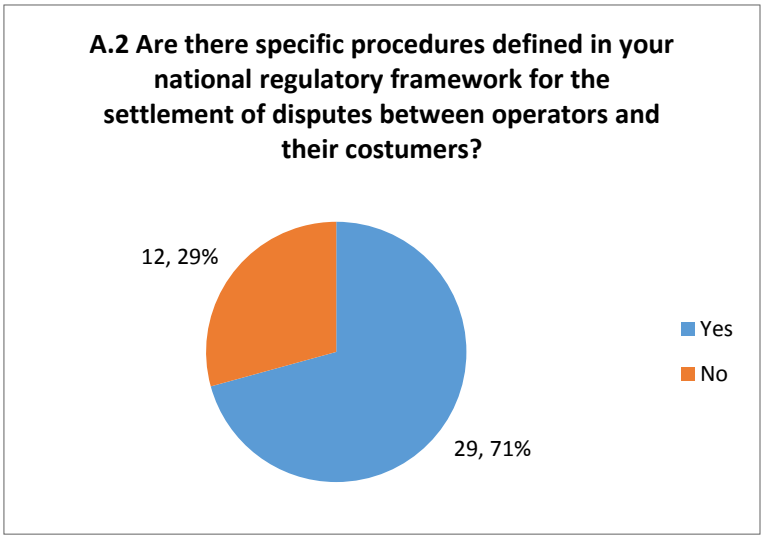

Figure 6

It was noticed that among those who have dispute settlement procedures, the majority receive claims from consumers via both the regulator and the operator, as half of them also have a governmental consumer protection body. Consumers in most responding countries have options to present their complaints in addition to the operator's call centers (see Figure 7).

Complimentarily, Madagascar informed that complaints are also collected by monitoring social media.

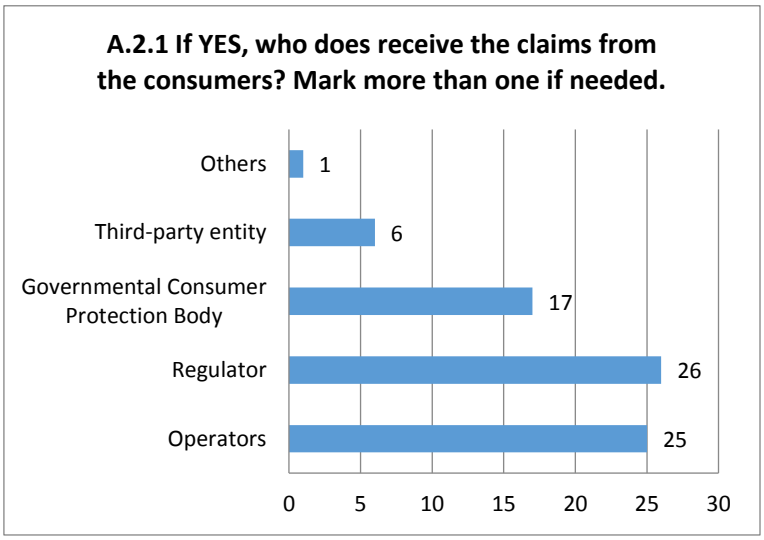

Figure 7

Furthermore, those who have dispute settlement procedures were asked to provide detailed information about the number of claims received, as well as the maximum time defined by the regulation to resolve a dispute. The answers can be seen in Table 3 below and may be a useful benchmark for countries wanting to define specific rules for complaint handling.

Country	A.2.2 a) Provide the following information. Total claims received by each governmental institution (e.g., Regulator) in the last years by each telecommunications service.	A.2.2 b) Provide the following information. Total claims received by each governmental institution (e.g., Regulator) in the last years per consumer by each service. Example: 1 million claims in a given year / 10 million fixed broadband consumers at the end of a given year = 0,1 claims per fixed broadband consumer in a given year.	A.2.2 c) Provide the following information. Maximum time defined by regulation to resolve a dispute. Example: 5 days
Argentina	http://datosabiertos.enacom.gob.ar/dashboards/20003/denuncias-y-reclamos/	http://datosabiertos.enacom.gob.ar/dashboards/20003/denuncias-y-reclamos/	N/D
Brazil	Total Complaints in Telecom Regulator: Internet via Fixed networks 2016 – 580.952 2017 – 525.288 Pay-TV 2016 – 511.053 2017 – 467.363 Mobile 2016 – 1.855.629 2017 – 1.629.931 Voice via fixed networks 2016 – 943.680 2017 – 760.992 Total Complaints in Governmental consumer protection body offices (all telecommunications services): 2016 - 559.764 2017 - 514.500 Total Complaints in Governmental consumer protection body website (all telecommunications services): 2016 – 137.068 2017 – 203.687	Telecom Regulator: Internet via Fixed networks 2016 – 0,00206 Complaints per consumers 2017 – 0,00181 Complaints per consumers Pay-TV 2016 – 0,00231 Complaints per consumers 2017 – 0,00216 Complaints per consumers Mobile 2016 – 0,00061 Complaints per consumers 2017 – 0,00056 Complaints per consumers Voice via fixed networks 2016 – 0,00185 Complaints per consumers 2017 – 0,00155 Complaints per consumers Governmental consumer protection body offices (all telecommunications services): 2016 – 0,0016 2017 – 0,0015 Governmental consumer protection body website (all telecommunications services): 2016 – 0,0004 2017 – 0,0006	5 business days
Costa Rica	Fix broadband service: 13 (2013), 33 (2014), 58 (2015), 55 (2016), 67 (2017). Mobile Internet service: 35 (2013), 162 (2014), 78 (2015), 86 (2016), 69 (2017). Fix telephony service: 1 (2013), 9 (2014), 21 (2015), 22 (2016), 17 (2017). Mobile service: 184 (2013),	Less than 0.01% per service per user. The total amount of claims are very low compare to the total amount of user per service.	15 days

Country	A.2.2 a) Provide the following information. Total claims received by each governmental institution (e.g., Regulator) in the last years by each telecommunications service.	A.2.2 b) Provide the following information. Total claims received by each governmental institution (e.g., Regulator) in the last years per consumer by each service. Example: 1 million claims in a given year / 10 million fixed broadband consumers at the end of a given year = 0,1 claims per fixed broadband consumer in a given year.	A.2.2 c) Provide the following information. Maximum time defined by regulation to resolve a dispute. Example: 5 days
	266 (2014), 311 (2015), 414 (2016), 395 (2017).		
Czech Republic	The Czech Telecommunications Office began collecting data this year, so the required information is not available.	Information not available	Information not available
Equatorial Guinea	for the voice service the regulator has received a total of 300000 complaints in recent years	175,000 claims / 700,000 consumers of fixed broadband at the end of 2017 = 0.25 claims per consumer of fixed broadband in the year 2017	3 days
Georgia	286 claims	Total 287 claims in a given year /50 fixed broadband consumer in a given year.	Usually from 15 to 1 month. It can last up to a maximum of 3 months
Ghana	15 times a week.		
Jordan	3017	Mobile Complaints 1218 Fixed Complaints 186 Internet related Complaints 1597	14 days
Madagascar	not available for the moment	not available for the moment	not available for the moment
Mexico	2015 Internet 2364 trunking 47 Fixed telephony 1524 Long distance telephony 55 Mobile telephony 3313 Pay TV 963 2016 trunking 16 Fixed telephony 1852 Mobile telephony 3555 Pay TV 1691 Internet 3639 2017 trunking 4 Fixed telephony 1422 Mobile telephony 4946 Pay TV 1409 Internet 4828	2015 Service %claims per subscriber Internet 0.000160185 Fixed telephony 7.88401 Mobile telephony 3.07647 Pay TV 5.29216 2016 Service %claims per subscriber Internet 0.000227462 Fixed telephony 9.44542 Mobile telephony 3.18183 Pay TV 8.61825 2017 Service %claims per subscriber Internet 0.000294289 Fixed telephony 7.08546 Mobile telephony 4.42918 Pay TV 7.18088	Undefined
Peru	The claims receive by the regulator since 1st of January until 31st of December of 2017 are break down as follow: lease lined: 1 Internet: 738	Fixed Internet Users (Dec-2017): 2,323,483 Mobile telephony users (dec-2017): 38,915,386 TV Paid users (dec-2017):1,976,805 Fixed telephony users (Dec -2017): 3,126,807	25 days at most. In certain cases, due to the complexity of the claim, the regulator could take 20 additional days.

Country	A.2.2 a) Provide the following information. Total claims received by each governmental institution (e.g., Regulator) in the last years by each telecommunications service.	A.2.2 b) Provide the following information. Total claims received by each governmental institution (e.g., Regulator) in the last years per consumer by each service. Example: 1 million claims in a given year / 10 million fixed broadband consumers at the end of a given year = 0,1 claims per fixed broadband consumer in a given year.	A.2.2 c) Provide the following information. Maximum time defined by regulation to resolve a dispute. Example: 5 days
	Fixed International long distance telephone service: 33 Postpaid Mobile International long distance telephone service: 113 Pre-paid Mobile International long distance telephone service: 3 National long distance telephone service: 12 Fixed telephony: 17,020 Mobile telephony: 94,600 Paid TV: 941 Public Telephony: 3 Rural Telephony: 0 Further information available at: http://www.osiptel.gob.pe/documentos/12-indicadores-de-reclamos-de-usuarios-segunda-instancia Claims received by operators are available at: http://www.osiptel.gob.pe/documentos/11-indicadores-de-reclamos-de-usuarios-primera-instancia		
Portugal	Total claims received by ANACOM (divided into semesters): Total claims 2014S1; 2014S2; 2015S1; 2015S2; 2016S1; 2016S2; 2017S1 Bundled services 8594; 8449; 7448; 7117; 7361; 8573; 8649 Voice via mobile networks 8923; 9826; 7419; 7917; 7302; 9013; 7592 Pay-TV 1924; 2759; 2080; 1888; 2116; 2209; 2100 Internet via fixed networks 982; 1709; 1163; 1152; 1280; 1342; 1463 Internet via mobile networks 1249; 1844; 1408; 1477; 1233; 1429; 1309 Voice via fixed networks 1371; 1556; 1179; 1057; 966; 979; 1008	Claims rate (‰) 2014S1; 2014S2; 2015S1; 2015S2; 2016S1; 2016S2; 2017S1 Bundled services 3,2; 3,0; 2,5; 2,2; 2,2; 2,5; 2,4 Voice via mobile networks 0,8; 0,8; 0,6; 0,7; 0,6; 0,8; 0,7 Pay-TV 0,6; 0,8; 0,6; 0,5; 0,6; 0,6; 0,6 Internet via fixed networks 0,4; 0,6; 0,4; 0,4; 0,4; 0,4; 0,4 Internet via mobile networks 0,3; 0,4; 0,3; 0,3; 0,2; 0,2; 0,2 Voice via fixed networks 0,3; 0,3; 0,3; 0,2; 0,2; 0,2; 0,2	Currently, consumers of essential public services who submit a complaint through the complaints book (physically or electronically) shall receive a reply from the service provider within 15 working days.
Senegal		We do not have an accurate number, but there are lot of claims	Not yet defined
Serbia	In 2017, RATEL received 767 claims in total:		A subscriber may file a complaint to the operator in writing, referring to the

