Over-The-Top Services
Understanding the Challenges and Opportunities

OVER-THE-TOP SERVICES: UNDERSTANDING THE CHALLENGES AND OPPORTUNITIES

ACKNOWLEDGEMENTS

TABLE OF CONTENTS

LIST OF TABLES, FIGURES AND CHARTS

Tables

Figures

Charts

FOREWORD

The Commonwealth Telecommunications Organization (CTO) is presenting this research report, a culmination of a two-year long comparative study on the policy and regulatory implications of the rise of Over-The-Top (OTT) services and applications. The comparative study is a fulfilment of a mandate given by the Commonwealth ICT Ministers Forum hosted in London in June 2016.

The study is to achieve a better understanding of the market dynamics and policy and regulatory issues of OTT services both in the context of their impact on traditional business models and in the context of opportunities for innovation and stimulation of economic growth.

One of the biggest evolutions within the technology sector, perhaps the biggest of all in the last decade, has come from fast-growing Over-The-Top (OTT) Internet companies and service providers, most notably the GAFAs (Google, Apple, Facebook and Amazon) but many others also. Thanks to the growth of the Internet, the value these players provide to businesses and end-users alike in an age of Big Data, IoT, Cloud computing and evolving AI is both unmatched, increasingly indispensible and ever disruptive.

Current research and in-depth industry surveys into OTT services and applications show that demand for OTT services and applications is increasing exponentially throughout the world. Furthermore, the popularity of OTT services will continue to dominate ICTs and digital markets long into the future. More than many disruptive digital technologies developed in the last few years, OTTs have had important developmental and socio-economic benefits which include lowering the cost to communicate, building global connectivity, ease in accessing or sharing information, encouraging the development of local content and driving investment in broadband infrastructure and high-speed connections, amongst other benefits.

In spite of these positive developments, a number of critical policy imperatives and regulatory issues have been highlighted as a source of great concern with regards to the rise of OTTs – these issues include cybersecurity, privacy, Quality of Service/Quality of Experience (QoS/QoE), and taxation, amongst other significant issues. OTTs have also disrupted the telcos traditional business models (massively eroding revenue from voice and SMS applications) ushering in fierce competition between telecom companies and OTT vendors (e.g. Apple, Google, Skype, and WhatsApp).

Thus, this report is intended to assist ICT Ministers of Telecommunications, regulators and policy-makers from Commonwealth countries and beyond to address critical policy and regulatory dilemmas, e.g. what type of policy and regulatory framework should countries establish to encourage the development of OTT type services while ensuring that competition, innovation and investment are sustained into the future? More importantly, is current legislation and policy fit for purpose?

The CTO stands ready to support countries in elaborating national policy and regulatory frameworks on OTTs and related data protection and privacy issues, based on the findings, recommendations and options presented in this report and in line with respective national objectives.

Shola Taylor
Secretary-General

EXECUTIVE SUMMARY

Following a mandate issued by Commonwealth ICT Ministers at the Commonwealth ICT Ministers Forum in London in June 2016, the Commonwealth Telecommunications Organisation (CTO) was mandated to conduct a study on Over-The-Top (OTT) services in order to understand the market dynamics, both policy and regulatory issues of OTT services, both in the context of their impact on traditional business models and the opportunities for innovation and the potential of these services in stimulating economic growth.

A core component of the study was an online survey targeting relevant stakeholders based in different Commonwealth jurisdictions. This online survey provided the study with a balanced representation of the challenges and impacts of OTT services from the perspective of the four stakeholder groups surveyed: Government, Regulators & Policymakers; ISPs, Telecom, Broadcast & Other Network Operators; OTT Service Providers, Vendors, and Content & Application Providers; Consumers (End-Users), Civil Society & Advocacy Groups.

It is salutary to reflect that OTT services and, more generally, the application (App) economy, have sprung into existence in the just over one decade since the launch of the iPhone in 2007. At that time, Microsoft was the only technology company in the top 10 publicly traded companies in the world. Now Apple is the largest company in the world and there are six technology companies in the top 10 making up almost 78% of its total value. This is a large and unusually rapid disruption in global industrial structure and economic activity and many pundits claim that this revolution still has a long way to run.

OTT services, which run over the mobile and fixed networks of incumbent operators represent a major disruption to their traditional business models, profitability and investment models. Consumers have flocked to OTT services attracting billions of users worldwide. These services have significantly impacted demand for carriers' premium voice and SMS services undercutting their overall margins. The telecommunication sector is being driven towards a 'data everywhere' or 'IP everywhere' world by a combination of technological change, OTT innovation and consumer demand.

Clearly, technological innovation and consumer behaviour have run well ahead of regulatory responses. This situation is now beginning to be addressed by developing appropriate regulatory responses in each country and will be a long and complex task. Commonwealth nations are a significant grouping of jurisdictions representing a population of almost 2.4 billion and over $US10 trillion worth of economic activity as measured by GDP. The Commonwealth also represents an enormous diversity of nations with members whose GDP is among the highest in the world to those with relatively low levels of economic development. A critical implication of this diversity is that regulatory responses to OTT services must be deeply and pragmatically embedded in the context of each country, particularly their various stages of economic development and the quality of their institutions.

OTT providers and consumers have benefited from the massive investments in networks and network quality by mobile operators. The capacity of carriers to build and upgrade their networks, however, is ultimately dependent upon the sustainability of their business models reflected in their growth and profitability. Regulating both carriers and OTT providers to achieve the best outcome for consumers requires navigating the trade-off between the benefits OTT services bring to consumers and creating an economic environment that provides operators with the appropriate incentives to continue investing.

The stakeholder survey showed that, while 100% of ISPs and Operators are of the opinion that OTT service providers should contribute to the upkeep of networks, only about 65% of Governments & Regulators and 11% of OTT service providers share this view. This need for regulatory responses is

often couched in terms of the need for 'a level playing field' in response to the disruptive impacts of OTT services. The list of regulatory concerns is long indeed encompassing licensing, data protection and privacy, universal service obligations, content regulation, spectrum management, quality of service, net neutrality and taxation. It is important to recognise that it is not only telecommunications, but also publishing, media and broadcasting that are affected by OTT disruption.

The finding of this study shows that majority of stakeholders recognize and appreciate the innovative nature of OTTs and do not want innovation to be stifled as OTT services offer numerous benefits to consumers. There is, nonetheless, widespread support for regulatory responses although, predictably, less so from the OTT sector itself. The stakeholder survey showed that most of the surveyed Governments and regulatory bodies (nearly 70%) and telecommunication & network operators (100%), believe that current regulatory regimes, including applicable laws and regulations do not address emerging OTT services. The majority of OTT service providers (nearly 90%) feel otherwise on this issue.

While larger and more advanced Commonwealth countries have the scale and market and regulatory sophistication to take advantage of the App economy, particularly by building domestic digital businesses, this is not necessarily the case with merging and small Commonwealth countries. Given the widely acknowledged role of telecommunication services in promoting economic development, it is critical that such markets focus on communication infrastructure investment attraction by ensuring that network operators can earn sufficient margins to sustain the rollouts and upgrades that underpin the App Economy.

In many small and less-developed jurisdictions, government still own monopoly operators and the impacts on government revenues from OTT adoption can be significant. OTT undercuts not only voice calls and SMS but also roaming and international interconnection revenues. Small Island Developing States (SIDS) have negligible leverage on transnational OTT players and this places significant limitations on their regulatory options.

It is also important to recognise that there are country specific 'hot button' issues, in particular, content regulation, which will need to be quickly addressed. Sovereign Commonwealth countries have the ability to quickly take down content that inter alia supports terrorism, potentially inflames ethnic and racial divides, and confronts religious conventions on issues such as child pornography and sexuality and issues.

A range of other reforms to licensing regimes, spectrum management, data protection and privacy, etc will also be necessary in order for Commonwealth countries to maximise the positives and minimise the negatives of OTTs and the move to the digital economy. The nature of these regulatory innovations will not be simple or straightforward and it is usually neither sensible nor feasible to apply the same regulatory structures to OTT providers as are imposed on operators

The CTO has presented the outcomes of this study and held further consultations in a number of jurisdictions both at National and Regional level. A summary of the deliberations in terms of lessons learnt on key issues and recommendations on OTT services is presented in this report.

Further consultation is recommended on the outcome of the study, involving all stakeholders, at national level for the countries surveyed, but also at regional and international level, given that the issues raised in the survey are not peculiar to any specific country. While it is understood that countries will vary in terms of existing policies and regulations, cross border collaboration is essential especially useful in sharing experiences and learning from mistakes and best practices.

1   INTRODUCTION

1.1   DISRUPTION UNLEASED

The current revolution in technology and telecommunications, variously referred to as 'the app economy', 'big tech' and 'OTT services', continues to sweep across the global economy. It began with two major events: the first was the August 1995 Netscape Initial Public Offering which valued the unprofitable start-up tech company at US$2.9 billion. This was the trigger for the dot-com boom and the beginning of the mass-market embrace of the World Wide Web and the Internet. The second event was, of course, the launch of the iPhone by Steve Jobs in 2007.

When Steve Jobs held the first iPhone aloft at the Moscone Convention Centre, only one technology company, Microsoft, was in the top 10 publicly traded companies in the world. Microsoft made up 8.9% of the total value of the top ten by market capitalization. In 2018 Apple was the biggest company in the world and seven technology companies occupied the top ten, together representing almost 78% of its total value amounting to $4.3 trillion dollars of market capitalization (see Table 1). Perhaps even more amazing than the scale of this historical change is the fact that these valuations are more about the future than they are about the past and present. They are a gigantic bet by global capital markets that big tech will continue transforming the world well into the future.

Table 1:   Largest ten publicly traded companies in the world by market capitalisation

2007 4th quarter		2017 4th quarter	
Company	Market cap $b	Company	Market cap $b
Petro China	724.0	Apple Inc.	868.9
Exxon Mobil	511.9	Alphabet Inc.	727.0
General Electric	374.6	Microsoft	659.9
China Mobile	354.1	Amazon Inc.	563.5
I&C Bank of China	339.0	Facebook Inc.	512.8
Microsoft	**333.1**	Tencent	493.3
Gazprom	329.6	Berkshire Hathaway	489.5
Royal Dutch Shell	269.5	Alibaba Group	440.7
AT&T	252.1	Johnson & Johnson	375.4
Sinopec	249.6	JPMorgan Chase	371.1
TOTAL	3,737.5		5,502.1
TOTAL TECH	333.1		4,266.1
% TECH	**8.9%**		**77.5%**

Source: Complied by Systems Knowledge Concepts from data at
https://en.wikipedia.org/wiki/List_of_public_corporations_by_market_capitalization

While the disruptive effects of these revolutionary changes are now reaching deeply into almost every industry across the Commonwealth nations, it is clear that telecommunications and media industries were the early cases of what is often called 'digital disruption'. OTT services challenged the business models of telcos which had operated successfully for decades. The emergence and growth of OTT services represent immense, potentially existential, threats to existing telecommunications providers and unprecedented challenges to regulators.

The year 2017, was in many ways, a pivotal year for this phenomenon of disruption. In 2017, for the first time, global advertising expenditure on digital channels exceeded television advertising spending – a major milestone in the history of the advertising industry. Following Donald Trump's election in November 2016, the post-analysis in 2017 revealed unprecedented influence arguably being wielded via Facebook and YouTube in driving political outcomes in the United States. It was also the year that

the European Union decided to move into a more aggressive regulatory stance including in relation to supporting personal data protection with respect to Apple, Google, Facebook and Amazon.

It needs also to be recognised that the impacts of OTT services and big tech, in general, reach well beyond the economic sphere, It is becoming abundantly clear that these technology-driven forces are having profound social effects and are also impacting the viability of core institutions not only in developed economies but in nations at all stages of development. By 2017 it became apparent the very concept of publishing has become ambiguous and that the role of the fourth stage and professional journalism as countervailing forces in the structures of power in modern democracies have been rendered increasingly infective.

Clearly, given this level of disruption, not only to the telecommunications sector but to society more broadly, the challenges associated with evolving regulation in response are enormous. The regulatory responses to these disruptions, however, are further complicated by the fact that they need to take into account the contexts of different jurisdictions. The Commonwealth nations are characterised by highly different economic and cultural circumstances and these difference will mean that regulatory adaptations required to respond to OTT services will be quite different across jurisdictions.

1.2   ANATOMY OF DISRUPTION

The disruptive power of big tech and OTT services arise from two key characteristics: ubiquity and scale. The arrival of ubiquity required the maturation of mobile, personal, connected computing devices. By 2017 computing hardware and energy storage in the form of lithium ion batteries had reached a level that, when combined with the design genius of Jobs and Apple, made possible a mobile device for the first time which had the many of general capabilities of PCs and laptops.

Achieving ubiquity, however, also required widespread wireless connectivity and the massive investments in mobile broadband by carriers over the past decade have enabled this. The provision of such enhanced connectivity across emerging countries in Africa, Asia, the Pacific and elsewhere should be applauded. Perhaps ironically, as telcos made these investments in increased data capacity, they also created the opportunity for incursions by OTT players into their core businesses. These economic and commercial pressures on carriers were all the more keenly felt following the decades of privatization and reregulation for increased competition that had been experienced in many (although, significantly, not all) jurisdictions around the globe.

Big tech has achieved scale via the rapid evolution of cloud computing, huge investments in data centres and related technology, data analytics and AI technology. This evolution has given technology companies capacity to service global scale marketplaces at ever decreasing per unit costs. Better technologies and scale enable Google to respond to each search request at lower cost, enables Facebook to accommodate another user at lower per-user costs, while Apple and Google amortise the cost of their mobile device operating systems across millions of users worldwide.

Nicholas Negroponte, in the 1990s, was a vocal proponent of evaluating production processes, or more generally, value creating processes, in terms of 'bits and atoms'. Almost all processes that create value in the economy involve manipulation of information as well as the manipulation of physical objects. The combination of ubiquity and scale at a global level in the manipulation of information has led to enormous decreases in many information manipulation processes. Thus, a Google search can achieve in seconds purely in the digital realm a task that, two decades ago, would have required days if not weeks of searching through physical paper publications. To give another example, Uber has developed a global software system spanning its data centres and millions of end-user mobile devices. This software system replicates the information processing components of the traditional taxi business including receiving bookings, managing rosters, dispatching taxis et cetera. Once this software system is in place, all that is required in addition is contractors to provide the cars and in users the demand for mobility.

The scale and ubiquity of this global system of connectivity that rests on telecommunications infrastructure in the widespread availability of mobile broadband is now, in effect, seeking out information processing activities that can be now encoded in software, automated as much as possible and replicated at ever reducing cost per unit transaction. This is the fundamental economic characteristic of the process of disruption of which the advent of OTT services are a prominent example. This process of disruption can be expected to continue as ongoing efficiencies are achieved in telecommunications and software systems further supercharged by advanced data analytics and AI techniques.

1.3   THE CHANGING FACE OF THE TELECOMMUNICATIONS INDUSTRY

The global communications industry, including in Commonwealth nations, has evolved over the past decades from an era where it consisted largely of national government-owned monopolies providing basic voice telecommunication services to citizens, to an era where the industry has become largely liberalized with multiple players offering various forms of communication services. This liberalization generated heightened competition in many markets increasing pressures to innovate and focus on consumers.

The communications industry has equally seen massive changes in terms of consumer growth, infrastructure deployment and especially the growth of mobile broadband. The enormous growth in mobile broadband subscription and usage over the last decade has no doubt been supported by the rapid growth in mobile connections and uptake of affordable smartphones and other smart devices. It is believed that by the end of 2016, there were more than 7.9 billion mobile connections globally, 4.8 billion of these were unique mobile subscribers, which is equivalent to 65% of the world's population. It is estimated that by 2020, almost three-quarters of the global population will have a mobile subscription, with around 1 billion new subscribers added by then. Similarly, it was also estimated that at the end of 2016 more than 3.8 billion connected smartphones were in use globally and this figure is also set to more than triple by 2020.[1]

The rapid rate of technological innovation and the resultant dynamic nature of the communications industry have no doubt led to a significant evolution of the communications ecosystem. The industry has transitioned from having just a few players along the value chain to a point where there are numerous players providing ancillary service along the supply value chain. This has had a positive socio-economic impact both nationally and globally. For example, in 2015 mobile operators and the ecosystem provided direct employment to nearly 17 million people and another 15 million estimated indirect jobs bringing it to a total of about 32 million jobs across the world.[2]

The increasing use of smartphones, the strong growth of mobile broadband capacity and coverage, and the development of online content and applications (a.k.a "Apps") have driven significant changes in the way users communicate and conduct their daily lives. For instance, consumers are now offered alternative platforms for communicating other than the more traditional modes of communication. Smartphone users are increasingly downloading and using Over-The-Top (OTT) communications applications (such as WhatsApp, iMessenger, Viber, Skype, Wechat, etc) for voice and messaging services which were, in the past, exclusively offered by traditional telecommunication operators.

These OTT services are offered as *free* or *freemium*[3] services to their consumers. As a result of this trend, many have raised concerns about the impact of OTT services on traditional telecom network providers being that voice and messaging services are regarded as the primary revenue streams for traditional telephone providers. There is also the issue of perceived "lack of level playing field" for

---

[1]   The Mobile Economy 2017 | GSMA 2016
[2]   The Mobile Economy 2017 | GSMA 2016
[3]   Basic features are provided free of charge while more advanced features require payment

traditional telephone network providers and OTT service providers. On the flip side, others have argued that although OTT services are offered to consumers as *free* or *freemium* services, consumers still require an active data connection and or subscription to enjoy these services. This secures the revenue of traditional network providers who own the networks and as such earn the revenue for data purchased by subscribers who want to access OTT services.

1.4   OTT SERVICES IN COMMONWEALTH COUNTRIES

As we have mentioned above, the Commonwealth nations are a highly diverse set of jurisdictions from the perspectives of size, stage of economic development, geographic isolation and the maturity of their telecommunications services to name but a few factors (see Table 2). The Commonwealth countries prepatent a population of almost 2.5 billion and over $10 trillion of economic activity as measured by GDP. The elements of common heritage which extend to a common English language the vast majority have adopted common law as the basis of their legal systems and thereby have a common framework for regulation.

The quality, coverage and price of telecommunications services are critical to the economic development of all nations. In particular, in countries that are less developed, the wide availability of affordable telecommunication services can accelerate the transition to markets away from subsistence contributing significantly to economic growth and moving populations out of poverty. The ITU's ICT Development Index (IDI) offers a useful and comprehensive summary of the ICT maturity of almost all Commonwealth countries.

In relation to OTT services, these very different jurisdictions face contrasting trade-offs in relation to the significance of these services in their local economies and the regulatory options and trade-offs that they face.

Less developed countries face a pressing need to improve their telecommunications infrastructure and telecommunications companies are unlikely to invest in this infrastructure if their current and anticipated future rates of return are insufficient. Regulators face the familiar but complex problem of intervening to promote the long-term interest of end users. Lower prices for services are always good in the short term but obviously, impact on long-term earnings and willingness to invest.

Increasing use of OTT services throws this problem into even sharper relief because it adds a new and complicating dynamic to these long-term short-term trade-offs. The fundamental problem with OTT services the telecommunications companies, as has been widely described, is that OTT services lead consumers to abandon telcos' premium services of voice and SMS and drive carriers towards becoming commodity broadband providers. As was the case with earlier changes to accounting rates on international inbound calls, which had facilitated traditional network deployment in emerging markets, an accommodation needs to be achieved.