Country	A.2.2 a) Provide the following information. Total claims received by each governmental institution (e.g., Regulator) in the last years by each telecommunications service.	A.2.2 b) Provide the following information. Total claims received by each governmental institution (e.g., Regulator) in the last years per consumer by each service. Example: 1 million claims in a given year / 10 million fixed broadband consumers at the end of a given year = 0,1 claims per fixed broadband consumer in a given year.	A.2.2 c) Provide the following information. Maximum time defined by regulation to resolve a dispute. Example: 5 days
	- mobile telephony, 471 claims - fix telephony, 51 claims - internet, 101 claims - distribution of media content, 53 claims - packages, 65 claims - other (outside of RATEL's jurisdiction), 26 claims.		amount charged for the provided service or referring to the quality of the provided service and may seek indemnification in line with the contractual provisions related to the quality of the provided service lower than agreed. The deadline for filing a complaint shall be 30 days following the receipt of the service bill, in case the complaint refers to the amount charged for the provided service, or within 30 days from the provided service in cases where the complaint refers to the provided service quality. Within 15 days from the date of the receipt of the complaint, the operator shall reply in writing to the subscriber, accepting a well-founded indemnification request pursuant to contractual provisions governing service provision if the quality of the provided service is lower than agreed quality level, or rejecting a request and stating facts and evidence of relevance to the determination of the amount of charges payable for the provided services or the provided services quality. The subscriber whose complaint has been rejected may address RATEL or another authority to mediate in extrajudicial dispute resolution or initiate court proceedings at a court of law within 15 days from the day of the receipt of the operator's reply to the complaint, or 15 days from the expiry of the deadline within which the operator was under the obligation to

Country	A.2.2 a) Provide the following information. Total claims received by each governmental institution (e.g., Regulator) in the last years by each telecommunications service.	A.2.2 b) Provide the following information. Total claims received by each governmental institution (e.g., Regulator) in the last years per consumer by each service. Example: 1 million claims in a given year / 10 million fixed broadband consumers at the end of a given year = 0,1 claims per fixed broadband consumer in a given year.	A.2.2 c) Provide the following information. Maximum time defined by regulation to resolve a dispute. Example: 5 days
			declare his stand concerning the complaint.
Sierra Leone	CLOSE TO 100	AROUND 500,000 CLAIMS IN A GIVEN YEAR (500 for fixed line/PSTN and about 400,000 for mobile/cellular users)/ABOUT 1,000 FIXED BROADBAND AND AROUND 150,000 WIRELESS BROADBAND CONSUMERS(WHICH INCLUDES 3G & 4G)	Maximum 5days if it is affecting service and 15days if not service affecting
Switzerland	Universal services claims: 46	46 / 2'550'000	10 days
Tunisia			5 days
Ukraine	2015: Fixed telephony - 811, Mobile communications - 1511, Internet access - 236 2016: Fixed telephony - 1683, Mobile communications - 2048, Internet access - 428 9 months of 2017: Fixed telephony - 236, Mobile communications - 428, Internet access - 672	Fixed telephony: 2015 - 0,0000924353, 2016 - 0,0001992848, 9 months of 2017 - 0,0005380764 Mobile communications: 2015 - 0,0000248847, 2016 - 0,0000361085, 9 months of 2017 - 0,0000323832 Internet access: 2015 - 0,0000387527, 2016 - 0,0000289616, 9 months of 2017 - 0,0000564369	The maximum time is not specified, but the written response of the regulatory authority is obligatory within the time period specified by the legislation: for an individual - within a period of not more than one month from the date of receipt of the application. If within a month, it is impossible to resolve the issues raised in the appeal, necessary time for its consideration is set, which is reported to the person who filed the application. In this case, the general term for resolving issues raised in the application, cannot exceed 45 days. For legal entities - 30 days Besides, the consumer (natural or legal person) is informed in writing of the results of unscheduled verification on his request (in case of its conduction).

Table 3

Question A.3 asked about the existence of consumer protection institutions. As can be observed in the Figure 8, 90% of the countries answered “Yes”. For those, question A.3.1 asked what are the main activities performed by these institutions. The responses are provided in the Table 4.

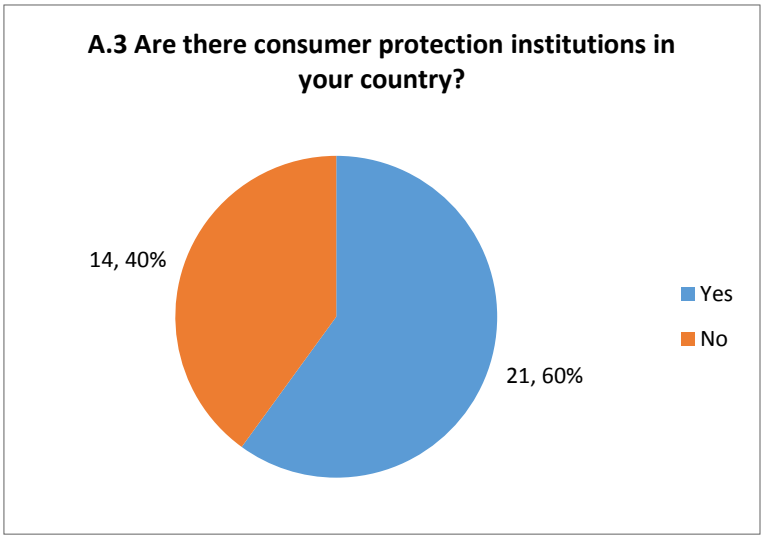

Figure 8

Country	A.3.1 If YES, what are the main activities carried out by each consumer protection institution in the resolution of claims?
Argentina	https://www.argentina.gob.ar/produccion/consumidor/funciones
Brazil	Guidance for consumers; clarification of doubts and conflict mediation in consumer relations; planning and execution of consumer protection policy; application of administrative penalties.
Canada	Commission for Complaints for Telecom-Television Services https://www.ccts-cprst.ca/ Telecommunications mandate We can help you with a wide range of complaints about products and services offered in the telecommunications (telecom) sector, including: • home phone • long distance phone services (including prepaid calling cards) • wireless phone services (including voice, data and text) • wired and wireless internet access services • white page directories, directory assistance and operator services • other unregulated retail telecom services (other than those in our list of exclusions) We can help you with most types of problems that can arise between you and your service provider. Compliance with contract terms and commitments (but not the contract terms themselves) Examples include: • disputes about whether there is a contract, what is included in a contract or how the contract should be interpreted • disputes about whether the provider's conduct meets its contractual obligations • misunderstandings about the particulars of a contract or term Billing disputes and errors (but not the price of the service itself) Examples include customer complaints about: • having agreed to one price and subsequently being charged more • being overcharged due to either a billing system error or a price that is different than advertised • being billed for per-use services which they claim they did not use Service delivery Service delivery complaints include complaints about: • the installation, repair or disconnection of service, including the quality of the service or unreasonable interruptions to service • transfers of service from one provider to another Credit management Examples include complaints about: • security deposits • payment arrangements • collections treatment of customer accounts TV mandate Effective September 1, 2017, we can help consumers (but not small business TV customers) with a range of complaints about subscription TV services provided by cable, Internet Protocol television (IPTV) and national satellite direct-to-home (DTH) TV service providers. We can accept TV complaints only when the facts leading up to the complaint occurred on or after September 1, 2017. The CRTC Television Service Provider Code (TVSP Code) is administered by the CCTS. Highlights include requirements for TV service providers to: • provide customers with their written agreement and related documents in plain language • ensure that prices, additional charges and the duration of promotional offers set out in the written agreement are clear • provide customers with a time frame and information on any potential

Country	A.3.1 If YES, what are the main activities carried out by each consumer protection institution in the resolution of claims?
	charges regarding service calls for installations and repairs • give 30 days' notice to customers in the event of a change in price of channels, bundles of channels or rental equipment • offer Canadians with disabilities a 30-day trial period Exclusions from our mandate The services and issues that CCTS cannot help with fall into three categories: • exceptions to telecommunications (telecom) services • exceptions to TV services • other applicable exceptions Exceptions to telecom services Exceptions to telecom services are: • internet applications or content • emergency services • payphones • yellow page or business directories • telemarking or unsolicited messages • 900 and 976 services Exceptions to TV services Exceptions to TV services are: • digital media broadcast undertaking (DMBU) services, which are services generally delivered or accessed over the Internet or delivered using point-to-point technology and received by way of mobile devices • interactive services and applications provided by TV service providers • broadcasting content • journalistic ethics • accessibility issues, for example closed captioning and described video • simultaneous substitution (when a TV distributor temporarily replaces the signal of one TV channel with that of another channel showing the same program at the same time) Other exceptions Other applicable exceptions are: • equipment • inside wiring • security services such as alarm monitoring • networking services • pricing of products or services • rights of way • plant, including (without limitation), poles, towers conduits, trenches and other support structures • claims of false and misleading advertising • privacy issues
Central African Republic	For the moment no procedure is initiated, we are in the phase of setting up the regulatory texts.
Chad	ADC (Association de Droit de Consommateur)
Comoros	The association of ICT consumers formally represents consumers in case of complaint
Costa Rica	Request the Regulator to solve the claims on time. Request information related to QoS, user protection, and procedures.
Czech Republic	Measurement of territory coverage, information transparency, resolving complaints.
Equatorial Guinea	sensitization to the population, and to the operator to later arrive at the solution favorable for the consumer
Georgia	There is the consumers right public defender office in GNCC which individually reviews and discussed consumers claims. In the case the certain consumer is not happy with the outcome of the activities, the case will be discussed by the GNCC.
Greece	The main steps are: - to ask the provider their opinion about the context of the complain - to send the complaint to the Public Service responsible for the specific market (in telecommunication market is EETT) for their actions or opinion - and taking in mind the above answers they prepare their answer to the consumer
Jordan	The Competition and Consumer Protection Commission (CCPC) main mission is to have markets work towards the betterment of consumers and businesses. TRC will publish quality of service information extracted from Licensees‟ reports in the public domain when it has been established that indicators readings used to measure Licensee performance provide accurate comparison for use by the general public and, more specifically, consumers of telecommunications products and services in Jordan, as and when it is deemed appropriate. The TRC reserves the right to conduct Customer satisfaction surveys to measure the quality of service from the Customers perspective.
Madagascar	They are mainly concerned about the cost of life in general (food, fuel). They are used to complaining on the media and social media
Mali	the referral of the operators and the regulator to the breaches found
Mexico	Profeco is the institution in charge of regulating the contractual obligations from the operators to the users. Profeco shall promote, protect, advise, defend, reconcile, and represent users and consumers against operators or authorized entities of telecommunications services or in advisory committees of standardization as well as record and publish standard contracts of adhesion in accordance with the telecommunications and broadcasting law and the federal consumer protection law.
Myanmar	The functions and duties of the Consumer Dispute Settlement Bodies are as follows: (a) mediating and conciliating consumer disputes; (b) distributing knowledge to consumer relating to consumer protection;

Country	A.3.1 If YES, what are the main activities carried out by each consumer protection institution in the resolution of claims?
	(c) accepting and examining the complaint in writing or oral of consumer relating to the goods or services; (d) carrying out duties conferred by the Central Body from time to time.
Namibia	Mediation between parties, make decisions
Senegal	to find a compromise
Serbia	Law on Consumers Protection regulates the fundamental rights of the consumers, conditions and means of consumer protection, rights and responsibilities of the consumer protection organizations, establishment of the system of out-of-court settlement of consumer disputes and the rights and responsibilities of the state institutions in the area of consumer protection. RATEL does not implement the procedures prescribed by the Law on Consumers Protection. The control over implementation of that Law is conducted by the Ministry in charge of trade, tourism and telecommunications.
Seychelles	The Fair Trading Commission is the principal consumer protection institution for the resolution of claims https://www.ftc.sc
Sierra Leone	NEGOTIATIONS WITH THE OPERATORS IN A MEETING NORMALLY ORGANIZED BY THE REGULATOR. RADIO TALK SHOWS DISCUSSION THE ISSUE AND THE WAY FORWRD
Switzerland	Not of the regulator competence
Ukraine	Consideration of consumer appeals; in case of need, carrying out unscheduled inspections according to consumer appeals; placing information for consumers on official sites.
Zambia	the act as an arbitrator between the consumer and the operator

Table 4

Question A.4 (Figure 9) aimed to explore whether telecommunications regulatory bodies have a consumer contact center to receive questions and claims from the consumers. Surprisingly, one fourth of the countries who answered said that their regulator does not have a contact center.