To the extent that operators have been cross-subsidising between these premium services and broadband, these markets now face a number of transitioning problems:

- decreasing revenues from premium services
- loss of margins for operators

Table 2:   Commonwealth Countries snapshot

Country/Region	ITU IDI	GDP (US$m)	Population	GDP/capita
Anguilla		288	14,764	19,507
Antigua and Barbuda	5.71	1,201	89,000	13,494
Australia	8.24	1,359,723	23,792,000	57,150
Bangladesh	2.53	248,853	158,762,000	1,567
Barbados	7.31	4,284	283,000	15,138
Belize	3.54	1,604	369,000	4,347
Bermuda		5,593	63,779	87,693

Botswana	4.59	15,568	2,176,000	7,154
British Virgin Islands		909	28,054	32,402
Brunei	6.75	12,326	421,000	29,278
Cameroon	2.38	29,547	21,918,000	1,348
Canada	7.64	1,600,265	35,819,000	44,676
Cayman Islands		3,393	60,765	55,838
Commonwealth of Dominica	5.69	498	71,000	7,014
Commonwealth the Bahamas		9,172	379,000	24,201
Cook Islands		283	17,459	16,209
Cyprus	7.3	19,648	846,000	23,225
Fiji	4.49	4,037	867,000	4,656
Ghana	3.88	42,753	27,714,000	1,543
Grenada	5.39	814	104,000	7,827
Guyana	3.44	2,970	747,000	3,976
India	3.03	2,454,458	1,299,499,000	1,889
Jamaica	4.84	14,276	2,729,000	5,231
Kenya	2.91	75,099	44,234,000	1,698
Kiribati	2.18	172	113,000	1,522
Lesotho	3.04	2,276	1,908,000	1,193
Malawi	1.74	3,814	16,307,000	234
Malaysia	6.38	309,860	31,032,000	9,985
Malta	7.86	11,164	425,000	26,268
Mauritius	5.88	12,245	1,263,000	9,695
Montserrat		64	4,900	13,061
Mozambique	2.32	11,170	25,728,000	434
Namibia	3.89	11,765	2,281,000	5,158
Nauru		121	10,000	12,100
New Zealand	8.33	198,043	4,579,000	43,250
Nigeria	2.6	400,621	184,264,000	2,174
Pakistan	2.42	250,136	191,785,000	1,304
Papua New Guinea		21,189	8,219,000	2,578
Rwanda	2.18	8,918	11,324,000	788
Saint Kitts and Nevis	7.24	767	46,000	16,674
Saint Lucia	4.63	1,317	172,000	7,657
Saint Vincent and the Grenadines	5.54	720	110,000	6,545
Samoa	3.3	705	193,000	3,653
Seychelles	4.8	1,398	97,000	14,412
Sierra Leone		4,788	6,513,000	735
Singapore	8.05	291,860	5,541,000	52,673
Solomon Islands	2.11	1,097	587,000	1,869
South Africa	4.96	317,568	54,957,000	5,778
Sri Lanka	3.91	84,023	20,869,000	4,026
Swaziland		3,620	1,119,000	3,235
Tanzania		51,194	48,829,000	1,048
Tonga	4.13	477	104,000	4,587
Trinidad and Tobago	6.04	21,748	1,357,000	16,027
Turks and Caicos Islands		728	31,458	23,142
Tuvalu		38	11,000	3,455
Uganda	2.19	27,174	35,760,000	760
United Kingdom	8.65	2,496,757	65,093,000	38,357
Vanuatu	2.81	821	278,000	2,953
Zambia	2.19	23,137	15,474,000	1,495
Avg IDI Total other	4.75	10,479,057	2,357,388,179	13,895

- the need for operators to charge higher prices for mobile broadband to enable future investment
- the resistance of consumers to higher data prices based on past experience
- the desire of governments, policymakers and regulators to increase infrastructure investment and consumer use of telecommunications services.

Consumers value their access to telecommunications networks and OTT services and, especially, in low-income countries, are highly resistant to higher service charges. This situation puts significant pressure on regulators as operators point out the need for a level playing field in regulatory compliance for OTT providers on traditional operators. Whereas in jurisdictions like the United States and the EU, regulators can bring significant pressure to bear on OTT players. In contrast, less developed economies and even regional groupings like ASEAN, Pacific Forum and ECOWAS struggle in this environment have almost no leverage over the giant transnational OTT players.

2 BACKGROUND OF THE STUDY

2.1 DEFINITION OF OVER-THE-TOP (OTT) SERVICES

It is believed that the coinage of the term *Over-The-Top* commonly referred to as "OTT" stems from the fact that Over The Top communications bypasses traditional network distribution approaches and run over, or on top of, core Internet networks i.e. they operate over the top of telecom carriers rather than build their own communications infrastructure. A perceived negative connotation to the term Over-The-Top amongst other things has led to some proposing that the term be changed to Online Service Providers (OSP) however this is not a generally accepted position.

The impact of OTT services and the 'App Economy' more generally, has led to an expansion and a complexification of the information and communications ecosystem. Where previously the main players in the marketplace were simply carriers, handset manufacturers and consumers, now the market includes the giant platform companies, Apple and Google, a greater diversity of handset manufacturers, app developers and app stores and so on.

Figure 1:   The new App Economy ecosystem
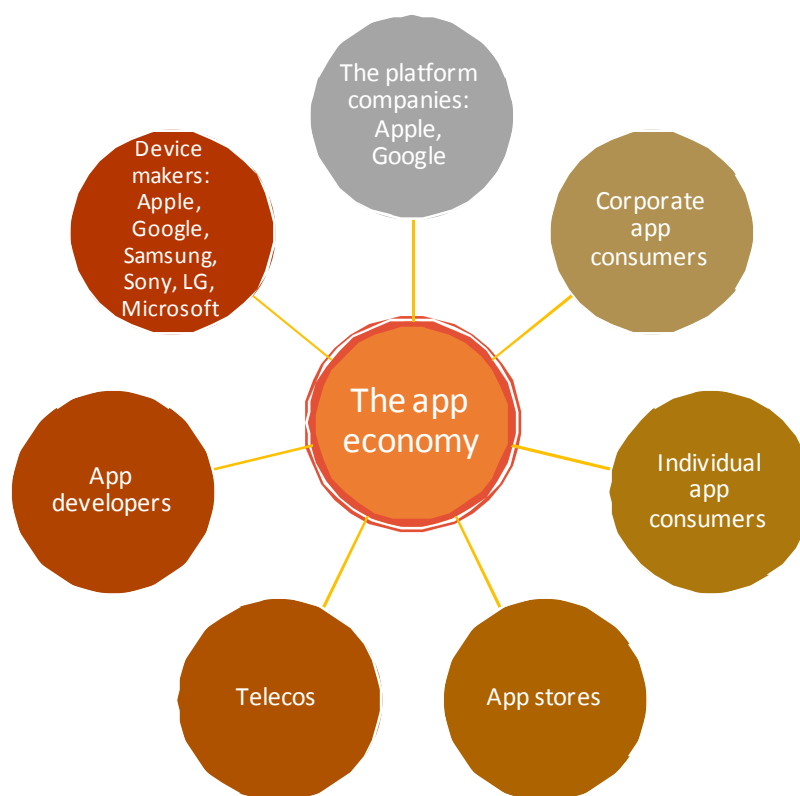
Although there is no generally agreed definition of Over-The-Top services however; many have made attempts at defining the term. The Economic Co-operation and Development (OECD) refers to OTT as video, voice and other services provided over the internet rather than solely over the provider's own managed network. [4] Bertin, Crespi, L'Hostis (n.d) define an OTT provider as a service provider

---

[4]   OECD Communications Outlook 2013| Organisation for Economic Co-operation and Development 2013

that offers telecom services, but that neither operates a telecom network nor leases networking capabilities from a telecom operator, relying only on the worldwide Internet network.[5]

The European Union (EU) broadly regards Over-The-Top (OTT) as an online service that can be regarded as potentially substituting for traditional telecommunications and audiovisual services such as voice telephony, SMS and television. It further distinguishes between OTTs, Online Services and Managed services noting that OTTs represent a subset of online services, which also differ from managed services. It holds that Managed services are those where the provider offering the service has substantial control over the fixed or mobile access network used for its distribution while Online services and the associated applications rely on the public Internet for at least parts of their distribution.[6]

In a paper presented at the Regional Economic and Financial Forum of Telecommunications and ICTs for Arab Region[7], the ITU refers to OTT services as applications and services, which are accessible over the Internet and ride on Operators' networks offering Internet access services e.g. social networks, search engines, amateur video aggregation sites, etc.

While there is no single, generally agreed definition for Over-The-Top (OTT) services, for this study, we adopt the definition which regards Over-The-Top (OTT) services as online services which can potentially substitute traditional telecommunications services such as voice telephony and messaging (SMS) services. OTT services are grouped into three broad groups namely:

1.   Voice over IP (VoIP) – for voice calling and video chatting services;
2.   Instant Messaging services- chat application; and
3.   Video and Audio Streaming services

Although these OTT services are offered as either *free* or *freemium* services, consumers still require an active data connection and or subscription to enjoy these services. OTT players are not just enabling users to access their services at much lower cost and encouraging more users to opt for IP-based free or low cost services, they are increasingly introducing more innovative services in the communications market and as a result creating an increasing loyal user base. With the increased use of mobile smartphones for payment to gaming, these OTT players are evolving beyond traditional messaging and voice, which are still the mainstream revenue streams for most operators.

On the flip side, this continued trend by OTT players increasing both revenues and customer base globally has raised regulatory concerns in a number of jurisdictions. In recent years, there have been numerous complaints, including from telecommunications network operators that they face unfair competition from OTT players and providers who are not subject to the same regulatory obligations as network operators. Similar sentiments have been raised in the context of new online service providers who might challenge other traditional services offered by network operators.

In subsequent sections of this report, we will take a closer look at OTT services to enable us better understand both sides of the argument.

2.2   OBJECTIVES OF THE STUDY

Following concerns raised by some Commonwealth member countries about issues surrounding provision of OTT services, jurisdiction, the impact on revenues of traditional telecom operators, perceived benefits and effects of regulating or not regulating, taxation, data security and protection, need for accurate and verifiable data on subscription and usage amongst other things; the

---

[5]   A few myths about Telco and OTT models | Bertin, Crespi, L'Hostis (n.d.)
[6]   Over-The-Top Players (OTTs) | European Parliament- Directorate-General for Internal Policies 2015
[6]   ITU Regional Economic & Financial Forum of Telecommunications/ICTs for Arab Region, Manam, Bahrain, 29 November 2015

Commonwealth Telecommunications Organisation (CTO) was mandated by Commonwealth ICT Ministers at the Commonwealth ICT Ministers Forum in London in June 2016, to conduct a study to understand the market dynamics, policies and regulatory issues related to Over-The-Top (OTT) services, both in the context of their impact on traditional business models and of opportunities for innovation and stimulating economic growth.

Motivated with this need, the main objective of this study is to develop a better understanding of OTT services and their imperatives, through a survey targeting relevant stakeholders (including service providers, policymakers, regulators, OTT service providers and consumers of OTT services) based in different jurisdictions. It is expected that the output of the study will enable future deployment of OTT services to be conducted in a manner that addresses the interests and concerns of all stakeholders to the benefit of consumers.

2.3   PRE-SURVEY CONSULTATION

As a foundation to this survey-based study, a pre-survey background report titled "*Understanding the Dynamics of Over-The-Top (OTT) Services"* was produced by the CTO in August, 2016. This report was a precursor to this OTT research study conducted across the Commonwealth and beyond by the CTO. The aim of the background report was to solicit from a selected sample of stakeholders based in different jurisdictions, the key issues and questions that should be addressed by the research study in order to understand better how OTT services can equitably be deployed in various jurisdictions.

The pre-survey background report was consequently sent out to a sample group of stakeholders comprised Operators, Regulators, Industry Associations/Groups, OTT Service Providers and Consumers for their input and propose relevant key questions that should be included in the survey questionnaire. The CTO subsequently produced a revised version of the pre-survey background report based on the input/comments received from the stakeholders.

3 SURVEY METHODOLOGY AND KEY FINDINGS

3.1 SURVEY METHODOLOGY

This research study adopted a methodology that aimed to ensure that all sample data collected from responses, was as representative as possible to the targeted global dataset. This approached aimed to fulfil the fact that since OTT services are used globally, it was imperative that the data collected was as representative to the global scenario as possible. The questionnaires focused on different types of responses, which included opinions, behaviors and factual responses.

3.1.1 TARGET DATA SAMPLE

As previously mentioned, this research study was conducted using formulated questionnaires, which were developed targeting four sectors of stakeholder groups globally. These four broad sectors included: - Sector 1 *(Government, Regulators & Policymakers)*; Sector 2 *(ISPs, Telecom, Broadcast & Other Network Operators)*; Sector 3 *(OTT Service Providers, Vendors, and Content & Application Providers)*; and Sector 4 *(Consumers (End-Users), Civil Society & Advocacy Groups)*. Sector 1, 2 and 3 questionnaires were *structured* (closed set of responses), while Sector 4 was *non-structured* (open-ended responses) since it was targeting mainly end-users.

Figure 2: Four broad sectors addressed by the survey questionnaire
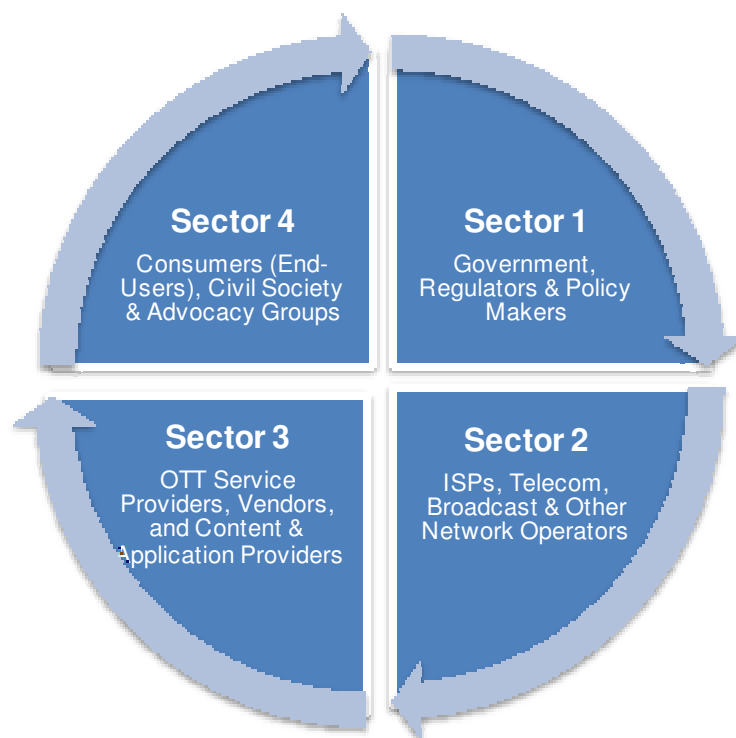
The four (4) broad categories of stakeholders were grouped into the following sectors:

Sector 1: *Government, Regulators & Policymakers*—This category of stakeholders included representatives of Governments, Policymakers, Regulators, Competition Authorities, and Data Protection Authorities and related entities.

Sector 2: *ISPs, Telecom, Broadcast & Other Network Operators*—This category of stakeholders included representatives of Mobile & Fixed Network Operators, Internet Service Providers (ISPs), Broadcasting Networks & other Network Operators.

Sector 3: *OTT Service Providers, Vendors, and Content & Application Providers*—This category of stakeholders included representatives of Over-The-Top Service Providers, Vendors, and Content & Application Providers.

Sector 4: *Consumers (End-Users), Civil Society & Advocacy Groups*—This category of stakeholders included consumers of Over-The-Top Services and representatives of Civil Society & Consumer Advocacy Groups.

3.1.2 DATA COLLECTION

The approach used for data collection, aimed to ensure that the surveyed target sectors covered far-reaching geographically dispersed jurisdictions across the Commonwealth countries and beyond. In order to do so, we used both the CTO and ITU data of member countries contacts, especially for structured questionnaires used for Sector 1 and 2 of our target audience. In Sector 3, we used publicly existing data to contact key individuals who would provide us with authoritative response on behalf of their organisation. While in Sector 4, the questionnaire was non-structured and therefore opened to as many unsolicited responses received during the data collection phase of the survey.

Figure 3: Survey Data Collection
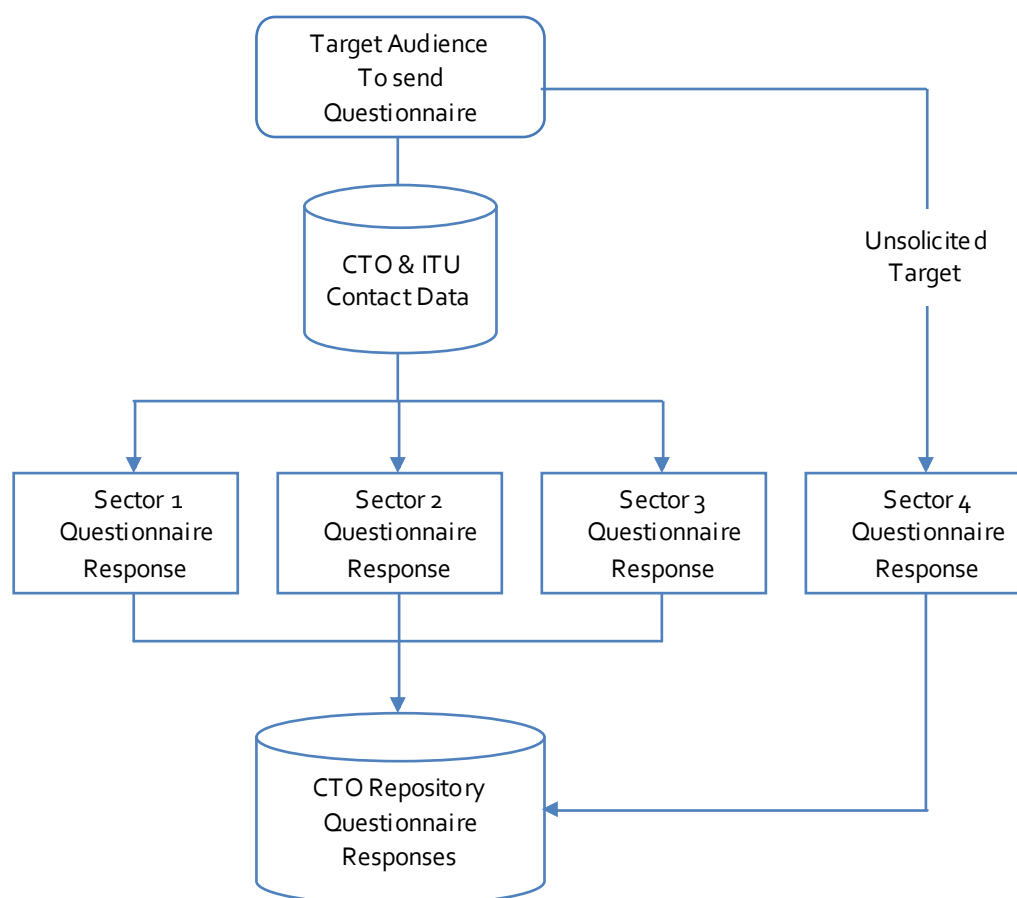
All participating respondents to structured questionnaires were formally invited to participate and were asked to confirm that their response represented that of the institutions they were representing. The CTO contacted and followed up with each targeted contact to inquire about their interest and

eligibility in volunteering for this study. Once eligibility was confirmed, a link to the online questionnaire relevant to the requested sector was then sent to the respondent. In extreme cases, respondents for Sector 1 were requested to extend the questionnaire for Sector 2 to eligible *ISPs, Telecom, Broadcast & Other Network Operators* operating in their jurisdiction.

3.1.3 SURVEY IMPLEMENTATION

During the formulation stages, a review of various alternatives for collecting data for the survey was undertaken. It was decided that administering the questionnaires online was the most effective to reach a geographically dispersed target audience across the Commonwealth and beyond. The survey used *SurveyMonkey*[8] online toolkit for data collection and part of the analysis. The toolkit simplified our survey process considerably. For example, in the survey design phase, we used SurveyMonkey varied formats for formulating different questions (multiple choice, true false, open-ended, etc) and used the ability to track respondents to avoid duplication and repeated responses during implementation of the survey. The entire data collection period was shortened considerably by sending target respondents a link to the respective sector questionnaires. In addition, the interaction between respondents and the questionnaire was more dynamic compared to either email or paper survey approaches.

A database repository was developed for all responses received from a across all the geographical jurisdictions covering Commonwealth countries and beyond. An analysis of the data was conducted, which we discuss next section.

3.1.4 SURVEY PARTICIPATION

The survey data was collected and then processed in response to the aims and objectives outline in Section § 2.0 of this report. One fundamental goal drove the collection of the data and the subsequent data analysis. The goal was to develop a better understanding of OTT services and their imperatives, through a survey targeting the four sectors (see Section § 3.0) based in different jurisdictions. The findings presented in this section demonstrate the need to understand the core needs and cost benefit analysis involving all relevant stakeholders.

Table 3:   Survey target and response data

Sectors	Target	Response	% of Respondents
Sector 1: Government, Regulators & Policymakers	61	37	46%
Sector 2: ISPs, Telecom, Broadcast & Other Network Operators	71	11	14%
Sector 3: OTT Service Providers, Vendors, and Content & Application Providers	15	9	11%
Sector 4: Consumers (End-Users), Civil Society & Advocacy Groups	100	23	29%

Initially the survey targeted 61 Commonwealth and non-commonwealth countries (including relevant ministry and regulator); 71 ISP, telecommunication and other network providers; and 15 leading OTT service providers. Out of the targeted respondents, 37 countries (approx. 46%) responded to the survey. 11 telecommunication and other network providers (approx. 14%) responded to the survey; In addition, 9 OTT service providers (11%) and 23 End-user consumers (29%) responded to the survey.

---

[8] Survey Monkey online toolkit | www.surveymonkey.com

The survey had varied responses for each sector, which confirmed our earlier hypothesis of the

Chart 1: **Survey Target & Response for each Sector**
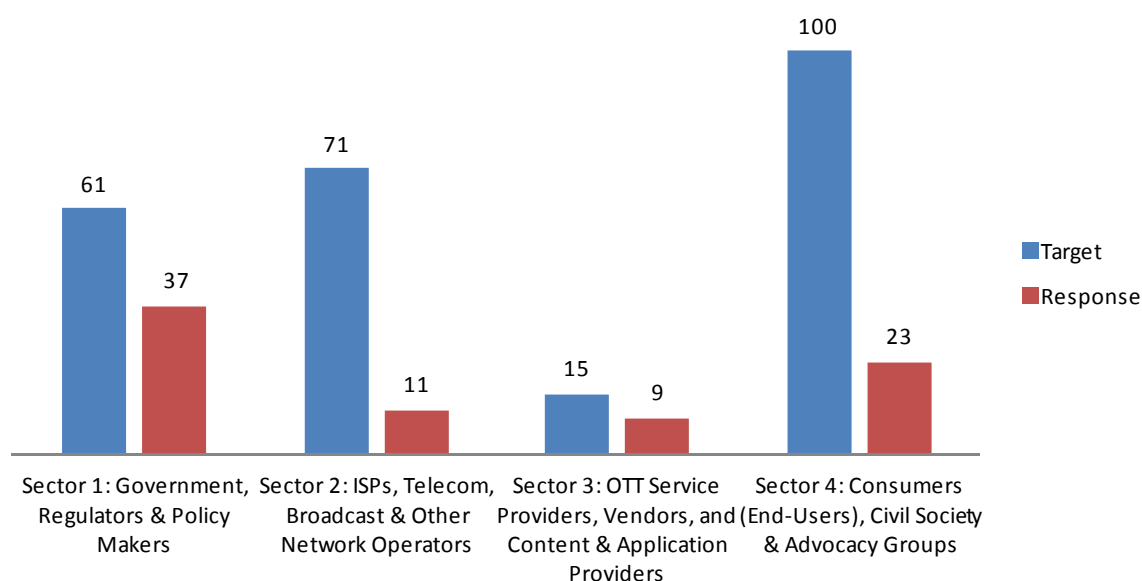
research that respondent's perspective of the same issues varies.

3.2 KEY FINDINGS

This section provides a summary on the survey. Detailed results are available in Appendix 1.

In our analysis, most of the surveyed Governments including relevant ministries & regulatory bodies (Sector 1, nearly 70%); and telecommunication & network operators (Sector 2, 100%) respectively, are of the opinion that current regulatory regimes, including applicable laws and regulations do not address emerging OTT services. The majority of OTT service providers (Sector 3, nearly 90%) feel otherwise on this issue.

While majority of Governments including relevant ministries & regulatory bodies (Sector 1, nearly 90%); and telecommunication & network operators (Sector 2, nearly 90%) respectively, feel there is a need to develop a regulatory framework for OTT services in their country that could be adopted in the future. However, majority of OTT service providers (Sector 3, nearly 80%) and End-user (or Consumers) (sector 4, nearly 80% respectively) feel otherwise (see Chart 2).

The majority of Governments including relevant ministries & regulatory bodies (Sector 1, nearly 83%); and telecommunication & network operators (Sector 2, nearly 78%) respectively are in favour of a regulatory framework be applied to both local and international OTT service providers offering communication services (such voice, messaging and video call services via Apps) to local consumers. In the contrary, nearly 89% of OTT service providers are opposed to the idea.

Chart 2:   Need to develop a regulatory framework for OTT services
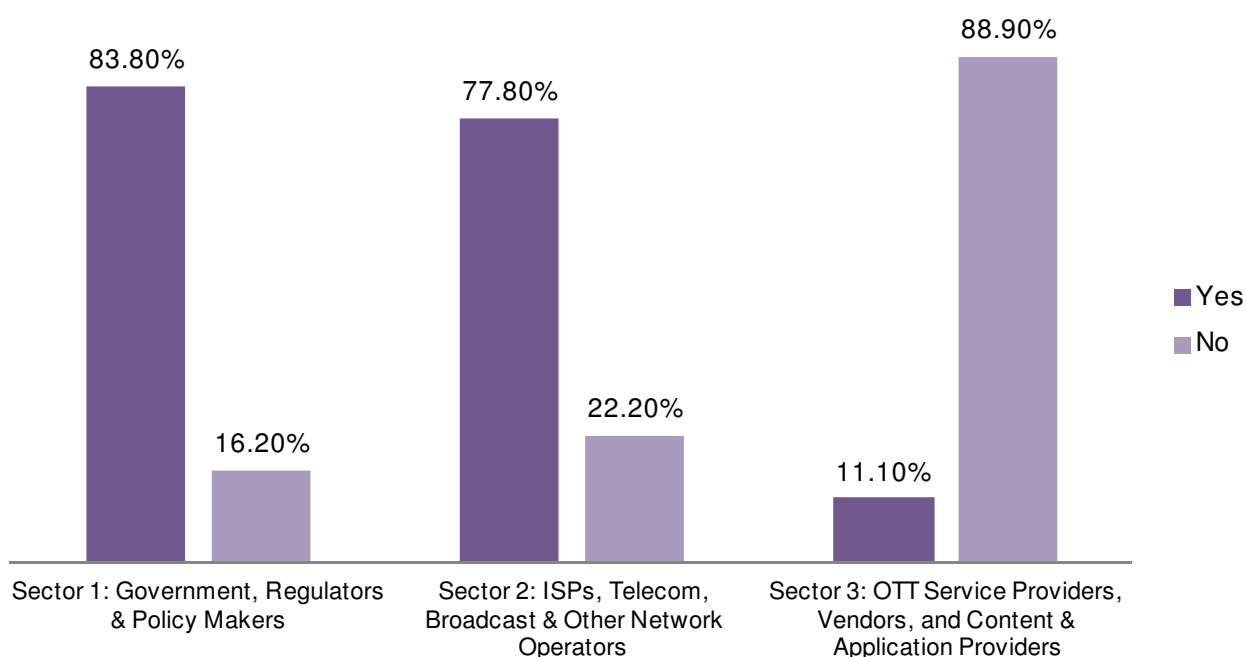
With regards to the upkeep of networks, while 100% of Sector 2 respondents are of the opinion that OTT service providers should contribute to the upkeep of the network(s) they utilize, only nearly 65% of Sector 1 (Governments & Regulators) and 11% of Sector 3 (OTT service providers) share this view.

In relation to contributions to Universal Service Fund (USF) used for network roll-out in un-served and underserved areas, 100% of OTT service providers do not support the idea of having a requirement for Sector 3 to contribute to USF. However, nearly 52% of Governments including relevant ministries & regulatory bodies (Sector 1) and nearly 67% of telecommunication & network operators (Sector 2) respectively feel otherwise.

Regarding Quality of Service (QoS), nearly 97% & 100% of Sector 1 and Sector 2 respectively agree that there are no QoS parameters currently in place in their jurisdictions for OTT service providers.

An overwhelming majority of respondents from all stakeholder groups-Sector 1 (nearly 92%), Sector 2 (nearly 89%) and Sector 3 (100%), agree that Net Neutrality should be considered as one of the key issues to take into account when addressing the dynamics of OTTs.

Similarly, 100% of stakeholders from the different sectors all consider Safety, Data Protection & Privacy as important issues in the provision of OTT services.

Majority of respondents from all stakeholder groups—Sector 1 (nearly 87%), Sector 2 (nearly 78%), Sector 3 (100%) and Sector 4 (nearly 87%) believe that traditional network services and OTT services are interdependent given that consumer demand for OTT services drives demand for data services (see Chart 3 – responses to survey question: 'Are traditional network services and OTT services interdependent, given that consumer demand for OTT services drives demand for data services?')

Chart 3:   Interdependencies between OTT services and traditional network services
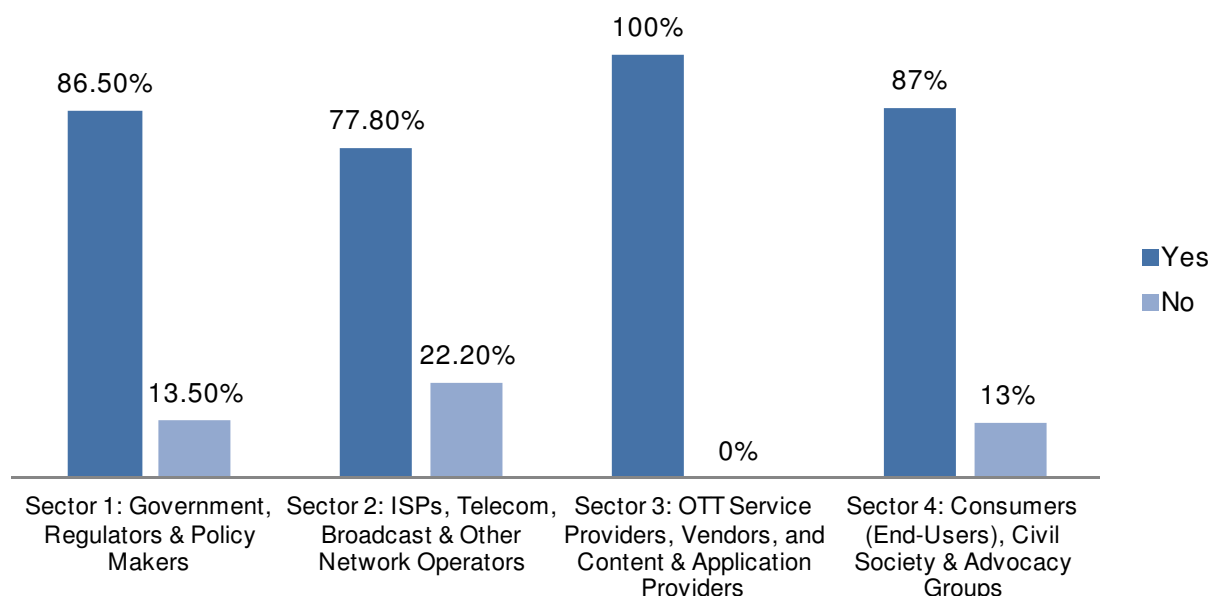
With regards to the impact of regulation on innovation, nearly 89% of OTT service providers are of the opinion that the impact would be extreme while only 11% of Sector 2 believes the impact would be very much. On the other hand, nearly 49% of Governments & Regulators believe the impact would be moderate, nearly 19% believe the impact would be slight while another nearly 14% believe there would be no impact at all.

When OTT service providers were asked how the imposition of fees, levies or taxes would impact their provision of OTT services globally, 100% said there would be a negative impact.

Regarding the impact of OTTs on voice revenues of traditional networks in the next 3-5 years, 100% & nearly 95% of Sector 2 and Sector 1 respectively are of the opinion that it would significantly impact voice revenues.

These results confirm what might reasonably be expected from a qualitative assessment of the interests of the various stakeholders in the digital economy. The results confirm that the interests of operators and OTT players are generally diametrically opposed and that their attitudes to regulatory interventions are similarly dichotomous.

To a significant extent, then, governments and consumers emerge as the adjudicators in the regulatory debate on the results of the survey a useful indicating the strength of sentiment for and against regulatory change going forward.

4 FRAMEWORK FOR REGULATORY RESPONSES TO OTT AND THE TRANSITION TO THE NEW IP WORLD

4.1 DISRUPTION AND REGULATION

The fundamental characteristic of disruption, of which the advent of OTT services is one example, is that it challenges existing business models. Existing business models are challenged when an innovator presents an option to consumers that is more attractive than existing offerings. This new option may have improved features compared with existing services, may be an entirely new service that wasn't previously available or may simply be cheaper than existing offerings, or some combination of all these.

Technological innovation enables the development of products and services that were simply not possible in the past. The combination of smartphones with their sophisticated operating systems and touchscreens and the widespread availability of relatively fast mobile broadband has enabled a broad range of applications and services to be provided. Some of these such as WhatsApp and FaceTime are close substitutes for traditional voice and text messaging provided by operators. Other services such as Facebook, Instagram and Twitter offer not only communications but also a range of publishing and social networking services that were not feasible in the pre-smartphone era.

From the general perspective of innovation, it is not surprising that a set of innovative software development companies have emerged that are able to provide better customer experiences than the operators can provide. Increasing specialisation is an intrinsic part of general economic development. In effect, while providers of OTT services increasingly specialise in and dominate the consumer experience, the traditional operators are being forced into a specialist commodity mobile broadband provider role. This type of industry disruption inevitably shifts the landscape that regulatory settings have been predicated on. There is almost no aspect of regulatory intervention in telecommunications that is left untouched by this industrial transformation.

Given the complexity and scope of the regulatory responses required, it is useful to conceptualise these adaptations has been responses to a transition. This transition begins in the traditional circuit-switched world and ends in the 'IP everywhere' world, although ongoing technological innovation will, no doubt, require further regulatory responses in the future. Many of the problems confronting regulators emerge because this transition is, as yet, incomplete but it is, nonetheless, within sight.

The endpoint of this transition process would appear to be one in which mobile operators become pure mobile broadband providers. This does not necessarily mean that their services will have become completely commodified. There will still be opportunities for differentiation in their consumer facing activities across a range of characteristics including reliability, speed, congestion and contention, customer service, and pricing.

To the extent that, in the past, the full cost of data provision has not been reflected in the prices charged to consumers because of cross-subsidisation from premium services, one of the adjustments required may be in terms of an adjustment of consumers' expectations about pricing of data services. In order for consumers' long-term interests to be served it is necessary that operators make sufficient margins to allow them to invest in upgrading infrastructure. To the extent that data services are underpriced currently, OTT providers are benefiting via cheaper consumer access to their services

that are being, to some extent, subsidised by operators through reduced margins. The sustainability of the situation is a central concern for regulatory evolution.

4.2 DISRUPTION'S WINNERS AND LOSERS

A useful starting point for developing a framework for regulatory responses is to consider who are the winners and losers from disruption processes among the set of stakeholders in the communications market. Understanding where the costs and benefits of disruption fall is a guide to regulators about where regulatory relief for regulatory pressure can be applied (see Table 4).

Table 4 shows how benefits and costs are redistributed in the app economy. Consumers, for example, have benefited from lower costs services and a wider range of innovative service offerings.

Table 4: Benefits and costs created and redistributed in the App economy

Group	Benefits	Costs	Outcomes
Consumers	− Better, lower price services − Wider range of innovative, content and services offerings	− More advertising − Loss of personal information (security and privacy) − Complaints	− Hugely positive for consumers
Non-comms businesses	− Better, lower price services − Increased competitiveness − New distribution and marketing channels increasing customer engagement	− Possibly reduced demand for outputs if telecommunications/ICT services increases as a proportion of GDP − Possible industry disruption	− Positive for business - except sectors disrupted
OTT or Online service providers	− More users, more revenues − Monetising personal info − Opportunity to initial public offering,(IPO) capital raisings, etc.	− Increased provisioning costs − May need to invest to address bottlenecks	− Hugely positive for OTTs
Existing fixed and mobile network operators, ISP, and broadcasters	− Increased demand for and revenue from data services − Falling costs due to simplification and move to lower cost IP infrastructure	− Reduction of revenue for legacy voice and SMS services − Loss of market power − Need for additional spectrum, investment to handle demand, congestion, quality of service	− Currently negative but increased Data demand may make positive − Partnering may be positive
National Governments	− Increased telecommunications/ICT efficiency − Increased penetration − Ability to provide government services online −	− Impact on taxation revenue & fees − Decreased capacity for regulatory intervention − Reduced ability to provide national security and policing −consumer protection	− Negative except in developed/tax haven markets where OTTs based
Country/ National level/ Economy wide	− Increased telecommunications/ICT efficiency & consumer welfare − Platform for the establishment of new and innovative disruptive businesses	− Increased imports, loss of tax − Reduced ability to pursue national objectives − Fragmentation of national markets and undermining of national culture/sport markets	− Variable depending on the country and its policies − Active policy setting required

Source: ITU, Regulatory Challenges and Opportunities in the new ICT ecosystem, 2018

For consumers on the cost side, however, there are concerns about privacy and the management of personal information in the availability of processes to resolve complaints. On balance, consumer behaviour would suggest that consumers believe the overall benefits of the shift to OTT services has been highly beneficial.

This framework indicates various areas for regulatory focus, for example, the need to address taxation issues in relation to OTT players and measures to address the capacity of operators to continue infrastructure investment in the face OF declining revenues. The literature on regulatory responses to the app economy is now expanding quickly[9] . From such sources it is possible to develop a taxonomy of regulatory concerns that includes the following:

- licensing
- universal service
- taxation
- quality of service
- net neutrality
- data protection and privacy
- interconnection
- infrastructure investment
- international roaming
- content regulation
- spectrum management.

These issues are dealt with in detail in Section 5.

4.3   ADDITIONAL COMPLEXITY IN THE TRANSITION TO AN IP WORLD

in addition to the many regulatory issues identified above, transition to an IP world involves additional complexities that arise from the more complex structure that communications markets are currently evolving into and fact that, beyond communications, the app economy is influence almost every aspect of economic and social life.

4.3.1 THE COMPLEXITY OF TWO-SIDED MARKETS AND CROSS-INDUSTRY PLAYERS

One of these complexities is the increasing importance of two-sided markets. Commercial terrestrial free to air television is the most common example of such a market structure. In effect, television networks produce audiences and sell these audiences' attention to advertisers.

Two sided markets are the basis of the business models for companies such as Google and Facebook. The lack of direct observable transactions and prices in such markets means that it is more difficult to assess the efficiency of these markets and define profit margins as inputs to regulatory decision-making.

Another factor affecting the complexity that regulators must contend with is the fact that OTT offerings are not restricted to communications markets. Over the past five years the most significant impact on broadcast television markets has been the rise of Internet-based streaming video services. High-resolution video content is a significant network capacity and consumers are increasingly viewing video content on mobile devices. In addition to streaming services, social media platforms are increasingly populated with video content which is typically viewed on mobile devices. This expanded presence of content being transmitted by the telecommunications system rather than via broadcasting, raises issues of content control and classification that broadcasting has contended with throughout its history.

---

[9]   See, for example, Regulatory challenges and opportunities in the new ICT ecosystem, 2018

4.3.2   GLOBE-SPANNING NATURAL MONOPOLIES

The issue of market structure is particularly problematic in the context of the app economy. While regulators are familiar with the problem of natural monopoly at the local or national levels, OTT players are transnational monopolists or oligopolists and these are intrinsically difficult to address with legislation and regulation based on national jurisdictions.

Scale is a key driver for app economy players and given the inherently unlimited scalability of the software and hardware systems that underpinned their services, the monopoly power of these players can only be expected to grow[10]. It is likely that many of the areas of activity or submarkets in the digital economy will be natural monopolies or at least highly concentrated oligopolies. This is because so many factors are driving global level scale. In addition to the unlimited scalability of computing systems, businesses like Facebook and Uber have strong network externalities characteristics – more users mean better services with more features and therefore more reasons to join. In addition, given the size to which the leading companies in each submarket have grown, new challengers, even if they are highly innovative, tend to be snapped up before they become a competitive threat.

4.3.3   SOCIAL, CULTURAL AND POLITICAL INFLUENCES

Discussion on the social cultural and political aspects of social media and Internet publishing and new sources is now widespread and daily news in its own right. Issues such as fake news, political manipulation to the level of interference with electoral processes, and exposure to potentially harmful content. These issues impact different countries in different ways. For example, non-Western cultures may view exposure to various types of content carried over social media, streaming or simply available on the World Wide Web, as being incompatible with their cultural norms.

There are also similar challenges in relation to religious sensitivities and content.

4.4   OTT SERVICES IN DEVELOPING COMMONWEALTH COUNTRIES

As Chart 4 shows, Commonwealth countries span an enormous range of economic development as indicated by GDP per capita and their levels of ICT maturity also vary enormously as measured by the ITU's ICT Development Index.