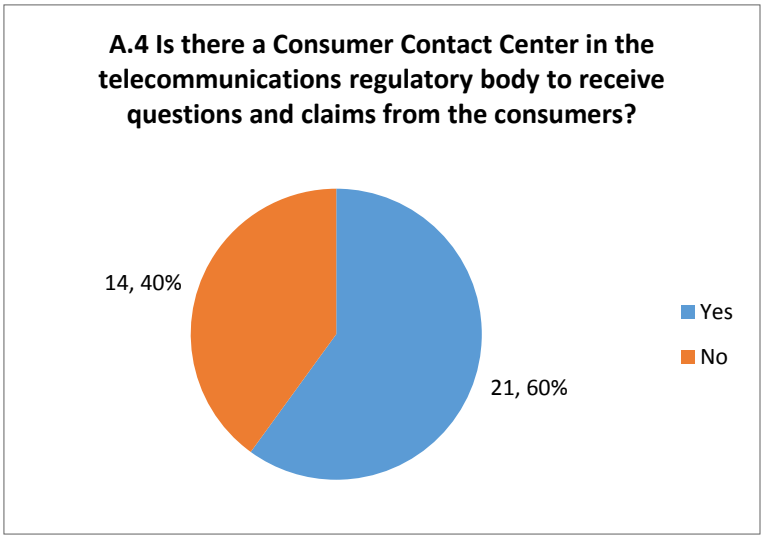

Figure 9

Countries were also asked about the claims received by the regulatory body. Although most of the countries did not answer this part of the questionnaire, the responses of 12 countries can be found in Table 5 below for benchmark. Other countries have just given descriptive information, which can be found in Table 6.

Average total claims per month							
Tool used / Country	Voice Call	E-mail	Fax	Social media	Electronic form	Physical visit	Other
Brazil	198,264				104,231	1,03	
Canada	1200	100			750		50 Letters; 140 Online Chat
Chad	120						
Comoros						0,16	
Costa Rica							48
Equatorial Guinea	15	5	3	8	4	2	
Georgia	14	4		2	3	2	
Jordan	250			500			
Mali	452						letter: 2
Senegal	60	30		2	1	5	2
Sierra Leone	150	50				25	During radio programs hosted for the commission
Ukraine	0,8	39				9	post and government hotline - 800

Table 5

Country	Descriptive information
Argentina	https://www.facebook.com/ENACOMArgentina https://twitter.com/ENACOMArgentina https://plus.google.com/+CncComisi%C3%B3nNacionaldeComunicacionesBuenosAires https://www.youtube.com/channel/UCa7rAwGCM0Ore03MAhOEvlQ https://enacom.gob.ar/contacto_c1 https://www.enacom.gob.ar/centrosatencion/c_1 https://www.enacom.gob.ar/denuncias-telefonia-internet-y-cable_p3613 0800 333 3344
Mexico	The regulator has a tool called “SOY USUARIO”, through which from 2015 to 2017 a total of 32,016 claims have been received.
Peru	There is a special number available to call to the OSIPTEL's call center for orientation purposes, nevertheless, through this number, users can not present claims. As said before, claims in first instance are receive by operators. In second instance, the claims are also receive by the operators, and the operators gather those claims and must sent them to the regulator.
Portugal	Complaints book - 2014S1:4501; 2014S2:5005; 2015S1:3940; 2015S2:3989; 2016S1:3900; 2016S2:4736; 2017S1:4548; Mail: 2014S1:164;2014S2:146;2015S1:134;2015S2:96;2016S1:106;2016S2:89;2017S1:101
Togo	official letter

Table 6

More significantly, when countries were asked about the main concerns voiced in consumer claims using a scale from 1 to 5, it was possible to notice that billing is the main reason for consumer complaints, as can be seen in Figure 10. However, other reasons such as customer service and quality are also among the main reasons for complaints.

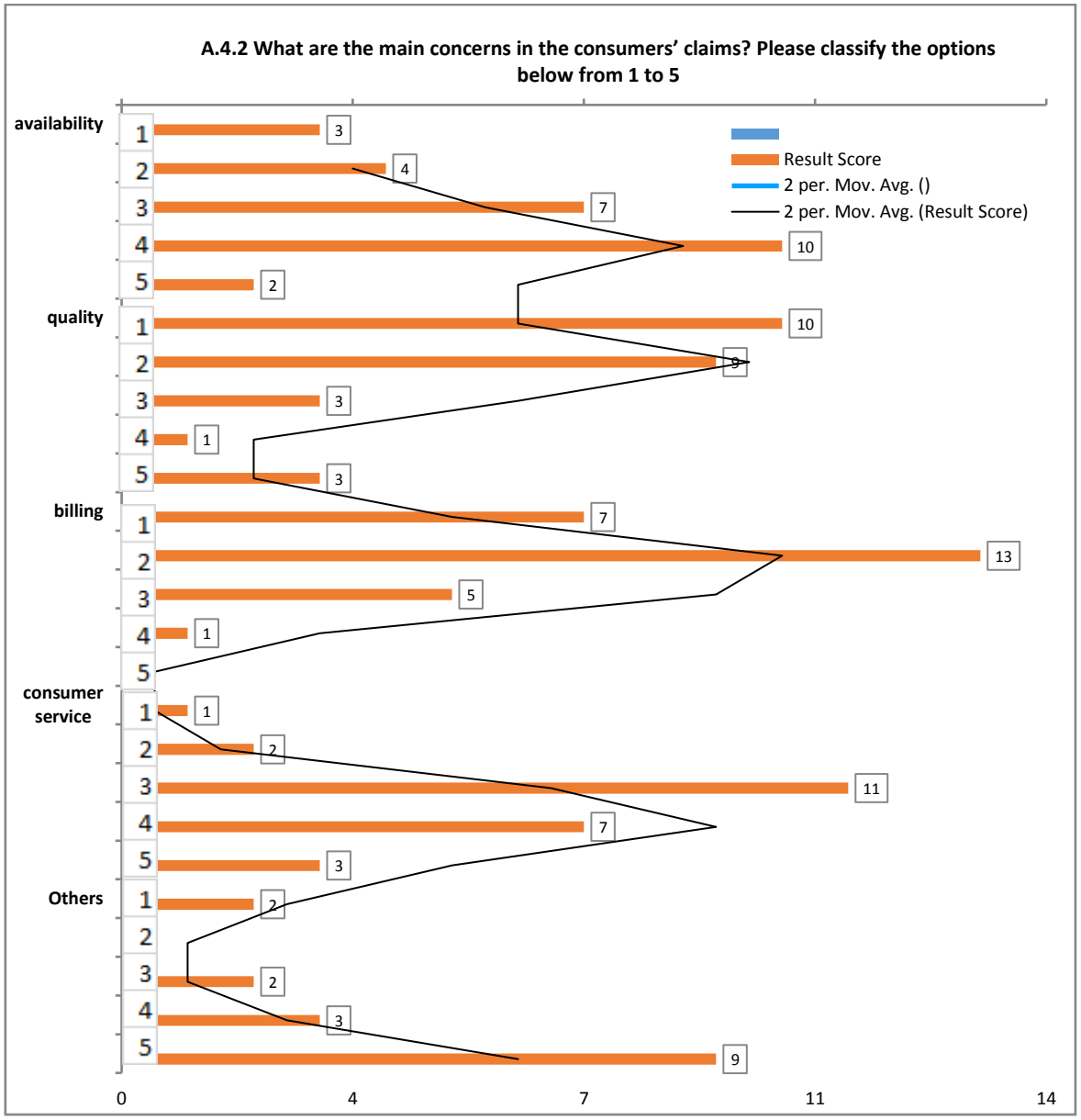

Figure 10

Only 60% of respondents reported that the regulator or the government promote campaigns to raise the consumers' awareness on their rights, as can be seen in Figure 11. On the other hand, answers to question A.5.1 (Figure 12) show that many countries are using new approaches to reach consumers with information on service quality, including social media.

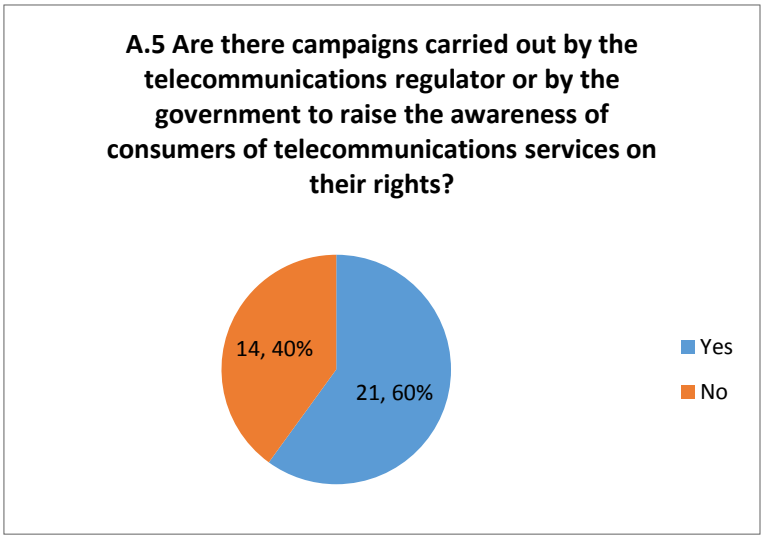

Figure 11

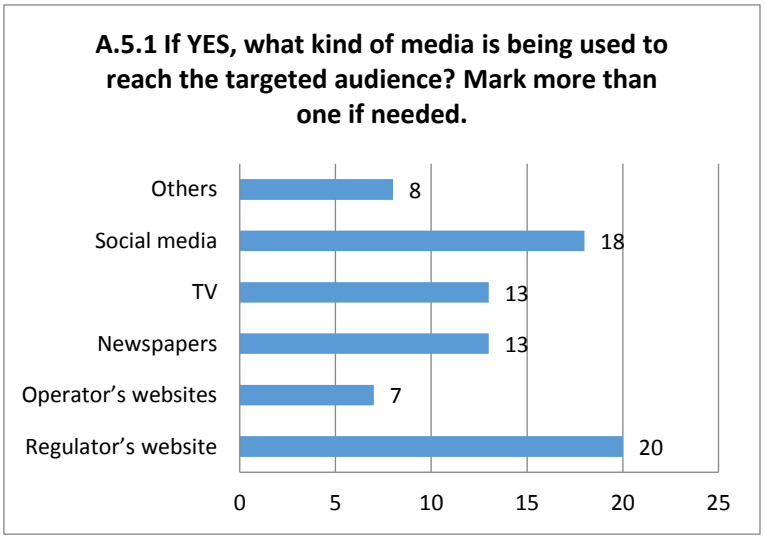

Figure 12

It was very interesting to see (Figure 13) that only 36% of the countries responding believe that the consumers of telecommunications services in their country are aware of their rights. Also, only 32% of the countries answered that their consumers are aware on how to open a claim on the consumer protection institution (Question A.5.3 (Figure 14)). When it was asked about the consumers' habit of searching for information about their rights and duties in relation to the services contracted, the result was that just 26% of the countries could confirm this kind of information as positive (Figure 15). On the other hand, the answers about the consumers' habit of requiring respect on their rights, a very subjective information, was confirmed as positive by 42% of the countries (Figure 16).