As mentioned above, telecommunication services can play a critical role in accelerating economic development in less developed countries. Information is the lifeblood of markets and bringing even modest communications services to previously underserviced populations can accelerate the process of transitioning from subsistence to market-based activity.

As communications technologies evolve and become more sophisticated and efficient, and the infrastructure becomes cheaper to deploy, telecommunications can have larger impacts sooner on lower income populations. For this to be achieved it is critical to activate and maintain to the communications infrastructure investment and to ensure that sufficient investment funding is available for new technology upgrades. For this reason, the impact of OTT services on operator revenues and margins is of particular concern in less-developed countries.

An additional factor affecting regulatory approaches to OTT services is the fact that in many less developed countries governments still own operators, often monopoly operators, and operator earnings form a significant component of overall government revenue.

For the proposed of this report, we have focused on the challenge associated with emerging and smaller Commonwealth markets and especially those which had a GDP per capita less that

---

[10]   See, ITU, The Race for Scale: Market Power, Regulation and the App Economy, 2016, https://www.itu.int/en/ITU-D/Conferences/GSR/Documents/ITU_AppEconomy_GSR16.pdf

$US10,000 per year, although many of the regulatory directions discuss are relevant for those countries with GDP per capital below $US30,000.

Chart 4:   Commonwealth countries: GDP per capita, ITU ICT Development Index.
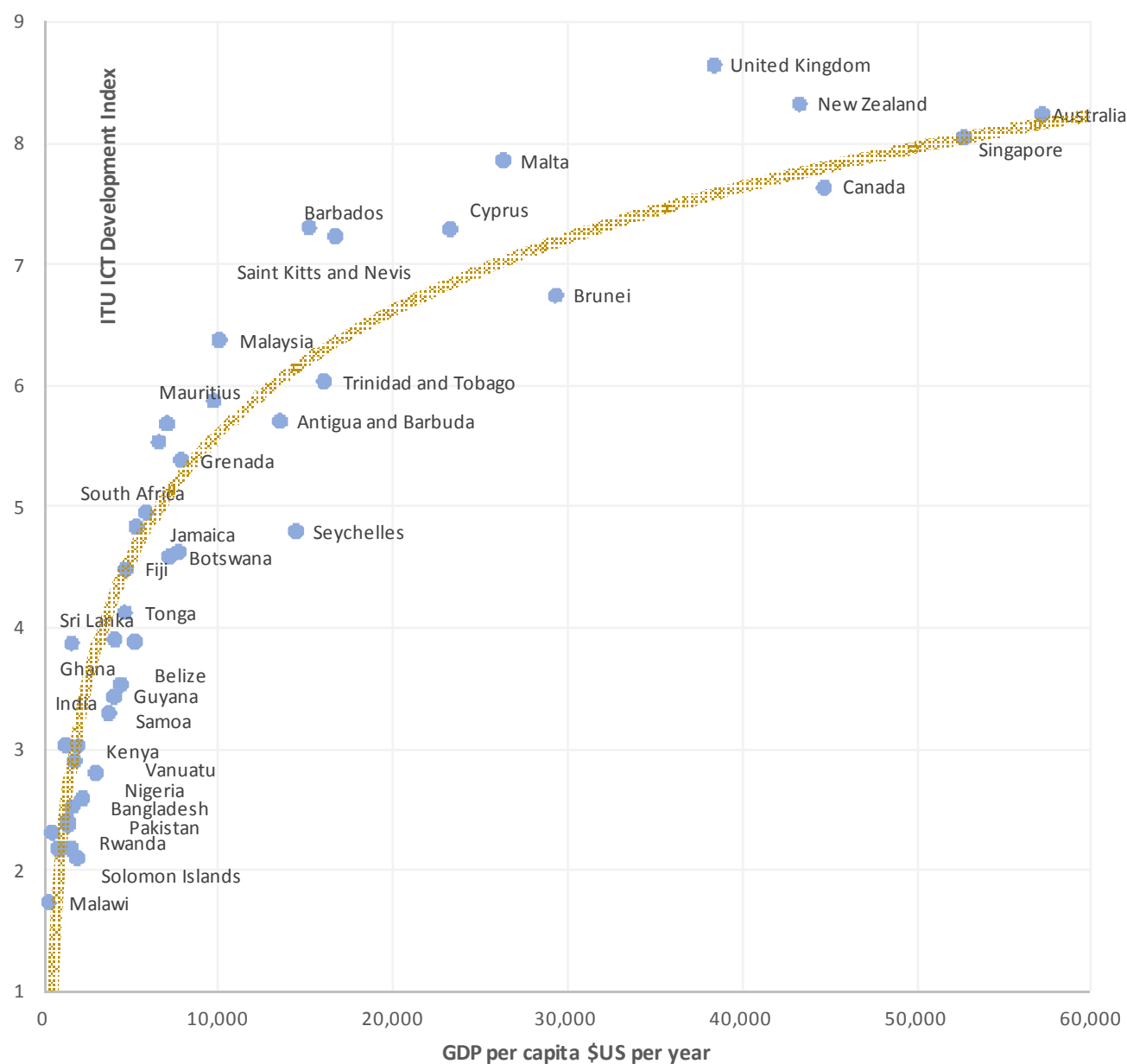
Source: https://en.wikipedia.org/wiki/List_of_Commonwealth_of_Nations_countries_by_GDP
             http://www.itu.int/net4/ITU-D/idi/2017/#idi2017rank-tab
             https://en.wikipedia.org/wiki/List_of_member_states_of_the_Commonwealth_of_Nations_by_population
             Includes logarithmic line of best fit

5 DETAILED ANALYSIS OF KEY REGULATORY ISSUES AND RECOMMENDED OPTIONS

5.1 THE IP REGULATORY AGENDA

As indicated above, the regulatory agenda for responding to OTT services and, more broadly, the evolution to an IP everywhere world, is broad indeed. Given this broad agenda it is extremely important to prioritise.

Following internal discussions and considering the survey responses, we have grouped the following regulatory topics under the headings critical, important and desirable:

Critical for Regulatory Attention

- content regulation
- licensing
- data protection, privacy, user control of data
- universal service provision

Important for Regulatory Attention

- spectrum allocation
- interconnection
- quality of service
- net neutrality

Desirable for Regulatory Attention

- international mobile roaming.

In addition to these more traditional telecommunications regulatory concerns, there is the additional issue of taxation of OTT providers. This challenge is cross jurisdictional in two senses: it requires international cooperation and it requires collaborative regulation as espoused by the ITU which brings together regulators from various regulatory and administrative arms of national governments.

5.2 CRITICAL FOR REGULATORY ATTENTION

5.2.1 CONTENT REGULATION

In the past ten years the proliferation of affordable smartphones, and increasingly ubiquitous wireless broadband networks has resulted in enormous disruption of the traditional content delivery models of newspapers (first), and now broadcasters are being disrupted by digital content providers. Ensuring a level playing field between old and new content distribution models has also been difficult with prevailing local content rules, cultural requirements as well as taxation and licensing requirements being inconsistent, dated and often ad hoc.

Regulatory frameworks, therefore, must evolve as markets evolve, it is not possible to regulate the future into the past. Flexibility in adopting regulatory approach is arguably the key, but there is little

doubt that new arrangements, approaches and tools will be necessary.[11] Historically, the focus has been on the traditional media platform – television, radio, film and print. However, the emergence of digital streaming services has led to revaluation of key concepts typically used in the regulation of content. This is now the subject of numerous reviews in Commonwealth countries.[12]

Digital content available to consumers can generally be divided into two categories, (i) Commercial content and (ii) User-generated content. These categories are not mutually exclusive and products where there is subscription content over social media platforms are evidentiary of both categories.

5.2.2   REGULATORY ISSUES ASSOCIATED WITH DIGITAL CONTENT

Social media companies have created OTT services used globally and intended to positively benefit individuals worldwide. However, the introduction of social media has also seen a proliferation of troubling content. Social media platforms have been used to spread terrorism propaganda and used as an outlet for violent content. The ability to distribute such content sparks concerns amongst policy makers. There is limited liability for social media platforms that aid users in distributing illegal content.

Social media platforms have also caused copyright infringement issues, especially with live broadcasts of sporting events. Live streaming is a potential threat to the future viability of live sporting events, and to the sustainability of live television broadcasts generally.

Social media platforms such as Facebook, Twitter and Google have arguably morphed into some of the world's biggest publishers and broadcasters. With this new role of social media as a news source, a specific concern has been the effect of false stories – or 'fake news' – circulating on the Internet. News shared through Social media platforms typically have dramatically different structures from and operate in different legal frameworks than traditional media organisations, meaning that content can be relayed among users with no significant third-party filtering, fact-checking, editorial judgment or legal liability.

In some Commonwealth countries such as Sri Lanka, in March 2018, arguably due to the lack of response from OTT players sought to block access to Facebook, as well as two other platforms that Facebook owns, WhatsApp and Instagram, in an attempt to reduce violence directed at its Muslim minority.[13]   As use of the social media platforms has accelerated in recent years, so have cases of extremist fringe groups using Facebook's reach to magnify their messages. [14] In 2017, India blocked a number of social networking services— including Facebook, Twitter, WhatsApp and YouTube— for one month in the disputed territory of Jammu and Kashmir in a bid to curb street protests there.

5.2.3   GLOBAL MEASURES FOR REGULATING DIGITAL CONTENT: GENERAL

There are a number of critical focus areas that have been addressed by organisations and national regulators globally.

---

[11]   Refer to ITU Paper "The Challenge of Managing Digital Content" for the 'ITU-TRAI Regulatory Roundtable', 21-22 August 2017, New Delhi, India. Available at https://www.itu.int/en/ITU-D/Regional-Presence/AsiaPacific/Documents/Events/2017/August-RR-ITP-2017/ITU%20Report%20Regulatng%20Digital%20Content%202017%20Final.pdf

[12]   For example, see South Africa, https://pmg.org.za/tabled-committee-report/2668/ , Singapore www.channelnewsasia.com/news/singapore/select-committee-concludes-hearings-fake-news-tense-exchanges-10086868 and Australia, www.accc.gov.au/about-us/inquiries/digital-platforms-inquiry. The Malaysian Parliament passed the Anti-Fake News Act 2018 on 2 April 2018 but it is understood this is subject to review with the change of Government.

[13]   www.nytimes.com/2018/03/08/technology/sri-lanka-facebook-shutdown.html

[14]   www.nytimes.com/2018/04/21/world/asia/facebook-sri-lanka-riots.html

The ITU launched the Child Online Protection ('COP') Initiative in 2008 within the framework of the Global Cybersecurity Agenda ('GCA'), aimed at bringing together partners from all sectors of the global community to ensure a safe and secure online experience for children everywhere.[15]

Regulators globally have begun to streamline content regulation and complaint-handling procedures in response to the ineffectiveness of current complaint procedures. The European Council is considering a more demanding approach, requiring companies to block videos containing hate speech and incitements to terrorism.[16] This will be beyond the current imposition and implementation of the General Data Protection Regulation (GDPR). The UK and France have joined forces to tackle online radicalization with plans, such has creating new legal liability, that could lead to much stronger action taken against social media companies who fail to remove unacceptable content.[17]

As pressure from governments heightens globally, including in the United States social media companies and ISPs have also taken steps to further improve self-regulation of their platforms. Facebook, Microsoft, Twitter, and YouTube have launched a partnership in June 2017 aimed at combating terrorists online.[18] Further developments following the allegations of interference in the US election have resulted in further calls for regulation in that market.[19]

In light of the perceived ineffectiveness of complaint procedures by the main social media platforms (eg including Facebook, Twitter, Snap, etc) combined with the importance of efficiency in taking dangerous and illegal content down, it is recommended Commonwealth countries formulate legislative amendments which would streamline content regulation and complaint-handling procedures to make them as efficient and effective as possible. Those domestic law processes or mechanisms (e.g. a court with a cyber jurisdiction or a special Commissioner with certain special delegated powers in relation to take-down orders for content that, for example, involves terrorism or child pornography) should is consistent with international norms and is readily understood by global OTT players.

There should be an agreed single point of contact for interfacing on such requests which should typically be the Commonwealth country's telecommunications regulator unless a specialist country regulator is created such as Australia's e-Safety Commissioner. Importantly, the optimal approach to regulation in this new digital environment is not more regulation, but rather, better regulation

5.2.4 OTHER MEASURES FOR REGULATING DIGITAL CONTENT

In a significant departure from the traditional licensing of broadcasters (and of telecommunications network facilities and services), several countries have sought to licence Internet content providers. One approach adopted in Singapore, a Commonwealth country has been specific amendments made to licensing rules to require country specific internet news content within the individual licensing regime.

Irrespective of where the content is hosted and/or whether the publisher has a presence in Singapore, an Internet site is required to be individually licensed under the *Singapore Broadcasting Act 1994* (as amended) if it meets the criteria in the *Notification*. Such an approach to licensing if promulgated would provide the any Commonwealth regulator with regulatory tools it may not have previously had because of the hosting location of material.

---

[15]   www.itu.int/newsroom/press_releases/2008/33.html

[16]   www.theverge.com/2017/5/24/15684168/eu-hate-speech-law-facebook-twitter-youtube- video

[17]   www.gov.uk/government/news/uk-and-france-announce-joint-campaign-to-tackle-online-radicalisation

[18]   www.theverge.com/platform/amp/2017/6/26/15875102/facebook-microsoft-twitter-youtube-global-internet-forum-counter-terrorism

[19]   www.cnet.com/news/congress-isnt-ready-to-regulate-zuckerberg-facebook-twitter-google/

Figure 4:   Singapore's approach to regulation of Internet News Content

Under paragraph 3A of the Singapore *Broadcasting (Class Licence) Notification*, sites which (i) report an average of at least one article per week in Singapore's news and current affairs over a period of 2 months, and (ii) are visited by at least 50,000 unique IP addresses from Singapore each month over a period of 2 months and are notified by the Info-Communications Development Authority (IMDA) will require an Individual licence.

Furthermore, if required by the Authority to do so by notice in writing, an Internet Content Provider who is or is determined to be an individual providing any programme, for the propagation, promotion or discussion of political or religious issues relating to Singapore shall register with the Authority under an Individual Licence.

Licensing under the Broadcasting Act for Internet Content Providers

CLASS LICENCE, under section 9 of the BA:
ALL INTERNET CONTENT PROVIDERS EXCLUDING SITES WHICH REQUIRE INDIVIDUAL LICENCES

Additional registration requirement for political and religious sites

News sites which
(i) report at least 1 one article per week on Singapore's news over a period of 2 months, and
(ii) visited by at least 50,000 unique IP addresses from Singapore over same period

INDIVIDUAL LICENCE, under section 8 of the BA

5.2.5   LICENSING OBLIGATIONS

In general, regulators award licenses or formal permits to service providers to supply telecommunication services and/or to operate networks (or equipment connected to the network). In addition, according to the Eastern Caribbean Telecommunications Authority (ECTEL)[20], licenses "generally define the terms and conditions of such authorization, and describe the major rights and obligations of a telecommunications operator."[21] The license will usually refer to the relevant enabling legislation, the applicable tariffs, the numbering plans, and the interconnection guidelines, amongst other critical elements. It is through these critical items of the license – given the specific context of the market realities in the regulatory jurisdiction – that the regulator attempts to strike a balance between the interests of the end-users and the licensees.

5.2.5.1 Policy and Regulation

In short, regulators employ the regulatory tool of licensing to achieve a number of objectives including to:

---

[20]   ECTEL is the telecommunications regulatory body for Dominica, Grenada, St. Kitts and Nevis, Saint Lucia, St. Vincent and the Grenadines

[21]   https://www.ectel.int/regulatory-framework/licencing/

a) Establish regulatory certainty and ensure predictability
b) Encourage investment in network roll-out and telecommunications service provision
c) Ensure efficient deployment of scare resources (e.g. spectrum allocation)
d) Mandate quality of service obligations and consumer protection guarantees

5.2.5.2 Trends in Licensing

The telecommunications sector has, in the last few years, been undergoing radical changes, which pose a challenge to regulators throughout the world. These developments, such as the convergence of previously separate applications such as voice, video and data streaming (from a single network as opposed to multiple networks) into a single data flow, demand an update of the regulatory and licensing regime. Having grappled with a few regulatory questions and policy issues, as a result of these innovations, regulators throughout the world reflected on the possible trajectories of these fast-evolving technologies. What has been clear is that predicting the path of technological advances and the long terms trends of the sector, with any degree of certainty, is challenging for regulators.

Consequently, regulators around the world have been steadily reducing the regulatory conditions attached to licensing, in recognition not only of convergence trends, but that licensing processes impose costs (e.g. bureaucratic delays, administration overheads, etc.) for both the regulator and the licensee. Also, authorities are appreciating that easing licensing requirements has been shown to boost market access and competition. The ITU argues the technology implications of the transition to Next Generation Networks means that "*fair competition between different network infrastructures demands a technology neutral licensing regime.*" Moreover, that, a "*unified licensing will stimulate optimal use of technology options by operators.*"[22]

Hence, licensing fees, whether calculated as a portion of the annual turnover or per subscriber, have been coming down in the last few years. In India, after steadily increasing with the boost in subscriber numbers, the license fees were later simplified and revised downwards by the regulator following an evaluation by the Bureau of Industry Cost and Prices.[23] Also, following a number of consultations with industry, the United Kingdom's Office of Communications, or Ofcom, revised down, annual license fees for mobile spectrum.[24]

Many regulators have been transitioning away from service and technology specific licensing regimes to introduce certain flexibilities, and/or even eliminating the licensing requirements altogether – and so, opening up the market to new players and new technologies. For instance, Japan eased the regulatory requirements extensively – currently, there is no tariff regulation, and furthermore, a simple registration and notification is sufficient to provide internet services and certain value added services in the country.[25] In place of these licensing conditions, the Japanese regulator strengthened the consumer protection regulations, and importantly, transferred the administrative and financial burden of addressing consumer complaints to the service providers.

Some countries, such as the US and China, even allocate certain bands of spectrum without a license, to boost wireless technologies for broadband access. Japan has assigned the 57 GHz to 66 GHz spectrum for use without a specific license.

Other regulators, such as in the European Union (EU) are recommending limited regulatory conditions for provision of services, or what is referred to as general authorizations. Instead the regulators conduct periodic evaluations and impact assessments of the policy choice on the market developments. Yet other countries such as Nigeria, India and Egypt have opted for unified, generic and technology-neutral licensing regimes which permit the supply of communications services

---

[22]   http://www.ictregulationtoolkit.org/toolkit/7.2.5
[23]   https://cis-india.org/telecom/resources/licensing-framework-for-telecom
[24]   https://www.ofcom.org.uk/about-ofcom/latest/media/media-releases/2015/annual-licence-fees-mobile-spectrum
[25]   http://www.ictregulationtoolkit.org/practice_note?practice_note_id=726

without specifying the type of infrastructure to deliver the service, or sometimes, even the type of service offering to be provided.

Following a public consultation and appointment of a consultant to undertake a market analysis of the new licensing regime, the Nigerian Communications Commission (NCC) published the relevant regulations observing that:

> *"... the Nigerian Communications Commission (NCC) issued a notice on the introduction of a unified licensing regime in Nigeria.*
>
> *It stated that:*
>
> - *The market shall be opened up by adopting a unified licensing regime which shall allow existing fixed wireless and mobile licensees to provide both services subject to geographical/regional limitations contained in their license*
> - *For the post exclusivity period all wireless licenses shall not be segmented in terms of mobile and fixed service categories. Once a spectrum is allocated, licensees shall be free to offer voice, data or multimedia services as they deem fit.*
> - *All active wireless licenses issued prior to the expiration of the exclusivity period shall be amended accordingly."*[26]

5.2.5.3 Good Practice

The entry of OTTs to the market has raised a number of regulatory questions and policy issues which need to be addressed. For instance:

- What are the implications if regulators completely eliminate market entry restrictions (especially in markets where the incumbents still have significant market power), expressed through a licensing regime, (as Japan has partially done)?
- Also, how do regulators address the issues raised by the legacy network providers while ensuring that the technological innovations and the competitive elements introduced by the entry of OTT service providers continue to accrue to end-users?
- How does regulation maintain an optimal balance between the incumbents and the new entrants?
- Further, which regulatory tools are best suited to protect consumer interests (or even extend universal service obligations without revenue from the license fees) outside of the licensing regime?
- Is licensing the best regulatory instrument to impose regulatory obligations?

Re-regulation through licensing (as envisaged by some ICT industry players) would seem to go against the liberalization trends introduced by the convergence program. Further, re-instating licensing would appear to be inconsistent with the underlying values that inform the 'light touch' regulatory arrangements embraced in the last few years. Will re-licensing impose legacy network regulations (mostly designed to countervail the power of an incumbent with a significant market power), to new technological advances and market place realities?

There is no silver-bullet answer to these critical questions, but a few tried-and-tested principles seems to inform the approach of a number of regulators as they address rapid market changes in the telecommunications sector. These principles are detailed below:

e) Committing to service-neutral and technology-neutral forms of regulatory regimes – experience suggests that such an approach encourages competition and take-up of new technologies
f) Encouraging investment in networks to engender a healthy telecoms market primed to provide affordable, trusted and quality services to end-users

---

[26]   https://www.ncc.gov.ng/docman-main/licensing-documents/434-licensing-framework-for-unified-access-service/file

g) Ensuring that consumer protection underpins key regulatory decisions
h) Committing to consultation, transparency and procedural fairness in all the regulatory amendments envisaged
i) Remaining adaptable and dynamic – being agile and responsive to the technological changes taking shape is critical

5.2.5.4 Conclusions

It is interesting to note that regulatory asymmetry in telecommunications is not unusual, e.g. asymmetrical interconnection rates between the smaller Cell C and the larger Vodacom and MTN in South Africa. The Body of European Regulators for Electronic Communication (BEREC) concedes that even though the ideal is a level regulatory playing field, "there can also be reasons for different regulatory treatment of services". BEREC goes on to state that:

> "*The range of services to which any specific obligation should apply, must be considered in light of the goals of the obligation and the proportionality of that obligation being applied to any specific service or service type. The proportionality of that obligation and its scope follows from whether the social benefits of the obligation are proportionate to the economic costs entailed for each regulated provider, and the static and dynamic competition effects of partial or universal application of the obligation. A preference for a level playing field can be part of the assessment of proportionality, but it is only one of the many elements.*"[27]

The regulator will continue to walk the tight rope of balancing the need to provide certainty for investors through a set of codified regulatory requirements on the one hand, and the flexibility demanded by a fast-evolving telecommunications sector on the other. Sector legislation in Commonwealth countries should provide flexibility so that licensing of OTT players is possible. However it should be noted that such licensing make have the desired policy outcomes in larger markets it may not work for all Commonwealth markets. There are also strong arguments for the licensing burden and costs imposts on network operators to be eased in order to allow them to better compete with OTT players.

5.2.6 DATA PROTECTION AND PRIVACY

In May 2016 the EU published the final text of the General Data Protection Regulation (GDPR) which came into force on 25 May 2018. The GDPR, one of the more robust and wide ranging privacy protection and data processing regulations, defines personal data as a piece of information (e.g. name, email address, IP address, social media profile, cookie address, location data) that is able to identify a person[28]. In addition, the official explainer of the directive emphasizes that "*personal data that has been de-identified, encrypted or pseudo-anonymise but can be used to re-identify a person remains personal data and falls within the scope of the law*".[29] In other words, wherever the identifiable personal information is stored is subject to the directive.

In order to protect personal data, the directive demands entities employ a number of techniques such as anonymization (masking personal identifiable information), pseudonymisation (using artificial identifiers to conceal personal data), and encryption to protect personal information. More importantly, the obligation is not only for the private data identifiers to be hidden or masked but also for personal data to be shared only on a strict 'need to know' basis.

---

[27] BEREC (2016), *Report on OTT Services* BoR (16) 35, p. 4
[28] Article 4 of the GDPR states that "'personal data' means any information relating to an identified or identifiable natural person ('data subject'); an identifiable natural person is one who can be identified, directly or indirectly, in particular by reference to an identifier such as a name, an identification number, location data, an online identifier or to one or more factors specific to the physical, physiological, genetic, mental, economic, cultural or social identity of that natural person".
[29] https://ec.europa.eu/info/law/law-topic/data-protection/reform/what-personal-data_en

Amidst unease about the harvesting and processing of personal data (e.g. the Cambridge Analytica scandal), the UK Information Commissioner's Office launched an inquiry in 2016 into the processing of such information. The enquiry was also in response to the growing global concern that electoral legislation has not kept up with the influence of digital and technological advancements on political campaigns. In another Commonwealth country, Kenya, their 2017 elections are another very interesting case study of the role of technology in electioneering. This is a perennial theme that emerges, i.e. the challenge that various key public services face in keeping up with digitization – whether in financial services (mobile money, blockchain, etc.) or taxation (digital vs physical presence, intangible assets, etc.).

Unlike in the US, where third party data can be processed without active consent, in the EU area such a practice was prohibited even before the GDPR was in force. For instance, in February 2018, a Berlin court ruled that Facebook's default privacy settings and personal data processing violate German consumer regulations. It ruled that Facebook regularly neglected to properly inform users not only about the collection of the data, but also to provide users with adequate opportunity to offer consent for use of such data.[30]

5.2.6.1 Data Protection and Privacy Trends

The Internet, through a number of OTT services and apps, has enabled millions of people around the world to access the Internet to shop, be entertained, and to learn, amongst other activities. However, this online access also presents new dangers. A relatively minor data breach can expose users to financial scams, cyber-bullying, grooming, profiling or being blitzed with spam and inappropriate content.

These dangers have inspired calls for the proper management of personal data protection and privacy, especially in light of the growth of OTTs. A number of specific policy issues about personal data protection and privacy have gained prominence in the last few years thrust in the headlines by the data analytics scandals referred to above but also the spectacular cyber data breaches and data protection failures. More recently, the WannaCry attack which, according to Wikipedia, affected 200 000 persons and some 300 000 computers in 150 countries is a classic example. The hackers were paid a ransom, through Bitcoins, by the victims to regain access to personal data held hostage by the hackers. Also, Uber failed to report a major security breach on the personal data of 57 million customers and 600 000 drivers. The company is now under investigation and faces civil damage claims. In 2017, Equifax, a leading consumer-credit reporting agency, experienced a data breach in which the personal information of 143 million mainly US consumers (but also Canadian and British customers as well) was accessed by hackers for several months. The personal information included the affected persons' names, birth dates, addresses, drivers' licenses and social security numbers.

These types of large-scale cyber-attacks are increasing in intensity and reach. The disquiet concerning the safety of personal data from, for instance, identity theft, goes beyond the proliferation of OTT services and applications. Most certainly, the concerns are even more pronounced in several OTTs (e.g. digital financial services such as Paypal and related online payment apps) that are not directly in competition with electronic communication services. It is clear that digital identity (and concomitant digital footprint) and personal information are increasingly a considered prized commodity. It has been reported by cyber-security companies that a growing number of fraudsters are pursuing leads on digital files of personal information ahead of financial or even physical assets.

All these unsettling developments are taking place against the background of terrorist attacks in Europe. Consequently, several European governments, have demanded a revision of the end-to-end encryption (calling for "responsible encryption" that allow law enforcement authorities to tap into conversations, and be provided with "backdoors" or special keys to unlock personal encrypted

---

30   https://www.theguardian.com/technology/2018/feb/12/facebook-personal-data-privacy-settings-ruled-illegal-german-court

messages, especially on WhatsApp and other related messaging services to address terrorism and related issues.[31]

What are the policy tools and regulatory process to address these challenges? Since, data breaches do not respect national borders, what international security infrastructure is in place to protect users and safeguard privacy online?

5.2.6.2 Policy and Regulatory issues

The EU's GDPR is significant because of its extensive reach and extra-territorial application. The EU is emphatic that the GDPR is applicable to all international companies (both EU and non-EU business) – even without physical commercial presence in the region – handling the personal data of EU citizens. These requirements will persuade developers and programmers around the world to re-think their data protection rules and revise existing protection systems to embed the Privacy by Design principles in the operations, as outlined in the directive. This extra-territorial applicability effectively elevates the GDPR to a global data protection regulation. Many countries around the world are reviewing and amending current national legislation to address issues highlighted by the EU directive.

The definition of personal data has, on the whole, been fairly extensive but the GDPR expands it to include new types of personal data (e.g. cookie ID) as outlined above. The implications of such a comprehensive reach is that a whole host of organizations and entities (whether in financial services, health sector, online retail, entertainment industry, etc.) will be obliged to comply with the requirements of the GDPR. Many organizations, whether in the OTT ecosystem or in the broader ICT industry, would have to invest in robust IT systems, as well as, develop appropriate policies and processes to enable early detection of data breaches and adequately protect personal data. It has been alleged that certain the social media app, Facebook on Android still logs users calls and texts.[32]

The GDPR introduces a stricter client consent system – the directive demands that entities that have access to personal information seek consent from end-users about the specific personal information they collate and archive. Also, organizations and institutions are required to explicitly underscore the option to opt-out, i.e. automatic opt-in is now restricted. More critically, silence from the user does not constitute consent. Similarly, entities with personal information are required to detail the reasons for collecting personal data, and more importantly, openly disclose the intention to share the information with third parties. Essentially, end-users, including of leading OTTs such as Facebook, Twitter and YouTube, are empowered to control the rights to their personal data.

More interesting, the EU directive endorses the right to data privacy – in Article 17, the GDPR re-enforces the concept of the right to be forgotten or the right to erasure. In other words, organization are required to provide a legitimate cause for gathering and archiving personal data. Further, end-users are empowered to request access to archived data, portability of the data, or even complete deletion. Users are empowered to object to the use of their personal data for advertising or research purposes. The data processing company is required to immediately cease to use the personal data if.and whenever an objection is lodged, or show compelling and legitimate public interest in processing the said data.

Also, the GDPR demands that Data Protection Officer be appointed, by public authorities processing personal data, as well as, as organizations that regularly handle and process large sets of personal information (OTT companies are considered included in this category), to ensure active compliance with the directive. Compliance is demanded in the collection, storing, sharing and use of the personal data.

Furthermore, the GDPR has harmonised the notification guidelines for data breaches in the EU area – a data breaches is to be notified within 3 days. It is required that the data-breach notification detail

---

[31]   http://www.wired.co.uk/article/uk-encryption-whatsapp-amber-rudd

[32]   https://www.tomsguide.com/us/facebook-logs-calls-texts,news-26847.html

the nature of the breach, the number of users affected, and the type of information accessed. Similarly, most US states already have data breach notification laws in place, while Australia has just enacted (February 2018) a new data-breach notification regulation which demands of organizations to promptly report the breaches that put lives at risk – the targets of the disclosure is the affected persons and the Office of the Australian Information Commissioner (OAIC).[33]. It is required that the data-breach notification detail the nature of the breach, the number of users affected, and the type of information accessed.

The directive obliges organizations that handle personal data to conduct privacy impact assessments (PIAs) to limit the risk of data breaches, and to ensure that sufficient security measures are in place. The French and Spanish data protection authority, i.e. the Commission Nationale de l'information et des Liberties (CNIL) and the La Agencia Española de Protección de Datos (AEPD), have already published detailed guidelines for industry to comply.

Finally, the GDPR demands data protection by default and design (PbD). In order to protect personal data companies are required to develop relevant policies and put in place appropriate technological capacity. The PdD framework were first advanced as a best practice in Canada in the 1990s by the Ontario Privacy Commission to address the quick-fix approach to data breaches. The PbD principle postulates that the best approach to addressing a data breach is to prevent it from happening in the first place, i.e. to observe data protection compliance from the onset of a project or application development, essentially cultivating a culture of compliance with privacy protection. The GDPR demands PbD as a default on all digital applications and services.

The GDPR Working Party also clarified in subsequent directive explainers that users have a right to personal data portability; this is data willingly provided to data controllers or companies that specialize in data processing as well as data generated by users' online activity. In addition, the data portability is applicable even in cases in which the data portability request includes information about other users. More significant, the data controllers are required to inform users of the right to data portability, even when customers elect to discontinue services, without charge as it is considered that such requests do not generally impose a significant administrative burden. The cases in which data portability requests will be denied are very few and far between – the threshold to justify denial of data portability, is very high. Data controllers are expected to appropriately cost the scenario of multiple requests for data portability. Finally, data controllers are expected to properly archive a user's personal data in order to positively respond to a future request for data portability even if a prior data portability request had been serviced.

The most significant part of the directive is the penalty and liability for the data breach – the penalties could be racked up to 4% of the global turnover for a breach of data or violation of the consent system.

The application of the directive is technology and service neutral – i.e. it is applicable both in the processing (manual or digital) and storage (on paper or via IT server) of the data; the processing of data involves complete or partial collection, structuring, adaptation, disclosure by transmission and other related opportunities to process personal data.

On its part, the US privacy regime lacks the unified single-market approach characteristic of the GDPR. The individual states have their own regulations. The FTC is the main privacy regulator but several sector-specific agencies are responsible for different aspects of privacy protections sometimes with competing requirements. For instance, on personal medical data, the Health *Insurance Portability and Accountability Act* (HIPAA), is the main sectoral regulator. However, pupil immunization and school health records are held by the *Family Educational Rights and Privacy Act*

---

[33]   http://parlinfo.aph.gov.au/parlInfo/download/legislation/ems/r5747_ems_ed12b5bb-d3b3-4a6a-9536-53bb459a00df/upload_pdf/6000003.pdf;fileType=application%2Fpdf#search=%22legislation/ems/r5747_ems_ed12b5bb-d3b3-4a6a-9536-53bb459a00df%22

(FERPA). The FERPA overlaps with the *Children's Online Privacy Protection Act* (COPPA), which only covers pre-teen children.[34] In general, the "US privacy system has a relatively flexible and non-prescriptive nature".[35]

The Malaysian *Personal Data Protection Act 2010* (PDPA), for instance, which came into force on 15 November 2013, sets out a comprehensive cross-sectoral framework for the protection of personal data in relation to commercial transactions. The PDPA does not define 'consent', nor does it prescribe any formalities in terms of obtaining consent as comprehensively as the GDPR. Also, the requirements for a data protection officer are not spelled out in specific terms as yet.

Around the world, regulators in both multilateral and regional platforms, have been exchanging experience and information about strengthening the security of the ICT systems to restore trust and confidence in the ICT systems.

In addition, there have been efforts to discipline the practice of processing personal data for commercial benefit as was the case with, for instance, Cambridge Analytica and AggregateIQ. The 1990 UN Guidelines concerning Computerized Personal Data Files was a first attempt at outlining international guidelines for data processing. More importantly, the UN, in addition to investigating a legally binding framework, is also engaging device manufacturers to develop ICT products and systems that place security at their core. The intergovernmental organization has also reiterated that privacy is a human right enshrined in the *Universal Declaration of Human Rights.* Special Rapporteur with a mandate to, *inter alia*, report on alleged violations of the right to privacy, including in connection with the challenges arising from new technologies, has been appointed.

In addition, there are several regional frameworks on personal data protection, such as the ECOWAS Cybersecurity Guidelines and the SADC Model Law on Data Protection, E-Transactions and Cybercrime, in operation but many are non-binding.

5.2.6.3 Good Practice

In order to protect the personal data and privacy of users of OTTs and other online apps, the following are critical:

- Data security issues transverse national borders and are not limited by physical jurisdictions – thus, international cooperation and harmonization of legislation on privacy and data protection frameworks are crucial.
- Intra-country cooperation between various intersecting e-government databases, such as health, education, immigration units
- Participation all the key stakeholders in developing personal data protections policy and principles
- Developing and adopting industry wide standards to inculcate a culture of cybersecurity awareness is not an option
- Outlining regulatory regime and institutional frameworks for protecting personal data
- Fostering a culture of cybersecurity through consumer education and empowerment
- Digital literacy, intended to equip users with tools, knowledge and skill to navigate online life including managing online privacy settings, from an early age is becoming increasingly imperative
- Updating current criminal prosecutions regime to align to the digital reality

5.2.6.4 Conclusion

Digital identity and personal information is increasingly a considered prized commodity by OTT service providers and by legacy networks, as well. Consequently, efforts underway at national and

---

[34]   https://www.cfr.org/report/reforming-us-approach-data-protection
[35]   https://thelawreviews.co.uk/chapter/1151376/united-states

regional levels to discipline the processing of personal data are important. However, the EU's GDPR, because of its extended jurisdiction and comprehensive approach to personal data protection, is rightly the focus point for global discussion, especially for countries that do not currently have comprehensive data protection regulations. A number of principles rights and obligations in the regulation, i.e. the rules on obtaining valid consent for processing personal data (in which companies are not only required to obtain user consent using simple and clear language, but to also clearly state how the personal data will be used) will affect how OTTs, as well as, legacy networks handle individuals data.

5.2.7   UNIVERSAL SERVICE FUND (USF)

Information and communication technologies (ICTs) are what are termed an infrastructural service, i.e. a key input into delivery of other equally critical services such as health, education, and commerce, amongst others. Thus, governments across the globe are committed to providing ubiquitous access to ICTs. However, deploying telecommunications network is not only costly, but involves higher commercial risks if the licensing obligations require that such infrastructure is extended to areas that are not commercially viable (i.e. due to low-population density, low-income population groups, and/or remote, mountainous terrain). In many countries consumers groups who fall in these categories remain underserved or unserved.

Consequently, through a plethora of policies and directives, governments have devised various incentives and strategies to bridge the service and coverage gaps. These incentives include financing schemes such as a surcharge on telcos revenue and tax credits to fund provision of universal service (network infrastructure to household level), and/or universal access (network access at a public or shared facility).

There is no single global definition of universal services in telecommunications, but the principle underscores the concept of providing accessible and affordable basic communication services to all. The ITU has identified over thirty (30) countries, such as India, Mozambique, Brazil, Russia and Australia, administering a heterogeneity of universal services and access fund (USAF) programs; the objective of these programs range from increasing full coverage in rural areas to boosting internet speeds.[36] Although some progress has been achieved, certain gaps remain even in the midst of deep market liberalization. And expectations, for more ubiquitous access and services, are getting higher with technological advancements.

5.2.7.1 Policy and Regulation

In the past, universal service and access policy objectives were mostly focused on providing voice telephony services. However, with recent technological innovations (e.g. increased availability of smart phones and internet services which enabled the rise of OTT services) universal service and access now includes broadband. In 2009, the French Government pronounced that access to the Internet is a human right, while other European countries defined specific Internet connection speeds in universal service obligations (e.g. Finland: 1Mbps). The US *Telecommunications Act of 1996* expanded the policy objective of universal service, which refers to broadband for all, including rural area consumers and low-income users, at a reasonable price.[37] More significant, the EU's universal service and access directive mandates that universal service obligations be reviewed every three years.

It is in this background telcos and other legacy networks have been raising the alarm about the negative impact of OTTs on revenues, and in turn, their financial capacity to continue to contribute to USAFs. Moreover, some of the network operators have demanded that regulators should compel OTT service providers to contribute to USAFs to finance network infrastructure development given the eventual shortfalls.

---

[36]   http://www.ictregulationtoolkit.org/toolkit/4.5
[37]   https://www.fcc.gov/general/universal-service

It bears recalling that very recently regulators were administering a scheme very similar to what some of the telcos are demanding. What the telcos are calling for is similar to *access deficits charges* – the concept that access rates, whether interconnection or termination are not high enough to cover the network costs of providing the service – in connection to OTT services. Interestingly, the ITU has noted that almost all of these access deficit charges are being revised because of the "wrong incentive" they facilitate. In fact, these charges are being "phased out in most countries [Malaysia, Russia and India] where they were previously adopted. For example, in India, TRAI, the regulator, after a consultation, announced in 2007 a cut in the total revenue raised by ADCs from USD 800 million to USD 500 million, and stressed that the ADC regime has always been intended to have a limited life".[38] It is also said that in the face of fierce competition such 'subsidies' may do more damage than good.

5.2.7.2 Trends in USF

The main source of universal service and access funds (USAFs) has largely been a levy on telcos operating revenue ranging from 0.16% in South Africa to 5% in India.[39] The levy, and consequently, contributions to universal service funds have been under some pressure (from falling termination rates receipts) for a few years, even before the rise of the OTTs.

In the past, the allocations were largely invested in networks for voice telephony. Similarly, the access and service funds were technology and service specific. The allocations have shifted in recognition of the fact that telecommunication access can be facilitated though a blend of many technologies and services. For instance, Eutelsat is investing in broadband access, though increasingly cost-effective satellite technology, in Africa.