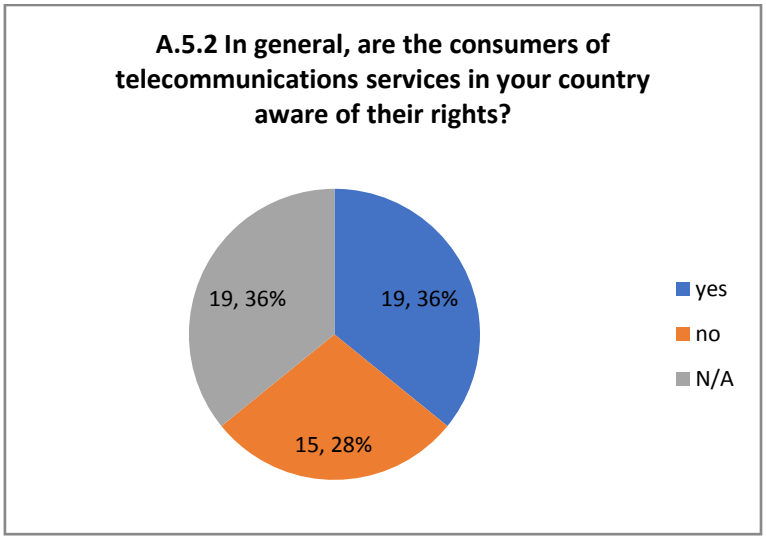

Figure 13

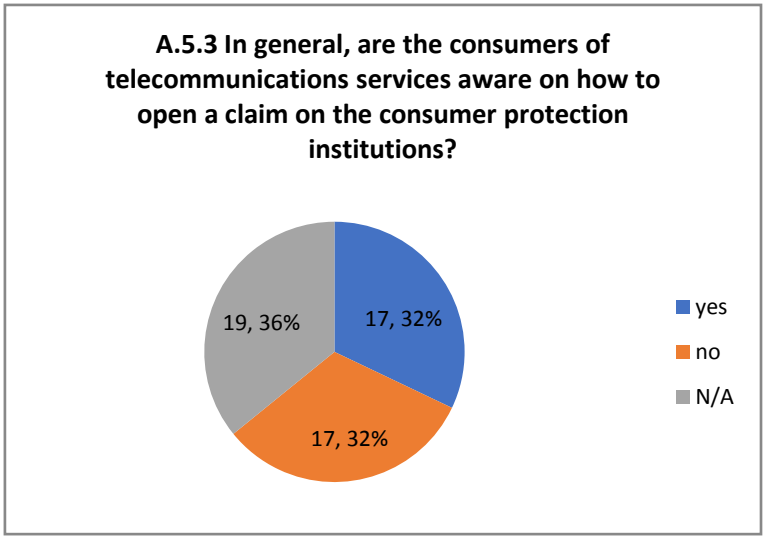

Figure 14

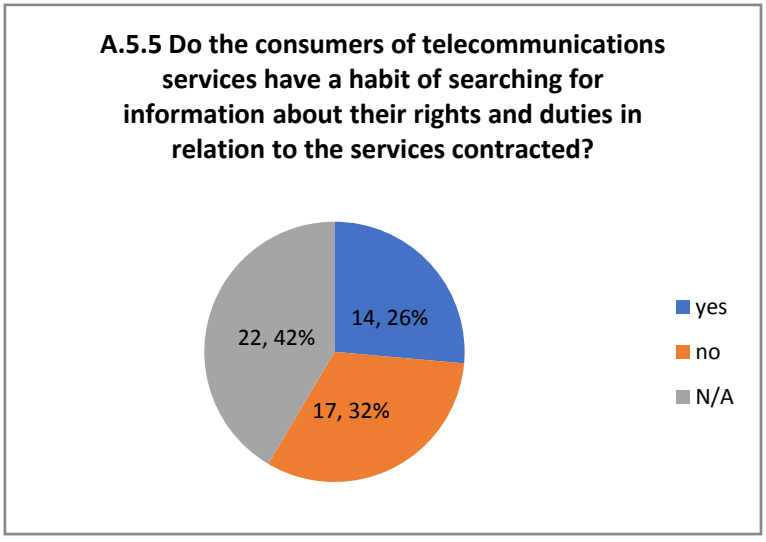

Figure 15

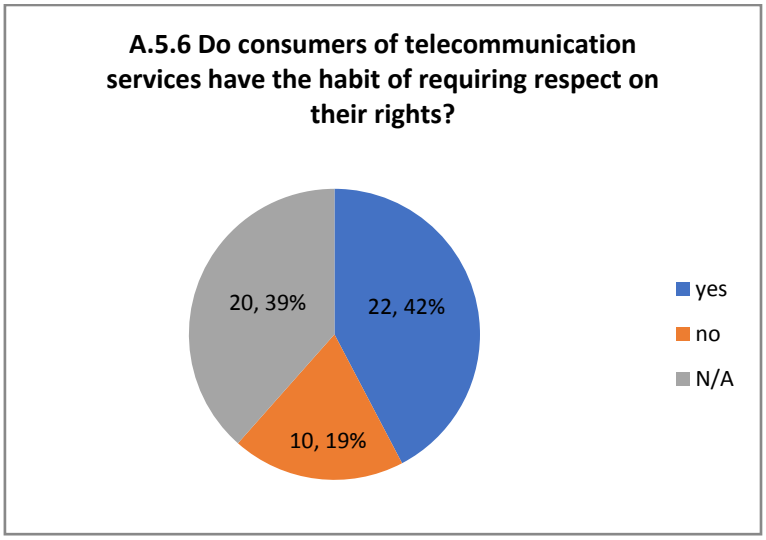

Figure 16

Finally, it was interesting to notice that although half of countries answered that their consumers are regularly informed by the operator regarding the prices of the offers, only 11% of them indicated that information about quality is provided, as it can be seen in Figures 17 and 18. Such results raise the importance of fostering the use of quality results as an important factor for market differentiation.

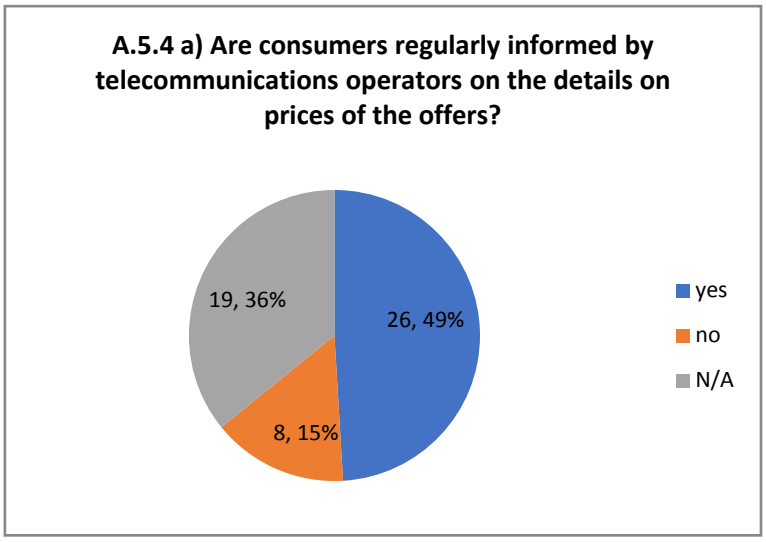

Figure 17

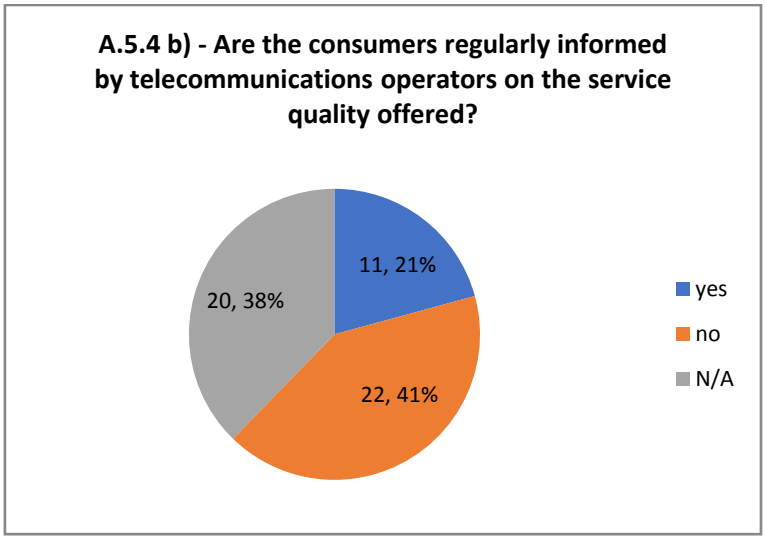

Figure 18

Indeed, this issue becomes more urgent if we remember that “quality of the services" is one of the main concerns in consumers’ claims, as it was highlighted in Question A.4.2 (Figure 10).

4 Analysis of the responses to Sections B and C

This section presents and discusses the countries' responses to Sections B and C of the Questionnaire. These sections mainly cover the status of national regulatory frameworks, measurement and enforcement strategies, as well as approaches to raise consumer awareness by QoS/QoE information publication.

As presented previously in this report, most of the countries who answered the Questionnaire indicated that they have national quality regulatory frameworks. However, it is important to bear in mind that these frameworks may vary greatly among the countries. Aiming to further explore the differences and identify common approaches, the Questionnaire asks some more specific questions on the national regulatory frameworks.

To begin, the Questionnaire aims to identify which telecommunication services are commonly addressed by the national QoS and QoE regulation.

As presented in Figure 19 (Question B.1, mobile services (voice and data) appear to be of greater interest for QoS regulation than fixed services, although the latter are regulated to a great extent as well. On the other hand, far fewer countries target Pay-TV services in their regulatory frameworks.

The same pattern cannot be observed for QoE regulatory frameworks. As per Question C.1 (Figure 20), it can be seen that countries are less focused on QoE regulation than on the traditional QoS approach. Apart from mobile telephony services, which are being addressed by 11 responding countries, the number of countries discussing QoE in their regulation for fixed services, mobile broadband or Pay-TV is fairly small.

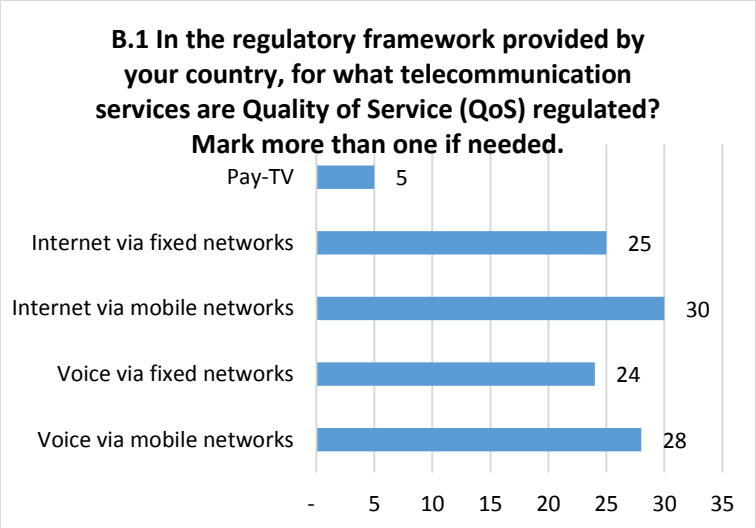

Figure 19

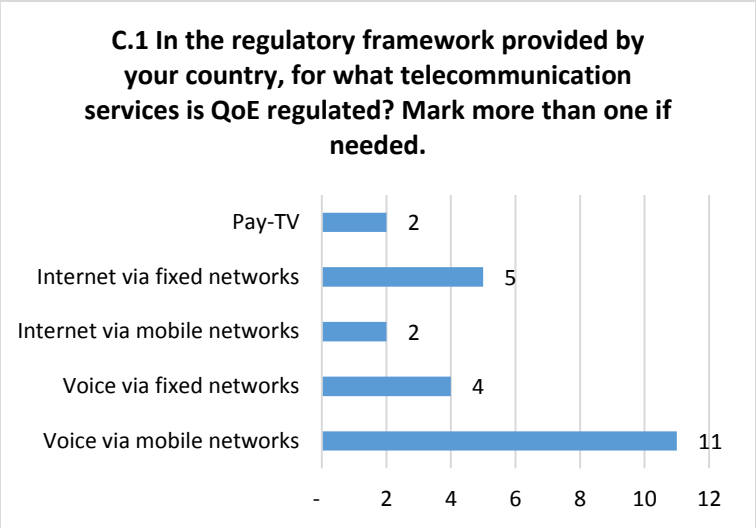

Figure 20

Such differences in the number of countries regulating QoS and QoE is understandable, mainly because the discussion on QoE definitions and its subjective measurement strategies is much newer than those related to QoS. Moreover, one may argue that the quality management departments of regulatory authorities are commonly headed by engineers, who tend to focus more on assessing technical network KPIs.

Questionnaire answers also show, as can be seen in Figures 21 and 22, that more than 80% of the countries define QoS regulatory indicators to track the quality of telecommunications networks. More significantly, only one country among all the 31 who have indicators defined does not establish minimum/maximum targets to be achieved by the operators. Furthermore, the countries' responses to question C.3 indicated that at least 20 countries also define minimum/maximum targets for QoE indicators.

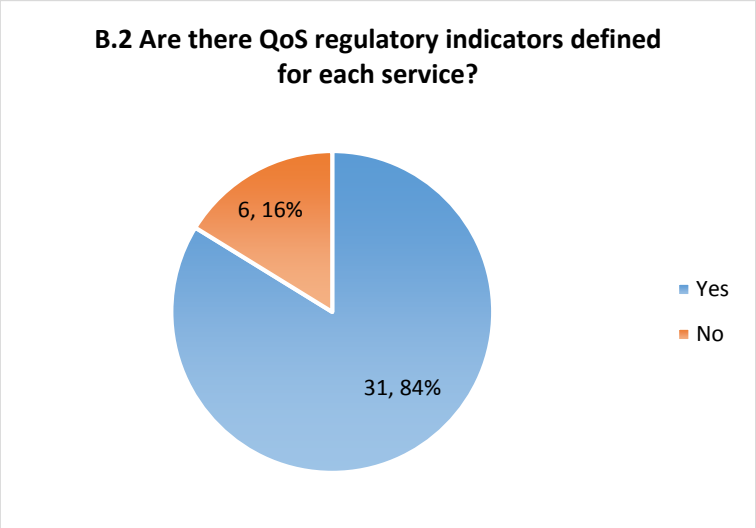

Figure 21

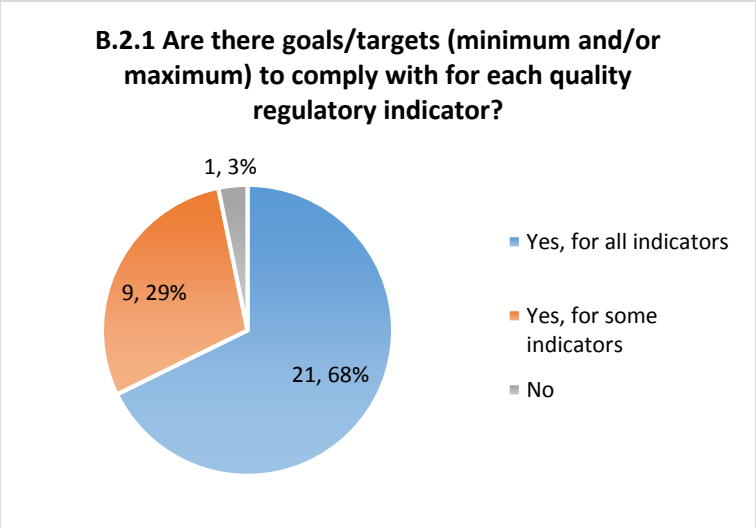

Figure 22

This result confirms the importance for SG12 work to provide international standards on indicators and related targets to be used as references by countries in establishing or revising their regulatory frameworks. As will be shown in the next chapter, where the answers for Question D.2 are discussed, the definition of technically feasible targets that are enough to assure a good level of quality is still a challenge for many regulators, what makes the guidance from SG12 highly appreciated.

Yet, some alternative approaches have been exemplified by countries who do not establish regulatory indicators. For example, in Mexico, QoE indicators are not yet implemented but the QoS regulation for the mobile service specifies that the regulator may carry out QoE measurements in which the results and methodology will be published and is not subject to sanctions.

Serbia, in a different approach, benchmarks the regulatory framework of other European countries and compares the measured level of the indicator in question with average level prescribed by other regulators. With such information, they issue a measurement report and use it in the mediation process between end user and operator.

The Questionnaire also explores if countries differentiate the indicators' targets based on any criteria. As can be seen in Figure 23, most of the countries responding use a geographical breakdown and the operator's number of subscribers as the main criteria to differentiate the QoS indicators' targets. The same can be said regarding the QoE indicators' targets, as per the responses to Question C.3.1 presented in Figure 24.

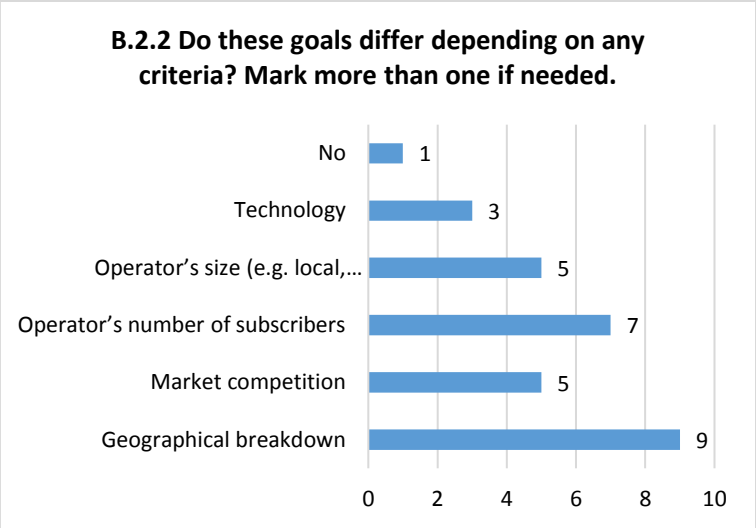

Figure 23

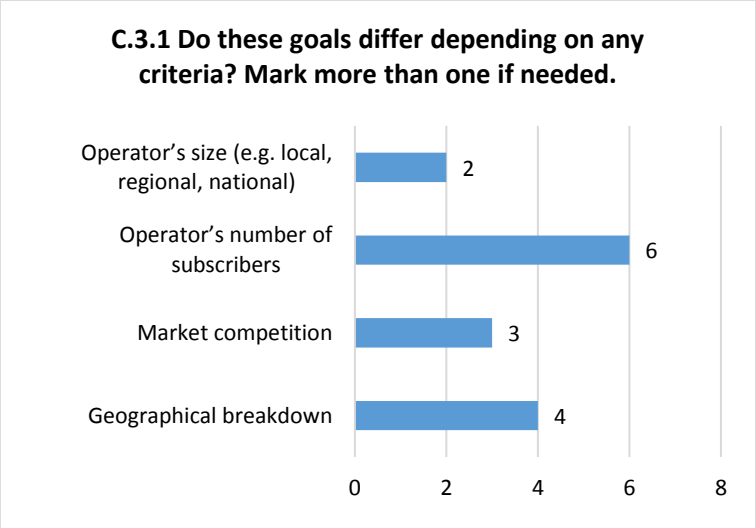

Figure 24

Nevertheless, other interesting criteria, including market competition, operator's size and technology are also represented among the responses – an interesting aspect to be further explored by SG12. Indeed, guidance on how to define differentiation criteria, as well as use cases could be an area for SG12 to provide international references.

Countries were also asked if they have obligations on service interruption. As can be seen in Figure 25, although 18 countries answered that they obligate operators to notify customers in case of interruption of the telecommunications services, less than half of them require operators to reimburse customers for such interruptions in the service provision. More significantly, as many as 22% of the countries who answered question B.8 (approximately 23 responses were received) do not request operators to notify end users in cases of service interruption. This is another important aspect to be taken up in SG12 work to provide guidance and best practices to establish quality regulatory frameworks.

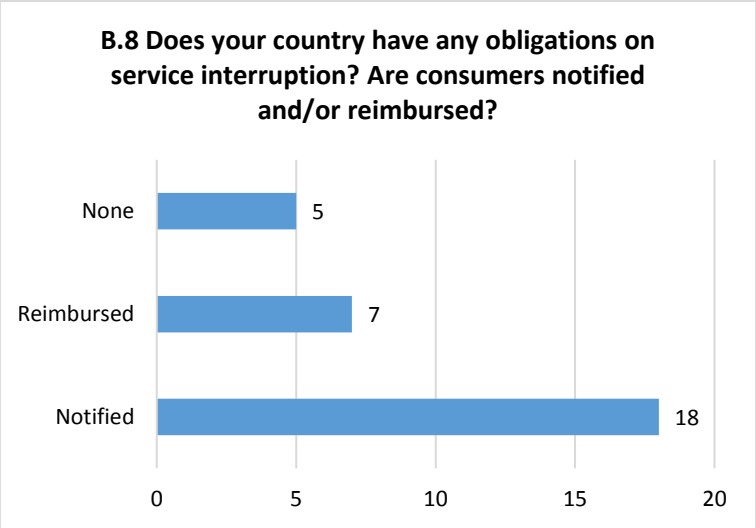

Figure 25

Regarding QoS measurement strategies, countries were asked what approach they are using to measure voice and broadband services in both, fixed and mobile networks. The results are shown in Figures 26 and 27.

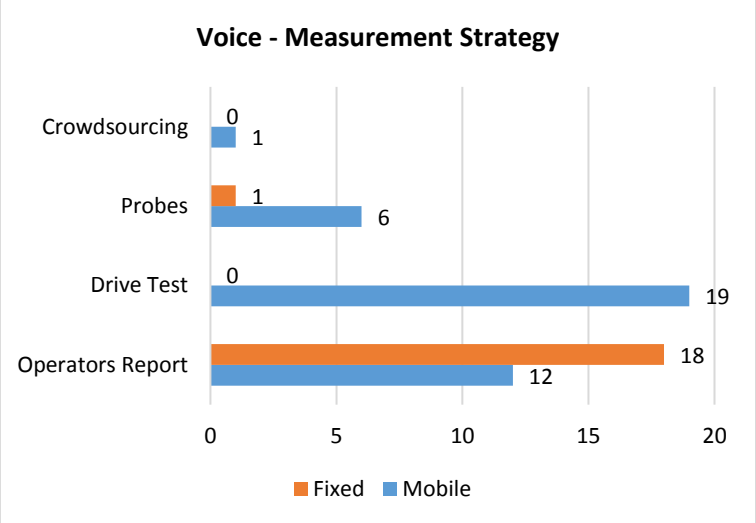

Figure 26

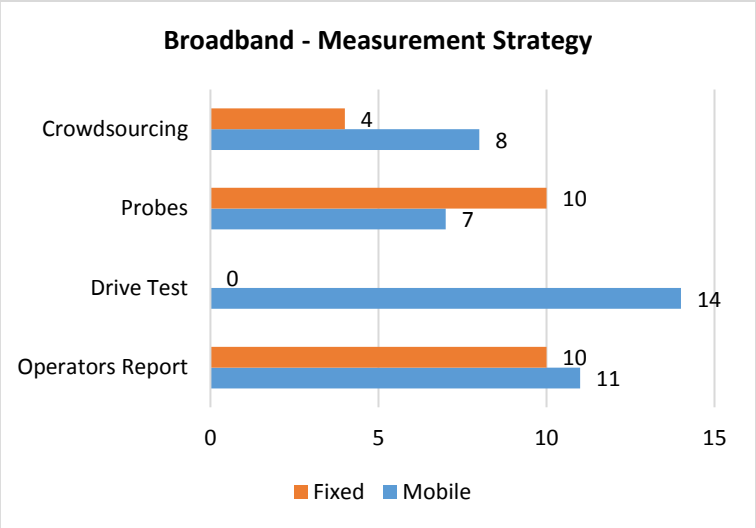

Figure 27

From the results it can be found that drive test and reports provided by the operators are the most widely used strategies to measure QoS of mobile voice and broadband services. However, it can also be seen that newer measurement approaches, such as the use of probes and crowdsourcing, are also well-adopted for mobile broadband measurement. For this service, it is interesting to notice that more countries are adopting crowdsourcing strategies than probes.

The situation is different for fixed broadband services, where probes are more common, probably due to the lack of knowledge about crowdsourcing approaches to measure fixed broadband (e.g., measurement solutions embedded in customer premises equipment).

The results present in Figures 28 and 29 also show that while most of countries measure the QoS of mobile networks yearly, QoS of fixed networks are more commonly measured monthly. The week, quarter-year and half-year periodicity have been uncommon among the countries who answered, no matter whether for voice, data, fixed or mobile services. Finally, it is also important to highlight the expressive amount of countries that do not establish a fix periodicity for QoS measurement, especially for measurements in broadband networks.