Currently, allocations include, for example, provision of high-speed Internet services and compliance with local content quotas in line with the broadcasting regulation. Nowadays, USAF resources are also disbursed to non-governmental organizations providing diverse services such as digital literacy training content development, etc. For instance, the Federal Communications Commission administers four universal service schemes, one of which is the E-rate program; the program, with a budget of $3.9 billion, supports school and library connectivity, as well as, the Lifeline program which funds broadband for low-income households.[40] Likewise, the Japanese government provides financial assistance for communication services costs incurred to provide telemedicine programs to remote areas considered unprofitable.[41]

In the past, infrastructure delivery, of such significance to socio-economic development objectives, was funded through government resources. In addition, international donor agencies disbursed financial support and/or technical assistance to accelerate investment into such capital-intense projects. In the last few years, however, financing for network infrastructure development has evolved - the role of non-state actors, including philanthropists and community based organizations, has increased. The Ruralfone project in Brazil and the Peruvian co-operative in the Chancay-Huaral valley have been underscored as examples of private funds and cooperative arrangements supporting major network infrastructure development. Other non-traditional players complementing the efforts of the government-led initiatives such include municipalities (City of Johannesburg in South Africa and the Minas Gerais region in Brazil) and public private partnerships (PPPs) in the United States. [42].

In addition, funds from development banks have increased. According a World Bank report:

---

[38]   http://www.ictregulationtoolkit.org/toolkit/4.3

[39]   https://economictimes.indiatimes.com/industry/telecom/india-sitting-on-over-4-billion-unused-universal-services-fund/articleshow/19481058.cms

[40]   http://blogs.edweek.org/edweek/DigitalEducation/2017/08/erate_universal_service_money_Treasury.html

[41]   Isisis Nakajima, I. J Med Syst (2010) 34: 1105. https://doi.org/10.1007/s10916-009-9329-y

[42]   https://www.itu.int/dms_pub/itu-d/opb/stg/D-STG-SG01.01.1-2017-PDF-E.pdf

> *"In Uganda, a World Bank contribution of over USD 7 million resulted in a much more rapid roll-out of the Rural Communications Development Fund (RCDF) programme than would otherwise have been possible. As a result, the leading GSM operator received subsidies amounting to more than its contribution to date. By 2007/2008, a similar contribution in Mongolia will result in similar benefits to the country, to operators and, of course, to the rural communities served"[43]*

In addition, activities complementary to Internet access are financed. For instance, the Internet Society (non-governmental organization focused on growing internet access) funded research into the impact of IXPs on broadband access in the Caribbean, Kenya, Nigeria and several countries in Latin America. The Japanese Telemedicine and Telecare Association international cooperation to extend telemedicine activities, while the Japanese government provided financial assistance for communications costs incurred for providing telemedicine in rural areas. In addition, developed countries are offering.[44]

The increasingly important role played by these different interested stakeholders is even more important in light of the concerns that have been raised by legacy network providers in relation to the impact of OTTs on USAF contributions.

5.2.7.3 Good Practice

As briefly indicated, USAFs have had some positive effect but impact assessments into the funds point to the access gaps that remain even after several years of existence. More to the point, as underscored by critics of USAFs, cellular mobile services expansion accelerated, even in remote areas, without USAF. The FCC has singled out wireless technologies as the future for broadband delivery.[45]

The USAFs have also been plagued by several implementation challenges including lack of adequate consultation with key stakeholders on project designs, on-going political interference, poor project management, lack of capacity to efficiently manage and disburse the funds, dearth of institutional arrangements, and legal constraints.[46] For instance, it was only in 2014 that the Communication Authority of Kenya finally received the first US$1 million from the telcos for USAF after a two-year long battle).[47]

More significantly, the World Bank reported that only small portions of the USAF funds have been disbursed. In 2013, GSMA had also calculated that $11 billion of USAF remained unspent by regulators and fund administrators.[48] The Broadband Commission has also indicated, "some USFs do not have the power to invest in broadband projects or have just accumulated large surpluses without investing the needed resources".[49]

5.2.7.4 Conclusions

In brief, the USAF fund landscape is evolving in line with the disruptive changes in the communications sector. The technological advancements ushering in new services and applications, as provided by OTTs, demand a review of the past approaches to financing network infrastructure, whether through levies, tax incentives, or subsidies, to meet the emerging infrastructure requirements.

---

[43]   http://www.ictregulationtoolkit.org/toolkit/4.3

[44]   https://www.ncbi.nlm.nih.gov/pubmed/20703597

[45]   www.rrt.lt/rrt/download/7937/mobile%20evolution_100701.pdf

[46]   https://www.gsma.com/mobilefordevelopment/programme/connected-society/universal-service-funds-effective-way-achieve-universal-access

[47]   https://www.itworld.com/article/2693785/networking-hardware/kenya-starts-universal-service-fund-implementation.html

[48]   https://www.gsma.com/newsroom/press-release/gsma-calls-for-re-evaluation-and-reduction-of-the-universal-service-fund-levy/

[49]   http://www.broadbandcommission.org/Documents/reports/WG-Fin-Invest-2014.pdf

Thus, there is no one-size fits all as far as managing, replenishing and disbursing USAF funds is concerned. UAS policies will need to be decided on a country-by-country basis. However, with there are a few lessons learnt to encourage investment and attract funds for telecommunications networks:

- Adopting innovative approaches to funding programmes such as the "pay or play", are gaining momentum.[50]
- Articulating a clear, forward-looking and stable telecommunications policy (including USAF policy) and regulatory regime is critical
- Financing innovative technology in the appropriate contexts (whether wireless, satellite, fibre, etc.) is key
- Commitment to release spectrum and accelerate approval of rights-of-way and planning permits has been singled as catalytic
- Aggregating demand for broadband and internet services amongst public institutions such as schools, hospitals, police stations and other related government facilities is crucial
- It is significant to demonstrate a commitment to good governance in the management of USAF, through the following:

  o Clear articulation of the public interests in the (realistic) objectives of the funds
  o High of transparency, accountability and contestability in the award of USAF funds for projects
  o Wide consultation, cooperation and buy-in from all interested stakeholders (including community organizations and NGOs)
  o On-going monitoring and evaluation are elements of best practice that attract funding from both private sector, non-governmental groupings and multilateral organizations

5.3 IMPORTANT FOR REGULATORY ATTENTION

5.3.1 SPECTRUM MANAGEMENT

5.3.1.1 Drivers of mobile spectrum demand

Significantly growing wireless data demand (as *inter alia* smartphone penetration rises rapidly), and for higher speed services to allow streaming of video etc will result in operator demand for additional spectrum (see Exhibit X below). This is notwithstanding the deployment of new LTE/LTE-A (4G) technology which is more spectrally efficient and has a lower capex cost (and capable of providing wireless data at a lower cost per MB/GB). Such increased spectrum demand is a direct response to consumers demanding better quality and higher speed wireless broadband services.

Optimising a country's provision of mobile services involves balancing two different costs to industry: the network capital cost required for operators to provide capacity for a given amount of spectrum (e.g. BTS/e-node B construction and maintenance)[51] and the economic or opportunity cost of assigning more spectrum to mobile in order to increase spectrum resources in productive use. As the supply of mobile spectrum is increased, existing base stations can supply increased capacity with modest additional network capital investment. In contrast, where the supply of usable mobile spectrum is restricted, the network capital cost increases.

While traditionally operators used higher-frequency spectrum to provide capacity in urban areas that require high cell site density (e.g. 1800 MHz capacity spectrum used in conjunction with 900 MHz

---

[50] The approach awards the entity requiring the least amount of subsidy to provide the required USAF obligations. The advantage of this approach is that it will only attract organization that are interested and committed to developing remote/rural areas and low-income groups, with the necessary financial resources. It has been estimated that the winner of the bid will usually receive back a huge portion of their contributions or even more.

[51] Other costs include high speed backhaul and transmission capacity and access to quality towers, masts etc for deployment.

coverage spectrum), new carrier aggregation techniques available with LTE/4G mean that exemplar mobile operators are now seeking to acquire multiple frequency allocations allowing them to deploy spectrum which maximizes network capacity and service speed to customers to address such demand. Such a 'portfolio' of 150 MHz or more of total mobile spectrum per operator includes, for example, allocations in a mix of spectrum bands (700, 800, 900, 1800, 2100, 2300 or 2600 MHz). Flexibility and technology neutral allocations are preferred.

Chart 5: Cisco global mobile data traffic forecast VNI 2016-2021
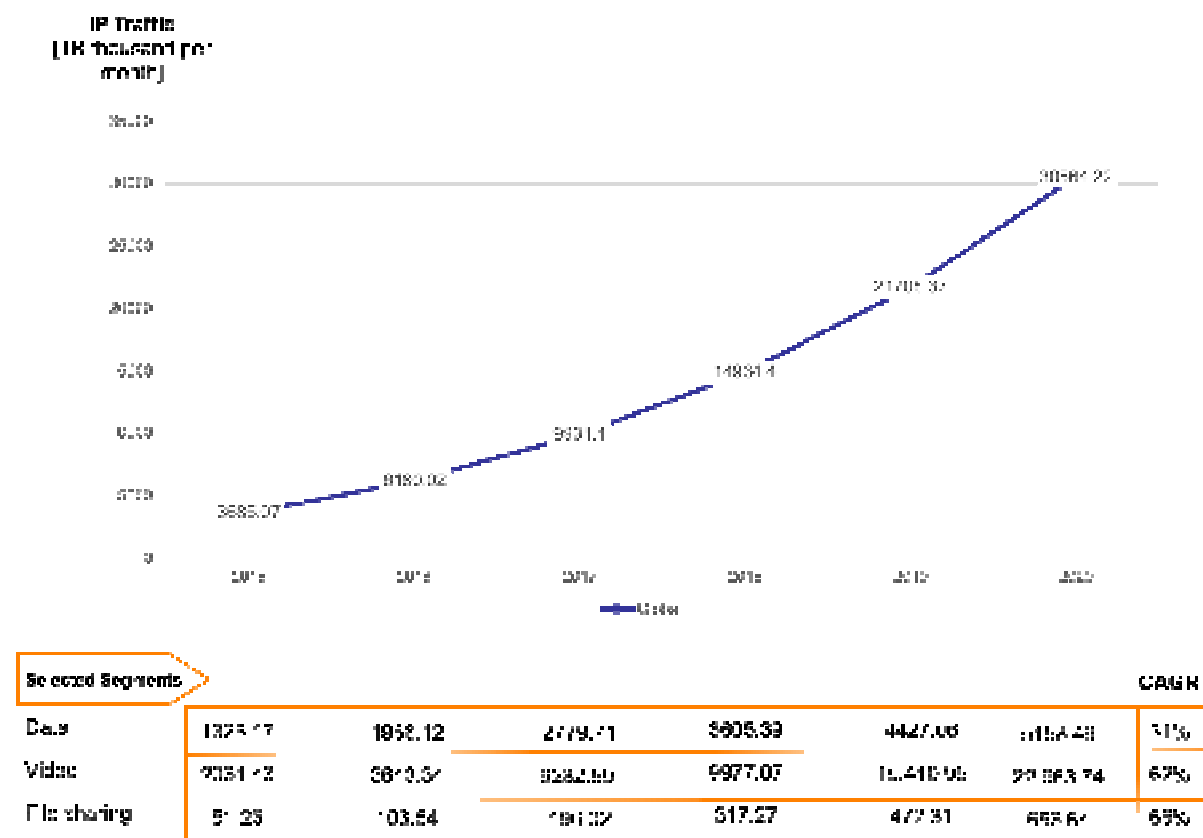
Source: Cisco, VNI Forecast 2016-2021

5.3.1.2 Estimates of IMT spectrum needed

International organisations including the ITU and the GSMA have modelled the amount of International Mobile Telecommunications ('IMT') spectrum that national economies will need by 2020. Estimates suggest that current national spectrum allocations for IMT which are, in general, between 440 MHz and 540 MHz nationally, should be increased substantially by 2020.

In the ITU Report ITU-R M.2290-0 prepared in advance of World Radiocommunications Conference (WRC-15), [52] defined the future spectrum requirements estimate for cellular mobile services below 6 GHz as 1340 MHz for lower user density settings and 1960 MHz for higher user density settings. In contrast, the ITU in its *Guidelines for the Preparation of National Wireless Broadband Masterplans for Asia Pacific Region*, October 2012, recommended that the minimum spectrum allocated and in use for cellular mobile services should be at least 760 MHz by 2020 and preferably 840 MHz.[53] In order for Commonwealth countries to meet these overall IMT spectrum assignment targets recommended by the ITU, if they have not do so, it is recommended that respective country spectrum managers develop an IMT spectrum roadmap.

---

[52]   ITU-R, M.2290-0 (01/2014), *Future spectrum requirements estimate for terrestrial IMT,* Geneva, January 2014.

[53]   Available at www.itu.int/ITU-
        D/tech/broadband_networks/WirelessBDMasterPlans_ASP/Masterplan%20guidelines%20EV%20BAT1.pdf. See page 45.

It is likely that the upcoming WRC-19 conference will also designate more spectrum bands for IMT usage. [54] See Figure 5 for the process and timeline on international spectrum allocation. A range of Commonwealth markets including *inter alia* Australia, Singapore, United Kingdom are planning auctions of 5G spectrum including 700 MHz, 3.4-3.8 GHz and higher frequencies and/or studying their allocation.

Figure 5:   Process of international spectrum allocation
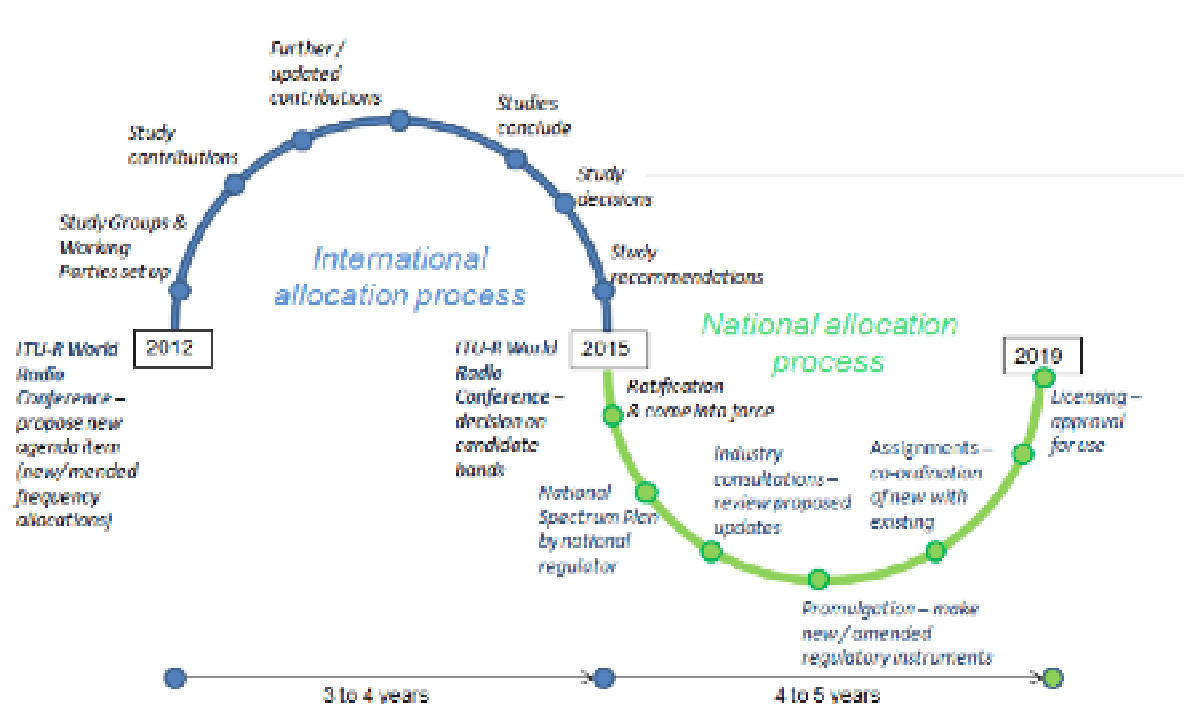
Source: Telstra, 2015

5.3.1.3 Conclusions: Securing the digital dividend and preparing for 5G

Commonwealth Countries which have not commenced the process of analogue television switchoff should commence such a process as soon as practicable in order to secure valuable sub-1 GHz spectrum. Refarming legacy broadcasting bands in the 700 and 800 MHz spectrum bands (depending on which ITU region the country is located) to mobile broadband is likely to be a more valuable use of spectrum than television use. The 700/800 MHz spectrum band is a very cost-efficient band given propagation characteristics and a much improving ecosystem.

The GSA earlier this year reports, that over 50 countries and territories have allocated, committed to, or recommend APT700 FDD (band 28), or compatible European bands,[55] for LTE system deployments.[56] As at 23 January 2018, there were 44 commercially launched APT700 Band 28 operators in many countries including Commonwealth markets like India, Australia, New Zealand, and Papua New Guinea. Worldwide countries with a population of almost 4 billion people have allocated 700 MHz spectrum compatible with APT700/LTE Band 28 devices.

It is also important to Commonwealth countries that are emerging markets and/or small in size that they adopt spectrum management policies which facilitate their future transition to 5G, post 2022. As many 5G deployments in either the 3.4-3.8 GHz band or in mmWave spectrum are (i) likely to be expensive, and (ii) may not be suited for the market driven geographic or climatic conditions of those

---

[54]   See www.itu.int/en/ITU-R/conferences/wrc/2019/Pages/default.aspx
[55]   These have a lower duplexer arrangement of APT700 (703–733/758–788 MHz).
[56]   GSA Snapshot: LTE in APT700 Spectrum Global Status, February 2018.

markets, adopting spectrum allocations which support efficient and cost-effective deployments is sensible. Spectrum allocations below 1 GHz are most suitable.

In this context, securing the digital dividend in 700 MHz (with the full APT700 allocation in ITU Regions 2 and 3 and with the lower duplexer arrangement in Region 1) is most desirable given its designation as a 5G spectrum band in the EU in December 2016.[57] This band could therefore become an affordable coverage layer for future 5G services. It should also be noted that individual operator spectrum portfolio holdings in Commonwealth countries will need to increase significantly in a 5G world in order to meet demand and for a country to be globally competitive.

It should also be noted that as the total amount of IMT spectrum available in a market increases, the price per MHz per population should and must fall. Previous pricing which may have been driven by artificial scarcity should not per perpetuated. Further, any charges on network operator to upgrade technologies (eg to go from 3G to 4G) should be eliminated. It is incongruous that making an investment in newer more efficient wireless technology also results in increases in spectrum costs. This disincentivises investment.

5.3.2   INTERCONNECTION

Interconnection is the physical point of contact or link between two or more networks and equipment to exchange communications traffic and a range of related multimedia services, such as Voice over the Internet Protocol (VoIP), email, etc. The ITU defines interconnection as "the set of legal rules, technical, commercial and operational arrangements between network operators that enable customers connected to one network to communicate with customers of other network."[58] In addition, the World Trade Organization (WTO) defines Interconnection in the *Telecommunications Services Reference Paper* as "linking with suppliers providing public telecommunications transport networks or services in order to allow the users of one supplier to communicate with users of another supplier and to access services provided by another supplier, where specific commitments [market access guarantees in national trade schedules] are undertaken."[59] The Organisation for Economic Co-operation and Development (OECD) has argued that the WTO Reference Paper is critical because, more than any other policy statement, it accelerated regulatory convergence as WTO Member States strived to comply with market access commitments.[60]

Furthermore, the WTO Reference Paper requires that "Interconnection with a major supplier will be ensured at any technically feasible point in the network." Moreover, that Interconnection is afforded "under non-discriminatory terms, conditions (including technical standards and specifications) and rates and of a quality no less favourable than that provided for its own like services or for like services". Finally, the WTO Reference Paper calls for cost-based pricing, as well as, transparency, not only of "procedures for interconnection negotiations", but also publication of the actual interconnection arrangements.[61]

The different types of interconnection agreements have different purposes (e.g. two local networks, local-to-long distance, fixed-to-fixed, fixed-to-mobile, mobile-to-mobile, local ISP to international ISP backbone). Generally, Interconnection agreements provide termination services and/or transit services, while others involve provision of unbundled facilities and services.

---

[57]   See http://europa.eu/rapid/press-release_IP-16-4405_en.htm

[58]   https://www.itu.int/en/ITU-D/Regional-Presence/ArabStates/Documents/events/2016/CT/Final%20Documents/Session%208/Expanding%20Connectivity%20through%20Access%20and%20Interconnection.pdf

[59]   https://www.wto.org/english/tratop_e/serv_e/telecom_e/tel23_e.htm

[60]   http://www.oecd-ilibrary.org/science-and-technology/trends-in-telecommunication-reform-2000-2001_pub/807b3d57-26e565be-en

[61]   https://www.wto.org/english/tratop_e/serv_e/telecom_e/tel23_e.htm

5.3.2.1 Policy and Regulation

The definitions highlighted above underscore not only the critical role of Interconnection agreements, but even more crucial, the rules governing interconnection conditions.