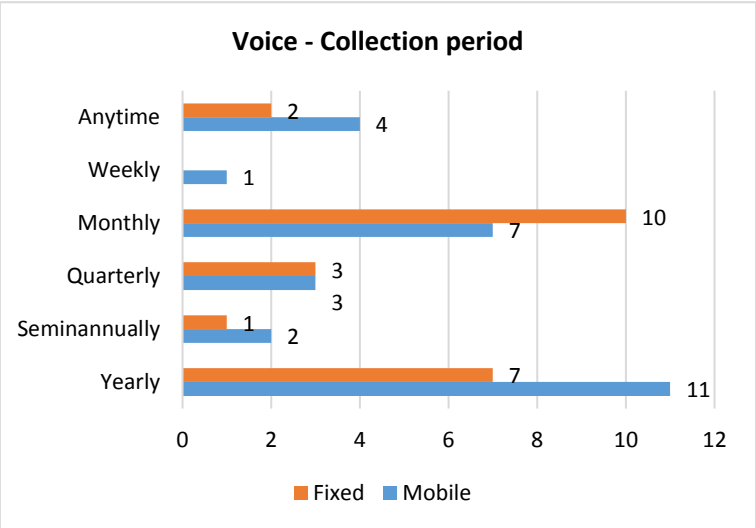

Figure 28

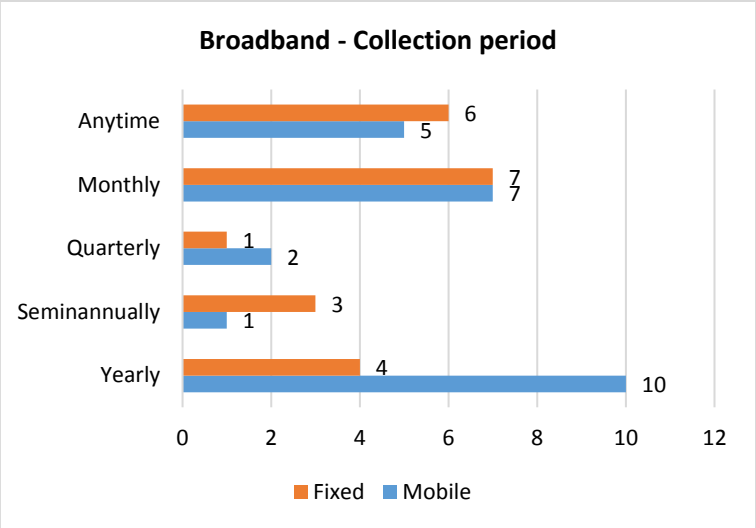

Figure 29

Such results raises some questions to be further explored by SG12. Why is the preferred periodicity for mobile networks a year and for fixed a month? Are countries choosing the measurement periodicity rationally? If yes, what makes the collection by month preferable, in particular when we consider that most of wide network improvements cannot be achieved in such a short period of time? Indeed, the criteria to be considered by regulators in order to decide what periodicity for the measurement of QoS for mobile and fixed networks should be chosen would deserve further SG12 studies.

The results also show that governments are mostly the ones in charge of performing the QoS measurements, followed by operators (see Figures 30 and 31). However, the number of countries which opt to designate a third-party entity to measure QoS is to be noted, particularly for mobile networks. The costs and benefits of each approach may vary with the indicator to be measured, the size of the country's territory and population, as well as the availability of budget and human resources in the regulator to perform the measurements.

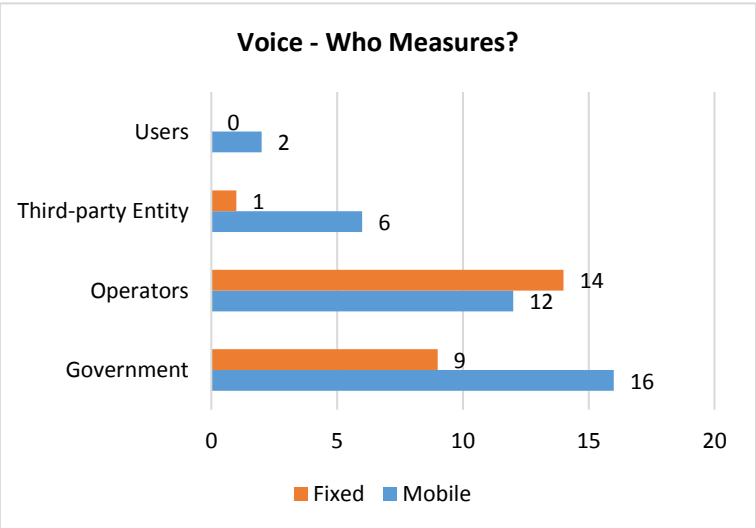

Figure 30

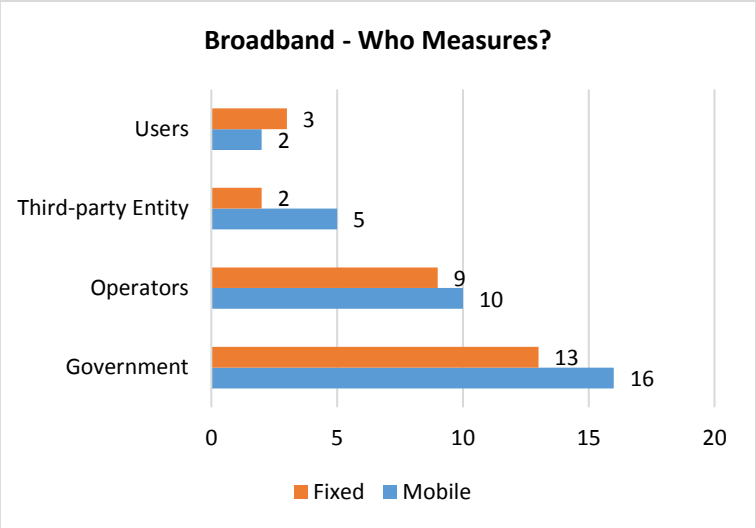

Figure 31

More significantly, as presented in Figure 32, almost 80% of the countries who answered Question B.5 affirm that regulators are the ones to set the measurement methodologies without any interaction with the operators.

As already discussed in previous SG12 meetings, such approach potentially raises the judicial litigation in the quality management process, because operators are more likely to dispute against imposed measurement methodologies. On the other hand, a multi-stakeholder discussion among regulators and operators in order to define reliable and accurate measurement methodologies would avoid litigation and help create a collaborative relationship among operators and regulators.

Similarly, as can be seen by analyzing the responses to Question B.7 (Figure 33), many respondents do not have a statistical framework to measure QoS at a national level. The lack of a statistical basis for the QoS measurement methodology could make its results easily questionable by operators, in particular if the results are being used by regulators to apply fines due to non-compliance with minimum/maximum QoS thresholds.

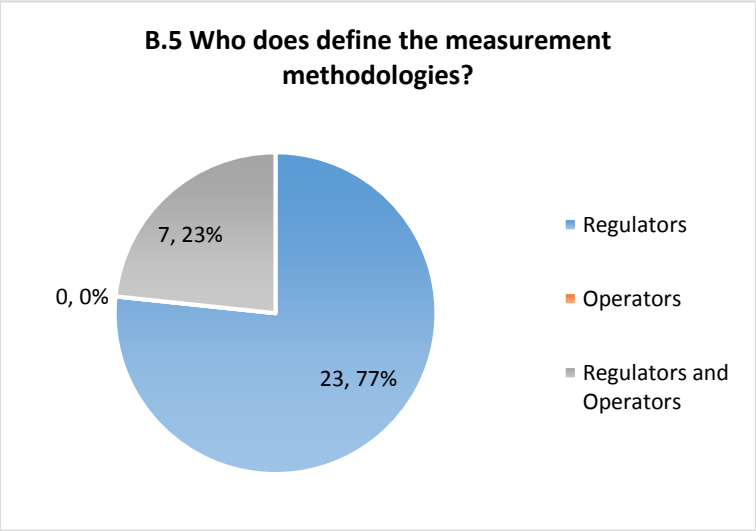

Figure 32

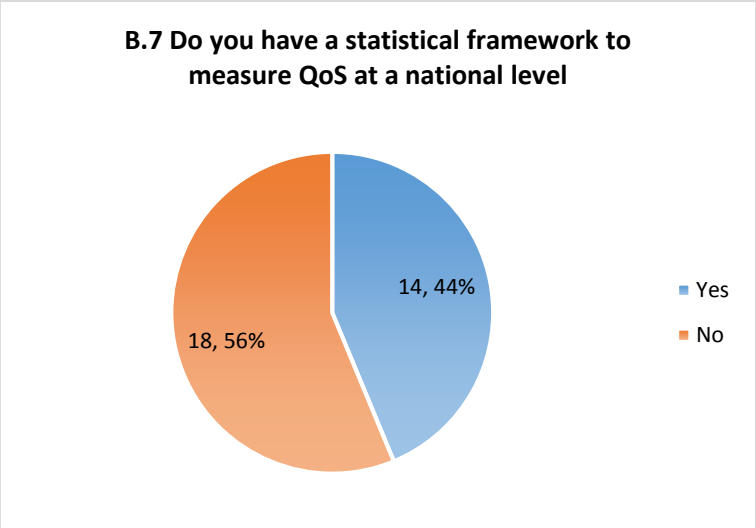

Figure 33

The Questionnaire also explores QoE assessment approaches used by regulatory authorities. As per the responses to Question C.1.2 (Figure 34), the models adopted greatly vary among complaint handling, perceived quality, as well as consumer satisfaction, with a slight advantage to the second over the third. However, as can be seen in the responses to Question C.1.3 (Figure 35), most countries does not differentiate between perceived quality and consumer satisfaction models in their regulatory frameworks.

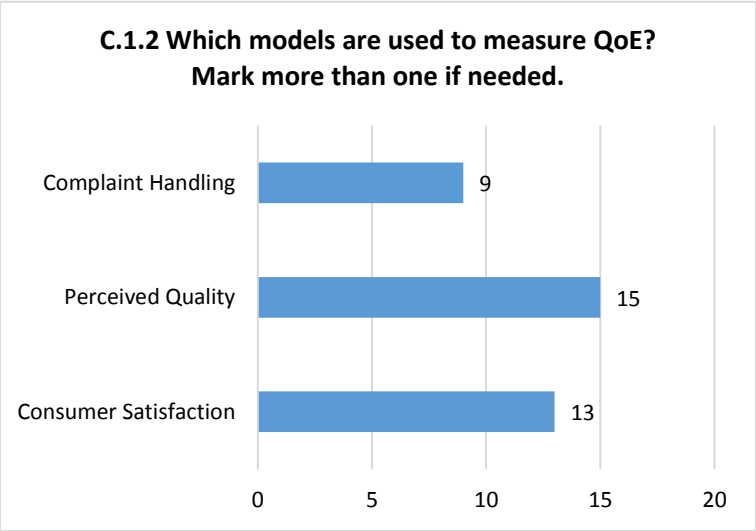

Figure 34

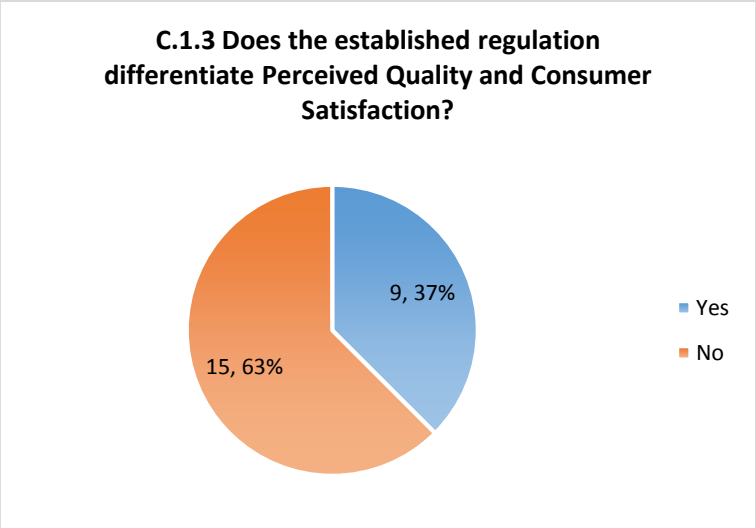

Figure 35

Such lack of understanding of the differences between the two assessment models should alert SG12 to provide further international references, as well as capacity building initiatives on QoE concepts and proper measurement techniques. On the latter point, the responses to Question C.2 (Figure 36) indicate that approximately 60% of responding countries are not using surveys to measure QoE. This raises a flag to re-iterate the importance to base any QoE assessment on a subjective approach. Responses to Question C.2.1 (Figure 37) demonstrate that those surveys seem to be coherently used to assess perceived quality and/or consumer satisfaction.