The ITU has observed that Interconnection rules facilitate access to networks and increases overall connectivity by linking disparate sets of customers (i.e. subscribed to different networks) onto one network, and in turn, increase traffic, economies of scale, as well as, expanding network capacity. Consequently, fair, reasonable, and non-discriminatory network access terms boost effective competition and lowers barriers of entry for new players. Interconnection regulation takes on various form but the two main approaches are unbundling and infrastructure sharing[62]

Legacy network providers and mobile network operators (MNOs) have raised concerns about the current uneven regulatory regime highlighting the compliance costs with Interconnection obligations that have been imposed on them. Consequently, some have requested a review of the interconnection obligation with a view to bring OTT services providers under a perceived fair interconnection regime. The Chief Executive Officers of Orange, Deutsche Telekom, Telefónica, *Telecom Italia,* Telia Sonera, Swisscom, and KPN, amongst others, have lamenting that "the EU is the region facing the harshest regulation" on Telecommunications. Consequently, in a letter addressed to the President of the European Council, Mr. Donald Tusk, in June 2015, called for the EU to "initiate a fast-track set of targeted regulatory reforms in the field of access regulation, spectrum management and asymmetries between traditional e-communication providers and internet players". [63]

Thus, with interconnection, regulators are attempting to deal with the perennial problem of facilitating access to an essential infrastructure (a not-so-easy-to-duplicate platform) which service providers, and more importantly, competitors need as a key input to supply services to their customers.

Although a vast majority of calls today use circuit switched fall back (CSFB), meaning that the LTE device 'falls back' to the 3G or 2G network to complete the call or to deliver the SMS text message, VoLTE is beginning to gain momentum globally. This is summarised in Figure 6.

---

[62]   http://www.ictregulationtoolkit.org/toolkit/7.2.4
[63]   http://telecoms.com/426231/operators-call-for-lighter-regulation-to-help-fight-otts/

Figure 6:   Voice calling on LTE networks
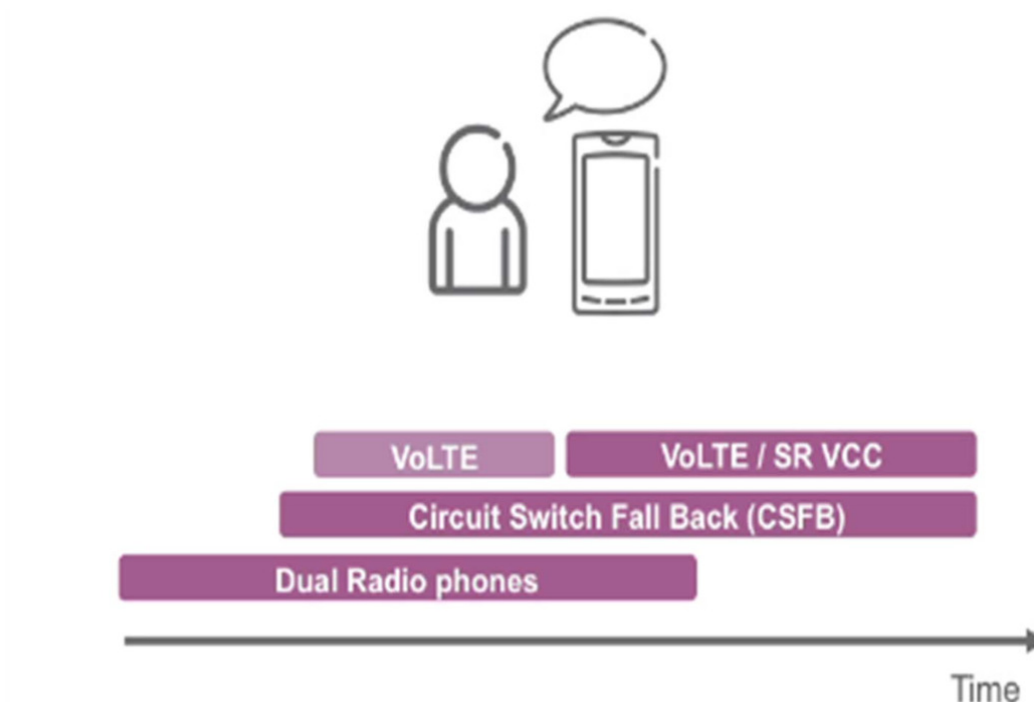
Source: Informa Telecoms & Media and Ericsson, LTE Early Launch Strategies: Who and Why? Webinar, 21 June 2011

As of February 2018, more than 134 mobile operators have commercially launched VoLTE-HD services in 65 countries including many Commonwealth countries (see Figure 7). 217 operators are investing in VoLTE in 102 countries, and several roaming and interoperability agreements are already in place. GSMA Intelligence estimates that VoLTE-capable handsets will rise to between 65 and 85 percent by 2020.[64] It is predicted that VoLTE connections will hit 3.33 billion by 2021, 53 percent of total cellular global subscriptions.[65]

Figure 7:   Number of launched VoLTE network by country
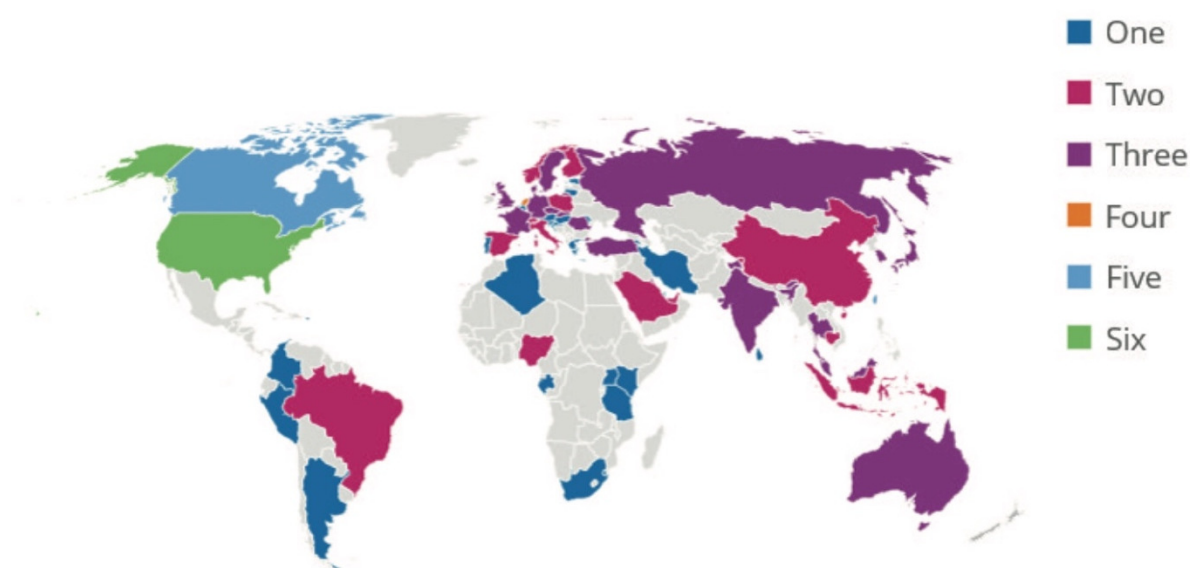
Source: GSA Snapshot, VoLTE Global Staus, February 2018

---

[64]   www.gsma.com/newsroom/all-documents/south-koreas-interconnected-volte-service-lifts-off/

[65]   www.mobileeurope.co.uk/press-wire/volte-to-hit-tipping-point-in-2021-new-report-claims

Given the above, VoLTE and IP based interconnection from circuit switched interconnection is the most profound change in mobile interconnection (and regulatory practice) in twenty plus years. A range of markets have introduced VoLTE interconnection including Japan, South Korea as well as others including Thailand (October 2016) and Kuwait (February 2017)[66] and the pace of markets moving to adopt VoLTE interconnection will accelerate. For example, in February 2018, the TRAI released a Consultation Paper on Voice Services to LTE users (including VoLTE and CS Fallback).[67] There are a few exemplar models at this time, key global regulators are either working on revising their rules (e.g. Australia, Germany, UK), jettisoning old costing models (e.g. ACCC in Australia, Ofcom in the UK) or putting in transition schemes in relation to VoLTE interconnection (e.g. ARCEP in France).

5.3.2.2 Interconnection Trends

The telecoms market has been transitioning in the last few years from circuit-switched networks to the world of IP-based networks and Next Generation Networks (NGN) ushering in innovative new connectivity products (e.g. wireless networks, broadcasting cable networks, etc.) and services, e.g. from PSTN voice to voice over IP. IP-based networks not only deliver better connectivity to even more customers, but also boost ubiquity of digital services. Also, the rise of new IP environments and converged networks has not only introduced new OTT services and applications but also new interconnection regimes to cater for the heterogeneity of IP-based platforms.

Further, the new Interconnection realities, as spawned by NGN and convergence trends, are changing the concomitant pricing models in interconnection agreements. The per-minute or per call billing system is irrelevant in the IP environment. Thus, there are increasing calls for cost-based interconnection rates which reflect the more efficient and cost-effective IP-based networks (as compared to PSTN platforms), especially as VOIP traffic via OTTs, e.g. Google Voice and Skype, grows.

The international accounting and settlement of termination revenue is changing – in the recent past, developing countries were net recipients of international termination revenue from incoming call. The US, and other Western countries, who are the major payers of these revenues have been working to address this tilt. However, the new technological developments, as well as, OTT services and applications bypass termination on the PSTN network and the concomitant revenue settlement system.

Further, most ISPs are negotiating peering arrangements and transit agreements (privately negotiated bilaterals) which, in theory, make interconnections simpler, efficient and beneficial (e.g. through the *Bill and Keep* arrangements) to both the ISPs and customers. However, of interest is the fact that ISPs from a number of developing countries do not offer the coverage and/or command the internet traffic volumes demanded to engage in the peering negotiations, and hence, the connectivity benefits of these arrangements. These ISPs from small developing are in the bottom rung of Internet interconnection arrangements.

In addition, investment in International Gateways is addressing conformance an interoperability challenges of linking IP-based systems with a variety of protocols for services and networks.

Moreover, unlike in the traditional termination rates regime, the Calling Party pays principal has shifted in the OTT and data-heavy space, so that both ends (caller and called) pay for the service or application. This change in compensation rules for originating, transporting and terminating services has implications for regulation of termination rates and the interconnection regime.

---

[66]   See www.gsma.com/futurenetworks/digest/kuwait-volte-interconnect-cto-qa/
[67]   www.trai.gov.in/notifications/press-release/trai-releases-consultation-paper-voice-services-lte-users-including

5.3.2.3 Good Practice

As indicated above, in some markets, the competitive environment has not matured enough to warrant a regime of minimal rules, but learning on the way forward regarding interconnection rules suggest the following for national regulators:

- Provides regulatory guidelines (with strong competition bias) in advance on interconnection
- Ensure parity with regards to the level of quality of service provided to competitors, especially where access to infrastructure and networks is still unequal and potentially discriminatory
- Monitor network planning and provisioning schedules, ascertaining that planning is responsive to growth in demand, especially for OTT services and applications
- Define guidelines for proper management and storage of end-user information between the OTT providers and the networks providing interconnection services along the value chain
- Review interconnection pricing unresponsive to the technological advancements (which boost efficient use of network) ensuring that wholesale interconnection fees reflect cost
- Promote investment network infrastructure such as internet exchange points in developing countries
- Negotiate international interconnection principles to guide peering agreements in the interests of developing countries

5.3.2.4 Conclusions

Regulating interconnection is said to be a relatively complex and technical area of regulation – preparing guidelines for negotiating interconnection agreements can be time-consuming, and monitoring whether the agreements comply with the regulatory guidelines is difficult.

In relation to VoLTE it is clear that profound change to access regulation is required: VoLTE and IP based interconnection will result in fundamental rewriting of rules and pricing models for interconnection and access. More work is needed with Commonwealth country regulators and operators need to undertake extensive review of technical, financial, regulatory aspects, and international roaming issues to explore implications, specifically:

- There is a need to adapt rules and costing/pricing models for an IP interconnection model. If set by a costing study there are likely to 30 percent, or lower than currently mobile termination rates. If such terminating rates are going to be significantly reduced then there may be commercial value in removing the cost of interconnection billing systems and moving to an IP peering arrangements after all voice as a percentage of total network traffic is falling substantially;
- Interconnect capacity (and any associated rules) between networks also need to change to move away from E1s with multiple network points of interconnection (POI) to a smaller number of IP connection points perhaps only 2 or 3 are needed in each domestic market.68 Possibly, any regulatory rules prohibiting such changes may require amendments; and
- VoLTE international roaming which is an all-IP solution and may involve –Internetwork Packet Exchange (IPX) peering depending on the technical solution adopted - necessitates in changes to roaming arrangements, pricing or other regulatory requirements (eg legal intercept, access to emergency calling by roamers etc).

5.3.3 QUALITY OF SERVICE (QOS)/ QUALITY OF EXPERIENCE (QOE)

Even though Quality of Service (QoS) and Quality of Experience (QoE) are industry-wide standards the concepts are often imprecisely defined or used interchangeably. At times, the concepts, especially QoS, are defined differently depending on which aspects of the network are measured for

---

68   Having a smaller number of POIs for IP Interconnection is a view supported by AGCOM in Italy. See *Summary Notification Form Concerning Agcom's Draft Decision on the Market Analysis for Wholesale Fixed Interconnection Services (Markets N. 1 Of 2014/710/UE Recommendation, N. 2 Of 2007/879/CE Recommendation and N. 10 Of 2003/311/CE Recommendation)*. Malaysia has also halved the number of POIs as it has moved to IP interconnection.

collecting QoS and QoE statistics (i.e. whether the focus is on the application layer, the network layer, or the transport layer (in IP-based technology), or even, the services and applications (voice call or video stream) deployed.

In some instance, it appears the focus on QoS and QoE is on traffic prioritization measures while in other instances it refers to the measurement of the experience of the service quality against the expectation. Further, in the qualitative measure of QoS and QoE (*refer to ITU-defined criteria below*) network operators will discuss some of the criteria (e.g. exclude important aspects such as security features due to VPN restrictions), defined by standard setting organizations (SDOs) such as the International Telecommunication Union (ITU), but not all the benchmarks.

The current debates about the impact of OTTs on QoS and QoE indicators are not immune to this lack of clarity. Thus, resolving which definition or what aspects of QoS and QoE are at issue for the telcos and legacy networks in relation to the OTTs presents a few challenges. QoS and QoE parameters, especially in the IP environments, can be viewed from several vantage points – from the end-user perspective, the ISP providing the access points, the OTT provider supplying the services and apps to the end-user via the ISP network, the ISP interconnecting with a Tier 1 ISP which owns the backbone network, amongst other issues.

In below, from the ITU report on QoS and QoE regulation, graphically presents the complexities of measuring quality standards, i.e. the measurement of the performance delivered, on the one hand, and the experience of the end-user (perceived against end-user expectation) on the other.

Figure 8:   Quality of service
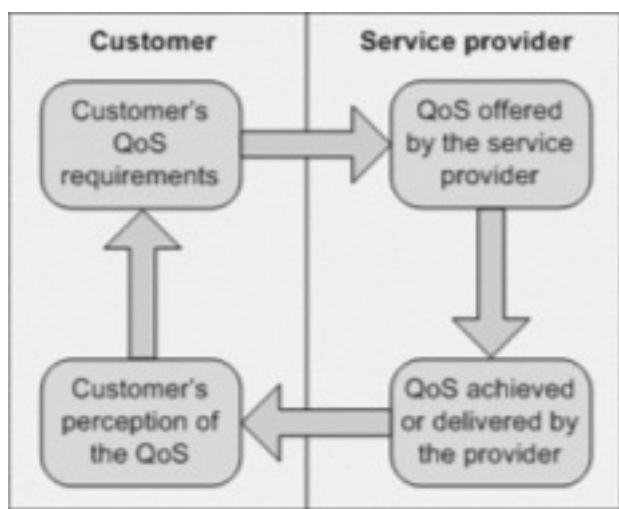
Source: ITU (2017) *Quality of Service Regulation Manual,* Geneva, Switzerland

The ITU has been defining QoS and QoE standards for decades. In the ITU's *Definitions of Terms Related to Quality of Service* [ITU-T Rec. E.800 (09/2008)] Quality of Service (QoS) is defined as the "totality of characteristics of a telecommunications service that bear on its ability to satisfy stated and implied needs of the user of the service."[69] The ITU has, in various QoS and QoE standards, articulated the criteria of seven parameters to measure performance of service and applications against agreed expectation (some of which are defined in various Licensing agreements issued by national regulators).

The parameters in QoS are:

- Accuracy (e.g. low packet corruption; correct accounting and billing)
- Availability (e.g. network coverage for mobile telephone)

---

[69]   ITU (2008), Definitions of Terms Related to Quality of Service E.800 Series, p. 3

- Flexibility (e.g. to switch between service providers; multiple bill payment systems)
- Reliability (e.g. low packet loss)
- Simplicity (e.g. user-friendly services such as clear billing statement)
- Security (e.g. personal data security)
- Speed (e.g. fast connection; prompt resolution of subscriber complains)

In addition to measuring QoS, statistics on Quality of Experience (QoE) performance as experienced by the end-user (as opposed to QoS which measures network delivery), are just as critical. The importance of monitoring QoE will be increasingly significant as end-users do more data-heavy online activity (e.g. video streaming for entertainment or distance-learning applications) which is sensitive to transmission speed and jitter.

In some senses, the customer perceptions of quality and the digital experience are integral to the growth of the Internet, and the impact of OTTs is significant. OTT services and applications (such as Skype, WhatsApp and Viber) have been driving positive consumer experience and customer satisfaction metrics – in terms of affordability, content, innovation, app functionality and features, amongst other performance benefits. In the early days of OTTs, it has been argued that end-users were more tolerant of poor performance (given that the services were free or very affordable), but, in the last few years, the quality performance has been increasing even as customer expectation is rising.

The ITU's newly revised definition of QoE is that it is "*the degree of delight or annoyance of the user of an application or service*"[70], as delivered through the network. In ITU parlance, QoE measures the mean opinion score (MOS), based on statistics collected through customer surveys, in which one (1) is *bad* customer experience and five (5) is *excellent* quality experience. MOS used to measure voice quality but has now been expanded to include video-television delivered via Internet protocols. QoE, evidently subjective, is impacted on by a number of variables including "*the type and characteristics of the application or service, context of use, the user expectations with respect to the application or service and their fulfillment*", amongst other issues.[71] Thus, the end-users impression of quality is not only about the interface with the device or the equipment delivering the service, but also the personal experience as the service is consumed. In a nutshell, QoE is dependent on QoS as well as users actual experience against expectation.

In summary, QoS and QoE metrics/indicators monitor the quality performance of services and applications provided, as well as, the end-user experience of what is supplied. The quality metrics are both objective and subjective.

5.3.3.1 Policy and Regulation

The quality standards and key performance indicators for QoS (and sometimes, QoE metrics based on international standards) are usually outlined in licensing agreements as overseen by the national regulator. For instance, the Australian Communications and Media Authority (ACMA) has stated that it "has a reserve power to make an *industry standard* if there are no industry codes or if an industry code is deficient. Compliance with industry standards is *mandatory*"[72] Similarly, on QoS, the Nigerian regulator asserts that: "Unified Licensees will be mandated to maintain the quality of service standard prescribed by the NCC and other quality of service thresholds mandated".[73]

As pointed out above, demand for data-heavy traffic has increased in the last few years, in part due to greater availability of smart phone and the take-up of OTTs such Skype and Viber. In response, telcos transmitting these services over their networks have adopted traffic optimization measures to

---

[70]   ITU (2017) Quality of Service Regulation Manual, Geneva, Switzerland, p. 12
[71]   Ibid., p. 12
[72]   https://www.legislation.gov.au/Details/C2017C00357
[73]   https://www.ncc.gov.ng/docman-main/licensing-documents/434-licensing-framework-for-unified-access-service/file

manage this type of traffic, which demands high bandwidth. These traffic management techniques, which include data caps and/or paid prioritization offerings for guaranteed QoS (e.g. special data-rates for gaming apps) to deliver data-heavy traffic.