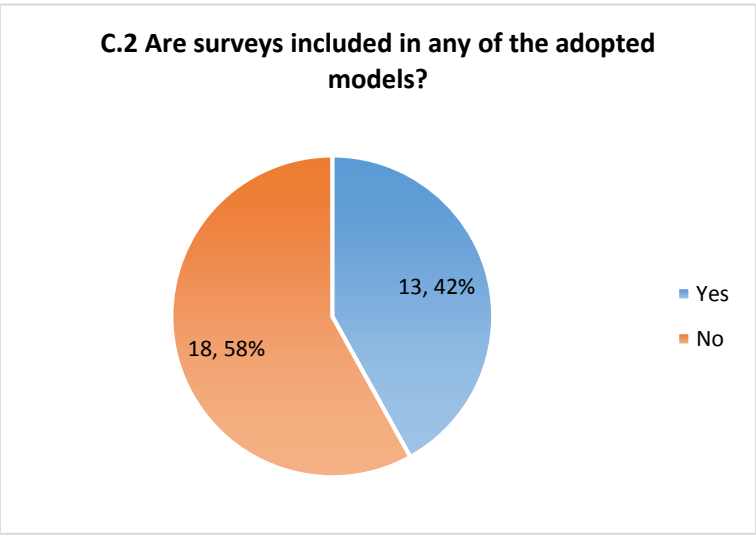

Figure 36

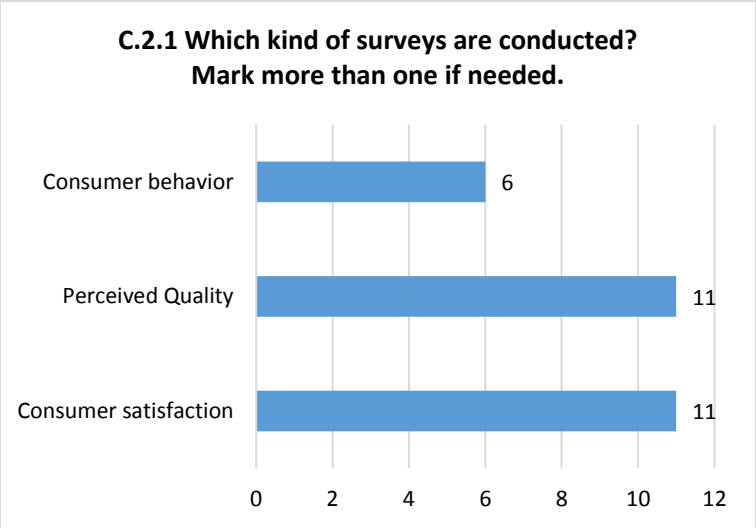

Figure 37

Regarding the enforcement strategies implemented by countries in order to avoid non-compliance with the established QoS and QoE indicators, the responses to questions B.4 and C.4 show that the traditional approach of applying sanctions over operators who do not comply with the minimum/maximum QoS/QoE indicators' thresholds is still the most common enforcement approach. Nevertheless, the efficiency of such enforcement strategy could not be assessed by the responses to Question B.4.1, since no coherent responses were received (Figures 38 and 39).

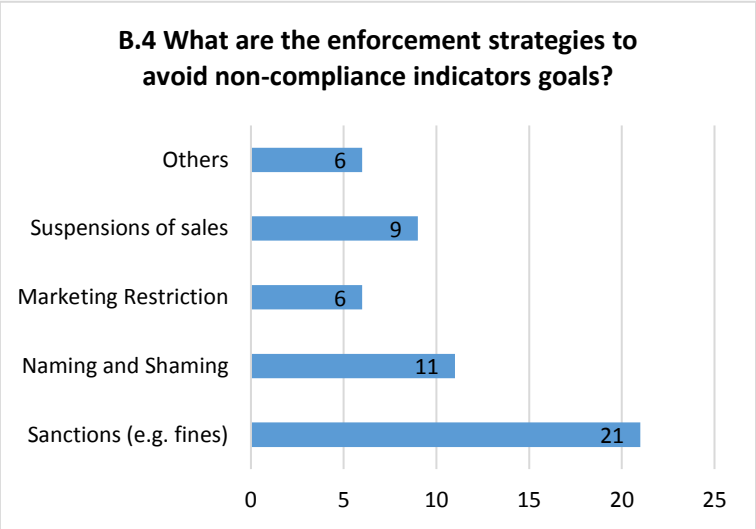

Figure 38

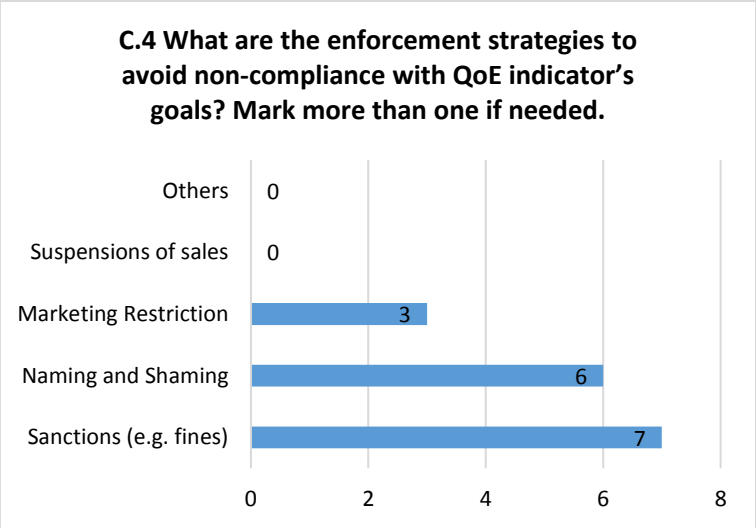

Figure 39

Concerning the strategy of applying sanctions, the "Naming and Shaming" approach, in which the QoS and QoE measurement results are published to make consumers aware on the differences in the service quality provided by different operators, appears second among the most adopted approaches listed.

More significantly, and in particular for QoS, a wide range of different enforcement approaches are used, which suggests a need for international references that provide further guidance on the specific situations in which each enforcement approach should be considered. This initiative would help countries to decide on the enforcement strategy to put in place, thus improving the efficiency of their quality regulatory framework.

On the other hand, although more than 70% of countries responding to Question B.6 confirmed that they publish QoS results, the same cannot be seen for QoE. As per the responses to Question C.5, only 33% of the countries are publishing QoE results to the end users. This finding should be further explored by SG12 in order to understand why countries would be measuring QoE without publishing the results to the end users. It reinforces the need of more international references on QoE regulatory frameworks that not only clarify the concept and its measurement techniques but also highlight the benefits of publishing QoE results (Figures 40 and 41).

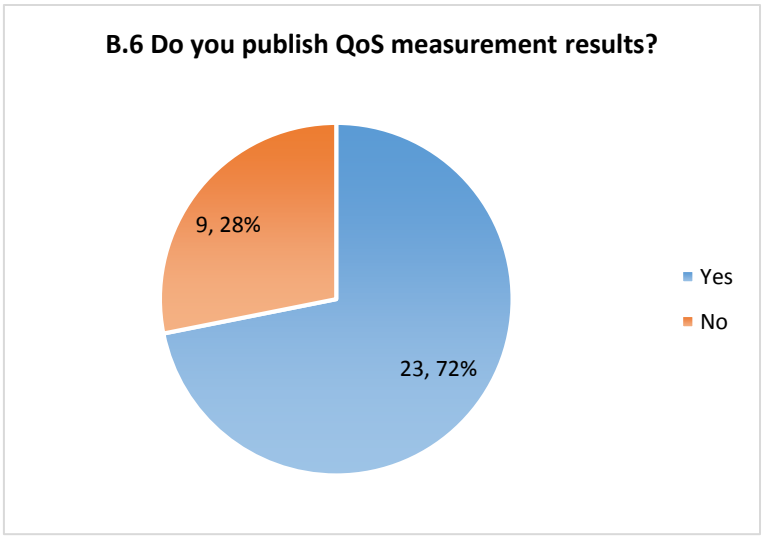

Figure 40

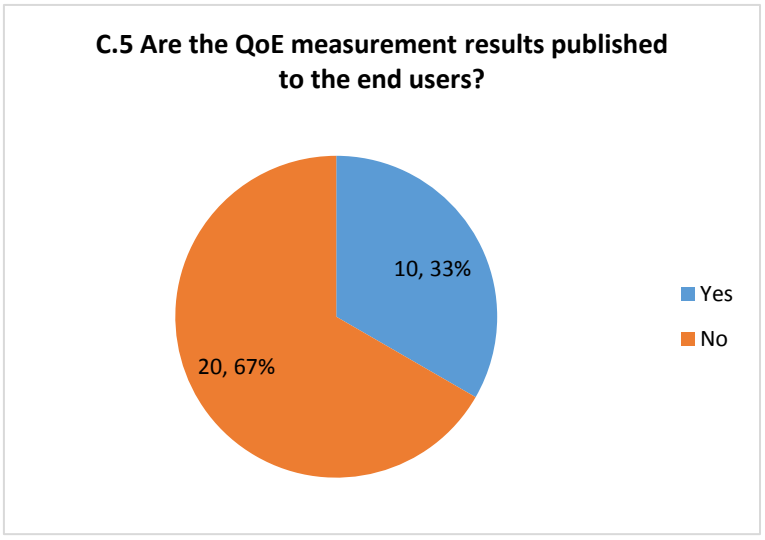

Figure 41

The responses to Questions B.6.1 and C.5.1 (Figures 42 and 43) suggests that guidance on the most efficient strategies to publish QoS and QoE measurement results is required. Most of the responding countries publish QoS and QoE results on the regulator's website. The efficacy of such publication should be further studied, mainly when compared with publication on social media or popular websites. The results showcase that some countries are adopting such new approach.

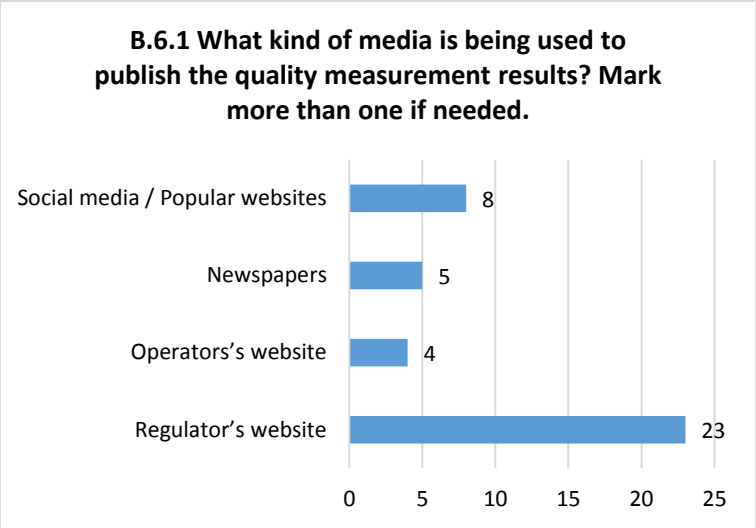

Figure 42

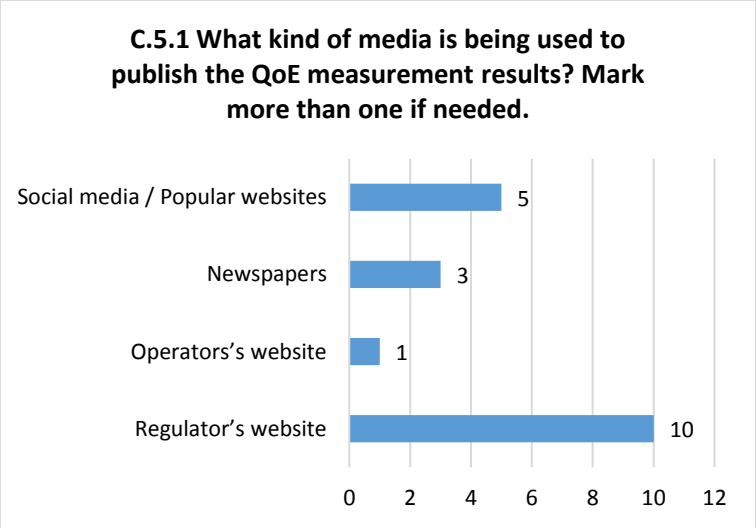

Figure 43

Finally, the Questionnaire tried to collect information about the frequency in which the QoS and QoE results are published. According to responses to Questions B.6.2 and C.5.2 (Figures 44 and 45), yearly publication is the most common approach, although responses vary greatly. However, in an era in which people are avid for up-to-date information, one could ask whether yearly publication can meet the users' needs or the goals of the operators to showcase improvements in their networks.

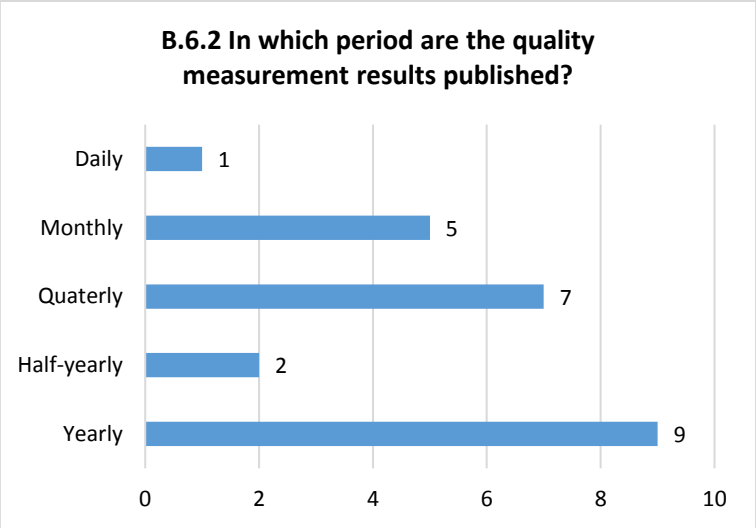

Figure 44

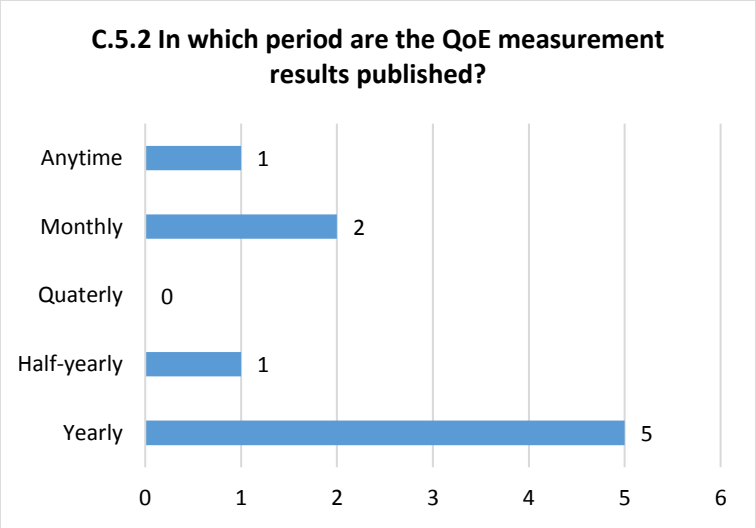

Figure 45

On the other hand, it should be noted that too frequent publication may create a sense that nothing is being done to improve service quality. In fact, more studies and discussion on this topic should be carried out by SG12.

5 Analysis of the responses to Section D

The last group of questions (Section D) invites countries to summarize their main issues to improve service quality, as well as their views on how ITU should assist them in establishing their quality regulatory frameworks. With respect to the issues related to the implementation of quality regulation, the answers varied the most. They range from the lack of a legal framework to the lack of training of engineers to solve problems arising from the network.

Furthermore, in answering how ITU could help countries to design and implement actions to improve the quality of service and keep consumers informed, the most common answer was international references and capacity building initiatives, with ITU also providing experts to help implementing frameworks and strategies through cooperation agreements.

The first Question *"What are the main issues faced by your country related to the provision of acceptable service quality to consumers of telecommunications services?"* was answered by 20 respondents. Figure 46 presents a word-cloud with the most frequent expressions.

Figure 46

The main topics are presented in Table 7. Many answers can be categorized under "Lack of Quality Legal/Regulatory Framework".

Category	Main issues to provide acceptable service quality to consumers
Lack of Quality Legal/Regulatory Framework	• Mechanisms to stimulate the promotion of the quality of service delivery in line with the expectations of society • Define and measure only strategic quality indicators. • Reduce the operational cost of both the Agency and the companies, re-establishing the focus of quality management in solving the problems identified to the detriment of activities that give little return for quality improvement, such as sanctioning and litigations. • How to capture quality truly from the users point of view • Lack of legal basis • Effective implementation of QoS monitoring system in real time

Category	Main issues to provide acceptable service quality to consumers
	• Lack of enforcement strategies • Lack of transparency • Asymmetry of Information • Defining the right tools for monitoring
Lack of consumer awareness and empowerment	• Raise consumer awareness • People don't want operators to install radio equipment near their homes • Providing consumers with the opportunity to independently control quality indicators • Undemanding users • Lack of consumer awareness on their rights
Lack of basic facilities (energy, security, costs etc.)	• Vandalism acts on copper cables and optical fiber • Energy issues for equipment • Difficulties to access certain areas of the country due to lack of security or due to rainy season • Poor coverage (both indoor and outdoor) • Poor infrastructure • Lack of investments in network infrastructure • High cost of international internet bandwidth
Lack of trained human resources	• Lack of practical experience on implementation • Lack of human resources • Lack of capabilities in the regulator to handle the complaints from the users • Lack of trained human resources in the regulator to stablished a quality regulatory framework

Table 7

The second Question *"How could ITU assist your country in elaborating and implementing actions to improve service quality and keep consumers informed? (e.g., recommendations, capacity-building, etc.)"* received descriptive answers from 19 respondents. The word-cloud with the most frequently used expressions is shown in Figure 47.

Figure 47

Similarly to the responses to the first Question in this Section, the answers for this Question were synthetized and categorized, and related stakeholders were identified, see Table 8.

Actions	Impacted stakeholder(s)	Synthesis of the suggestions
Capacity-building / Development Program	Consumers Operators Regulators/Gov	• Capacity-building on consumer rights and introduction to telecommunications services; data systematization; exchange of experiences between countries, especially to be developed by ITU-D. • All the actions need to be implemented in close collaboration between ITU-D and ITU-T. • Capacity Building on Quality Assessment.
Direct Support	Regulators/Gov.	• Direct assistance to countries. • Direct Assistance to countries on Quality Assessment. • Capacity-building (in country training). • Procuring equipment for the regulator to monitor services provided by the operators. • A close follow up after capacity building initiatives should be done by the ITU expert in order to be sure that we are on the right way.
Seminar and Workshops	Academy Consumers Operators Regulators/Gov	• Organizing seminars, workshops and capacity-building. • Seminars and workshops specifically targeted to developing countries on Best Practices on Quality Assessment, Consumer Satisfaction

Actions	Impacted stakeholder(s)	Synthesis of the suggestions
		Surveys, and Sanction Mechanisms, among others. • make available to us ITU senior experts working in the field to help.
An Organized and Published Set of Regulatory Framework / A Benchmarking Measurement Practices	Academy Consumers Operators Regulators/Gov	• Review and diffusion of national experiences. • Lead study about the impact of the terminal quality on QoS or QoE delivered. • Create a standard (recommendation) to measure the quality of Internet access parameters using the TCP protocol - especially for mobile networks. • Establishing reference frameworks related to quality. • Define reference threshold for the KPIs. • Define a baseline measurement methodology framework. • Define harmonized QoS/QoE indicators, thresholds and methodology to measure parameters. • Define a list of minimum KPI's that can be included in the QoS and QoE regulatory framework, with reference thresholds for the KPIs. • Providing references to best practices for the resolution of disputes between operators and consumers.

Table 8

The results show a great demand for guidance on regulatory frameworks and a benchmark of measurement practices. This raises questions about the extent to which current ITU-T Recommendations provide sufficient guidance. A number of countries would like to not only have international references and capacity building initiatives, but also "direct assistance" from ITU.

Finally, the third question of Section D was *"In which topics could international standards provide useful references for your country when establishing national quality regulatory frameworks? (e.g., regulatory indicators, goals, measurement strategies)"*. Twenty countries responded and the word-cloud from the answers is shown in Figure 48.

Figure 48

The answers were summarized and categorized in four main topics. It is possible to notice that countries are mostly asking for support in establishing goals/enforcement strategies, as well as on how to measure QoS (Table 9).

Category	Topics for international standards
Regulatory Definitions	• Framework of Quality of Experience (QoE) as a Perceived Quality and Consumer Satisfaction • Setting of limit values (Indoor/Outdoor) for different indicators (in mobile networks with radio parameters). Definition of measurement procedure • Studies on how to apply a quality of service regulation depending on the grade of economic and social development of a country (since goals must be different)
Targets and Enforcement Strategies	• QoS/QoE results publication strategies • Review and diffusion of national practices and experiences related with QoS/QoE (benchmark) • Regarding QoE, a possible role for ITU's lies in the review and diffusion of national practices and experiences. Hence a thoughtful discussion about these practices should precede any action regarding the possibility and convenience of the adoption of international standardization on the topic. • It is advisable to invite international experts to help with the Framework of Quality of Experience (QoE) as a Perceived Quality and Consumer Satisfaction (consumer experience or consumer satisfaction) • A benchmark of QoS/QoE regulations in other countries, • References on statistical methodologies in order to have a representative sample of the quality of service in the country

Category	Topics for international standards
Measurement Strategies	• Recommendations on alternative methods for quality measurements (Apps, collaborative tools, etc.). • Recommendations that indicate which KPIs and/or KQIs better reflect quality of services in the perspective of consumers. • QoS/QoE measurement methodologies • Internet measurements standards. • References on statistical methodologies in order to have a representative sample of the quality of service in the country • QoE indicators per services • Measurements procedures • Characterization of results (e.g. good, bad) • Accuracy of the measurement procedures and measurement setup • Regulatory KPIs, thresholds, measurement strategies

Table 9

6 Conclusion

This report presented and analyzed the responses to the Questionnaire on the status of national quality measurement frameworks. The objective of this initiative was to collect information as input for the work of ITU-T SG12 in creating international references on national regulatory approaches and assist countries in deploying their quality regulatory framework.

Although the number of questions to be answered was extensive, what may hinder to achieve a high response rate to some extent, the Questionnaire was successful in gathering information from a wide number of countries.

Based on the valuable information received, key findings were identified, which will inform future work of ITU-T SG12, and can serve as a benchmark for any country interested in establishing or reviewing its QoS and QoE regulatory framework.

To summarize, this initiative meets the objectives of WTSA Resolution 95 (Hammamet, 2016) on ITU-T initiatives to raise awareness on best practices and policies related to service quality, and hopefully will promote further discussion among ITU members on how to assist countries in fostering a better quality of their telecommunications services.

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