It has been highlighted that these network optimization techniques (mainly employed to manage OTTs), that emphasize paid service differentiation, are an opt-out from the Net Neutrality principles which require all internet data be treated the same regardless of content, origin or destination.

Furthermore, QoS has implications, especially in IP-based networks, for Interconnection (and the concomitant service level agreements) between network operators and service providers who need to connect to the core network. Without specific measurable access terms, dominant network operators have been found to deliberately delay interconnection request or outright degrade the quality of the interconnection, and hence, the performance of its competitors. Consequently, Interconnection terms can present a challenge to end-to-end QoS for telecommunications services including services provided by OTTs.

It is, thus, increasingly imperative that national regulators are able to constantly monitor scheduling priorities and compliance with specific QoS performance levels – a) to enhance quality access to internet services b) to assess that network degradation is limited c) to safeguard the interests of end users by ensuring that network optimization measures are not employed to restrict competition. Further, by setting and enforcing QoS standards, the national regulator will hopefully persuade the network operators to further invest in robust network capacity and innovative network optimization tools including the Internet Engineering Task Force (IETF) defined traffic management protocols (such as the Integrated Services and Differentiated Services models) to enhance end-to-end QoS in IP environments.

5.3.3.2 Trends

QoS/QoE are end-to-end measures (meaning delivery of the application or service to the end-user is guaranteed, or user-to-user delivery is supported) dependent on the performance of the entire network infrastructure including on network planning, network operations and network maintenance.

Thus, transmission of data in an end-to-end QoS environment pre-supposes that various networks interoperate seamlessly along the routing and transmission path to deliver a great end-user experience. However, in the Internet environment, the users' end-points are constituted by different networks (powered by different technologies and protocols), which straddle different national jurisdictions and licensing obligations. Thus, guaranteeing end-to-end QoS in the varied IP-based environment is challenging given that several transport technologies along the transport path will have different QoS provisions.

In the IP-based environments, OTTs are mainly delivered on Best Effort basis (i.e. without end-to-end QoS and no prioritization), and in line with the principle of network neutrality. The QoS parameters guaranteed under the PSTN, i.e. telecommunications services provided through the circuit-switched networks, are not always applicable in the instance of OTTs. The quality performance of the OTTs is, thus, impacted on by the performance of the multiple networks and systems that constitute the whole network. Consequently, the quality of voice calls experienced, for instance, under the PSTN platforms is not easily replicated for Voice Over IP (VIOP) services as offered by various OTTs.

In a typical scenario, OTTs traffic is transported on IP-based networks which usually include Tier 3 ISPs (which connect to Tier 1 ISPs that have access to the rest of the internet) that are not in control of the entire transmission chain, and therefore, will not always guarantee end-to-end QoS.

One way for OTTs to ensure guaranteed QoS, as proposed by legacy networks, is to upgrade to priority forwarding and service differentiation (at network nodes) for their content. Bearing in mind that the utility of the paid prioritization is really only prized during congestion and high network traffic. However, instead of these complex traffic management techniques, including paid

prioritization, it is also possible to provision adequate network capacity to handle heavy peak traffic, effectively improving service quality guarantees all round.

The capacity of the Internet has greatly expanded with the migration of telecommunication services from circuit-switched platforms to IP-based systems. Parallel to this technological transition, real-time data-heavy and bandwidth-demanding applications (such as streaming video), on IP environments, are growing exponentially. Given that end-to-end QoS functionalities are not guaranteed in IP networks (which are the predominant transmission platforms for OTT services and applications), what policy measures do regulators need to define new performance standards? As more services and applications migrate to IP platforms including such time-sensitive applications such as videoconferencing, what new network design and provisioning technologies could network operators invest in to optimise performance in this new environment and deliver higher end-to-end QoS beyond Best Effort?

5.3.3.3 Good Practice

National regulators that monitor and enforce QoS and QoE provisioning share some of these lessons:

- Conducting public awareness campaigns about quality standards does not only empower end-users to make informed decisions about service offerings, but also increases transparency, accountability and provides a valuable feedback loop.
- Interconnection, Net Neutrality as well as Network Performance are inextricably linked, and have impact on QoS and QoE indicators.
- The IP connections (main platforms transporting OTTs), which by design only deliver best-effort service, straddle different networks. Thus, guaranteeing end-to-end QoS and QoE in the varied IP-based environment is challenging given that several transport technologies will have different QoS and QoE provisions. Furthermore, QoS and QoE obligations in licensing agreements are addressed differently by different regulators, dealing with different network capacities and infrastructures.
- International standards, designed to boost end-to-end QoS in IP environments, are a great starting point to harmonize regional quality standards.

5.3.3.4 Conclusions

QoS and QoE indicators have evolved with the transition from circuit-switched networks to IP-based platforms to now include indicators on performance of multimedia services. However, IP-based systems present a challenge with regards to measuring end-to-end QoS. As pointed out above, quality standards are influenced by a number of parameters and protocols along the Internet value chain. Thus, has regulation on QoS and QoE kept up with these changes in relation to interconnection between operators, net neutrality guidelines defining Best Effort delivery, or even QoE indicators for end-users? Are the current minimum QoS and QoE standards adequate for data-heavy applications, such as multimedia apps, which demand guaranteed bandwidth in a best effort IP network?

 QoS solutions for both OTTs and managed services, in IP environments, are increasingly critical, and answers to these questions will impact on the growth of the data ecosystem.

5.3.3.5 QoS/QoE Recommended Options

It should be noted that extending QoS and QoE obligations to OTTs presents an opportunity to empower end-users with information about quality, cost, and benefits of various OTT offerings. While on paid prioritization, it has been shown that different customers have different levels of willingness to pay (WTP) for QoS and QoE. Similarly, that the vast majority of users may only really need basic QoS performance (given the possibility of paying more for higher QoS-differentiated

services). Thus, allowing for differentiated QoS and QoE standards, based on a range of price points,[74] may inspire a diverse set of customised offerings

Guaranteeing end-to-end QoS, in the varied IP-based environment, is challenging given that transport technologies in the network will have different QoS provisions and diverse QoS obligations in licensing agreements. Thus, committing to regulating end-to-end QoS will present an opportunity to share good practice and harmonize QoS regulation (including on interconnection on IP exchanges) on a regional basis, and perhaps, on a multilateral level.

It is also possible to argue that QoS and QoE regulation, in evolving IP environments, is complex and can impose a significant administrative burden (of setting the standards, as well as, measuring and monitoring them) on the regulator. It is possible that paid prioritization, to improve QoS, does not necessarily guarantee overall user experiences (as it is challenging to ensure that all switches and routers on the packet flow path are QoS-enabled).

Paid prioritization (ostensibly to improve network performance and guarantee QoS standards) derogates from net neutrality guidelines, which experts, such as Tim Berners-Lee, have argued are the reason the Internet has been open and innovative.[75] Thus, the key concern about applying this type of QoS-enhancing measure is not only focused on the derogation from Net Neutrality principles (that promote fair, reasonable and neutral and non-discrimination treatment of traffic flows), but the pernicious commercial incentive that traffic management measures fuel.[76] Network operators have been shown to apply traffic shaping measures that specifically target OTT apps which are in competition with their offerings. Conversely, OTT start-ups who are not able to pay for priority forwarding for their traffic will be disadvantaged in such an environment

It has been argued that paid prioritization is a zero sum game, i.e. prioritizing one set of data packets slows down the rest. Thus, there is unease about the impact of these traffic management measures – essentially, that Best Effort data traffic will be so degraded as to be relegated to the "dirt lane".

Information asymmetry between the regulator and the network operators, about QoS indicators and traffic management techniques, is a concern – regulators are not always equipped with specific and up-to-date information about the resources that network operators require to properly build and adequately maintain provisioned networks without needing to resort to traffic management techniques, such as paid prioritization, to guarantee a higher quality of service and experience for service providers and end-users

In developing countries, where competition is limited and quality standards are relatively low, imposing QoS requirement may increase access barriers for small new players– QoS standards may entrench the dominance of the incumbent given their network capability to deliver on more robust QoS requirements.

5.3.4   NET NEUTRALITY (NN)

There is no globally agreed definition of net neutrality – a term attributed to Tim Wu[77], a media law professor from Columbia University – but most definitions refer to the idea of *a)* equality of treatment of data flows regardless of application or content *b)* a level playing field *c)* traffic management principles with implications for Quality of Service (QoS), access and interconnection. Mr. Wu's 2002 concept paper, *A Proposal for Network Neutrality*, recommended that:

"The proposal [on net neutrality] would strike a balance: it would forbid broadband operators, absent [of] a showing of harm, from restricting what users do with their internet connection, while giving the

---

[74]   https://hal.inria.fr/hal-01533590/document

[75]   https://www.theguardian.com/technology/2017/nov/15/tim-berners-lee-world-wide-web-net-neutrality

[76]   http://archive.oreilly.com/pub/a/network/2002/06/11/platform.html

[77]   http://www.law.columbia.edu/news/2017/11/net-neutrality-Tim-Wu-FCC

operator general freedom to manage bandwidth consumption and other matters of local concern. The principle achieves this by developing "forbidden" and "permissible" grounds for discriminating among packets on its network".[78]

It was not very long after these principles were published by Mr. Wu, following a few years of *de facto* net neutrality, that the Federal Communications Commission (FCC) set out to adopt Open Internet principles into legislation largely based on the main elements of Wu's proposals.

The US Open Internet rules, are based on a strong legal foundation afforded by Title II of the Communications Act and Section 706 of the Telecommunications Act of 1996 (which classified broadband as an essential service), in effect, empowered the FCC to prohibited blocking, throttling and paid prioritization of data services. In February 26, 2015, in its declaratory order (FCC 15-24) on *Protecting and Promoting the Open Internet,* the FCC stated that the "benefits of an open Internet are undisputed". Furthermore, the declaratory order stated that:

"The overwhelming consensus on the record is that carefully-tailored rules to protect Internet openness will allow investment and innovation to continue to flourish. Consistent with that experience … … we adopt carefully-tailored rules that would prevent specific practices we know are harmful to Internet openness— blocking, throttling, and paid prioritization—as well as a strong standard of conduct designed to prevent the deployment of new practices that would harm Internet openness. We also enhance our transparency rule to ensure that consumers are fully informed as to whether the services they purchase are delivering what they expect."[79]

In December 2017, the new FCC chairman, Mr. Ajit Pai, and two of his commissioners, (two out of five commissioners including Mr. Pai) voted to repeal the net neutrality rules, (and the related Title II classification of broadband providers as common carriers). In simple terms, the ISPs can now employ various traffic management tools such as throttling and paid prioritization as long as these techniques are disclosed to their clients. Once the vote was published, Comcast, the largest network provider in the United States, deleted a pledge to avoid paid prioritization from its website. Advocacy groups have vowed to refer the FCC vote to the courts.

As stated above, there is no widely accepted definition of net neutrality. The Body of European Regulators for Electronic Communications (BEREC) definition is one of the more nuanced and comprehensive. In 2010, the BEREC, which has been consulting with various stakeholders, including European national regulators across the continent on NN since 2010, stated that a "literal interpretation of network neutrality, for working purposes, is the principle that all electronic communication passing through a network is treated equally."[80] In BEREC's definition, "equally means that it [electronic communication] is treated independent of (i) content, (ii) application, (iii) service, (iv) device, (v) sender address, and (vi) receiver address. Sender and receiver address implies that the treatment is independent of end user and content/application/service provider."[81] However, BEREC cautioned that although there were reasonable "deviations" from these principles, which have largely benefitted the users, there are other forms of *departures from the standard* that are a cause for concern.

Essentially, in practice, a hard and strict adherence to NN regulations does not mean network operators cannot deviate from the core principles of equality of treatment. The demands of efficiently managing traffic on the network, in the interest of all users, renders these well-established deviations not only commonplace but necessary if the service providers are to deliver quality services. It is through these traffic management tools (for instance, differentiating between premium and Best Effort traffic) that Internet Service Providers (ISPs) are able to identify the type of traffic (a voice call,

---

[78]   http://www.timwu.org/OriginalNNProposal.pdf
[79]   https://apps.fcc.gov/edocs_public/attachmatch/FCC-15-24A1.pdf, p.3
[80]   berec.europa.eu/eng/…/berec/…/1094-berec-report-on-differentiation-practice_0.pdf
[81]   berec.europa.eu/eng/…/berec/…/1094-berec-report-on-differentiation-practice_0.pdf

a video stream or a data packet) coursing through the network, and hence, package different service levels to different customers including OTT providers.

5.3.4.1 Net Neutrality Trends

In response to concerns raised, in the last few years, by various regulators and advocacy groups (some of who represent OTTs) about certain types of net neutrality deviations, ISPs have argued that traffic management is necessary to ensure that bandwidth-hungry applications, such as video-on-demand apps like BBC iPlayer and YouTube, as well as, video conferencing programs such as Skype, are not causing congestion to the network. Essentially, without undertaking traffic management, the ISPs will not be able to guarantee a certain level of quality of service.

There are a number of tools that ISPs employ to engineer the performance of a network – these tools fall into four main categories:

Data cap (sometimes called a bandwidth cap) is a data transfer limit intended to restrict usage – the restriction is lifted when extra charges and fees are levied. The concern with data caps is that this technique is also employed as a pricing strategy – the more data consumed, the higher the price, and hence, the higher the profits for ISPs. The network operator, Verizon allowed its own video streaming service, *Stream TV*, to run without any data caps (i.e. zero-rating) on mobiles while charging Netflix subscribers for the same treatment.[82] The FCC has been ruling against these practices (Comcast vs BitTorrent, AT&T versus Apple's FaceTime) arguing the actions may result in persuading customers to upgrade to more expensive data plans, and thus, institutionalising tiered pricing bands. A variation of the data cap is a traffic *shaping* measure, which is targeted towards certain applications (e.g. specifically degrading a YouTube video stream), as opposed to slowing down all traffic on the network.

Paid Prioritization (or vertical prioritization or tiered-service model) – ISPs employ the technique of differentiating network traffic by directing selected network traffic to a "fast lane", for extra fees and charges. Thus, network operators will privilege one type of data over another in order to optimise data transfer rates. In simple terms, the OTT providers will be required to pay a toll to get onto the 'fast lane'. This is different from a prioritization of time-sensitive traffic such as emergency services (as required by the regulator and license conditions). Again, the concern is that paid prioritization is applied in a manner that discriminates against OTT providers – especially the smaller service providers who do not have access to financial resources that are demanded to fast-forward their traffic. As has been proven in the recent past, paid prioritization has tended to favour ISPs own content and apps (hence vertical prioritization, i.e. content/applications offered by the vertical company is prioritized) over the competition, unless the competition pays more. Comcast has been found to degrade bandwidth for certain applications, i.e. Netflix. Paid prioritization tolls are eventually passed on customers of these OTT providers. Conversely, it has been argued that ISPs could potentially offer these tiered-access options on an exclusive basis for certain types of services that will specifically disadvantage of their competitors, mostly the popular OTTs. Another concern is that prioritizing a set of data packets over others slows down all the other packets. Incidentally, it has been shown that paid prioritization is only really valued during network congestion – at other times, data packets are carried on a first come first serve basis.

Bandwidth Throttle – intentional slowing down (or speeding up) or degradation of traffic to regulate data traffic and to ease congestion. Throttling can be applied at different points of the network and may be employed to direct traffic to other servers or the wider network to ease a local congestion. To enable the throttle network operators will employ tools such Deep packet Inspection (DPI) method or collected metrics on flow traffic sizes (e.g. monitor peer-to-peer file shares), with our without the users' knowledge. The Canadian Gamers Organization complained to the Canadian Radio-television

---

[82]   https://arstechnica.com/information-technology/2016/02/verizons-mobile-video-wont-count-against-data-caps-but-netflix-will/

and Telecommunications Commission (CRTC) about throttling by Rogers and Bell Canada. The CRTC conducted its own investigations and found evidence of the practice. As a kind of name-and-shame approach, the CRTC now regularly publishes network operators that throttle.

It has been said, that sophisticated throttling technology is quite expensive – essentially, taking up financial resources that advocacy groups say should be invested in increasing network capacity. Similarly, the CRTC has argued that "differential pricing practices do not represent innovation in the provision of telecommunications services; they do not involve making new, improved, or different products, services, or technologies available to consumers. Rather, such practices essentially constitute a marketing strategy and occupy resources that could otherwise be directed toward network innovation and investment by ISPs."[83]

BT offers a two-tier product, called *Content Connect*, which promises priority delivery of OTT traffic even during periods of network congestion. Comcast degraded Netflix content until the OTTs agreed to pay for direct interconnection to the ISPs network. During that time, Hulu (partially owned by Comcast) experienced speeds, which far exceeded those of Netflix. It has been reported (see graphics below) "Comcast subscribers went from viewing Netflix content at 720p on average HD quality to viewing content at nearly VHS quality. For many subscribers, the bitrate was so poor that Netflix's streaming video service became unusable."[84]

Chart 6:   *Video quality: Comcast and Cablevision*
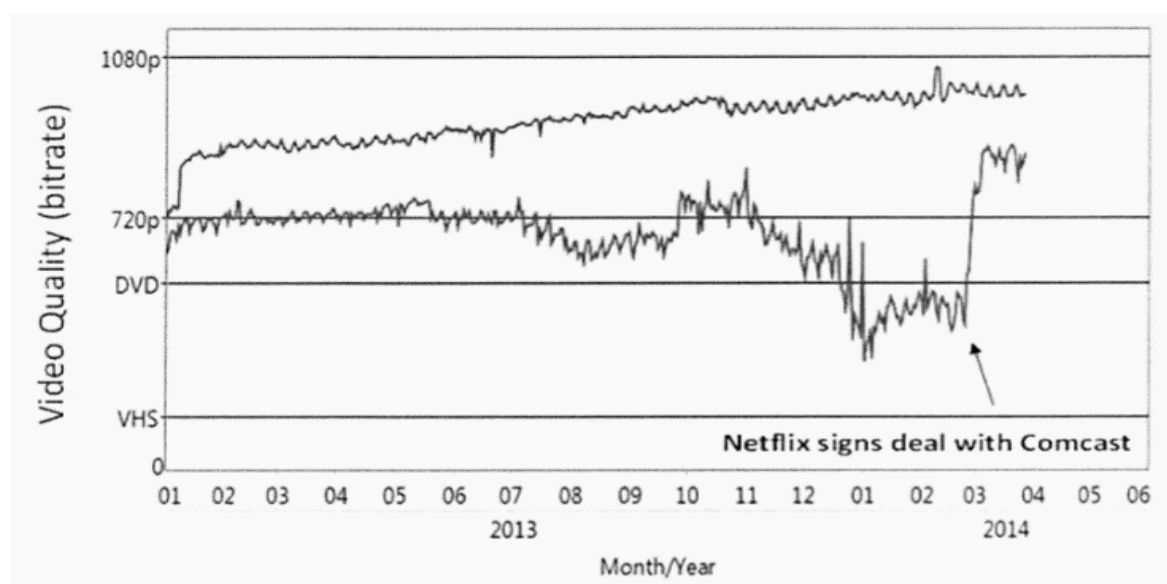
Blocking – a complete internet access restriction to applications or services to manage traffic flow. Most data-heavy apps such as file-sharing services and gaming apps are often subject to blocking. For a long time, file sharing apps had a reputation for facilitating the sharing of pirated files, however, in recent years, these file sharing apps are disseminating legal files. The UK government has shared detailed information about its tax spending through BitTorrent. Academic institutions routinely distribute large files of data sets via the file-sharing app.

 In 2010, BEREC researched the NN derogations throughout the EU. The review established that "blocking of VoIP in mobile networks occurred in Austria, Croatia, Germany, Italy, the Netherlands, Portugal, Romania and Switzerland. Incidents of throttling or blocking of Internet traffic (e.g., of certain websites, the entire broadband connection, P2P file sharing or video streaming) occurred in

---

[83]   https://crtc.gc.ca/eng/archive/2017/2017-104.htm
[84]   https://qz.com/256586/the-inside-story-of-how-netflix-came-to-pay-comcast-for-internet-traffic/

France, Greece, Hungary, Lithuania, Poland and the United Kingdom. With respect to blocking of VoIP in mobile networks, some operators in some countries allowed usage of such VoIP services for an extra charge."[85]

5.3.4.2 Policy and Regulation

The concerns about NN derogations discussed in the preceding paragraphs underscore a number of critical policy and regulatory issues, including interconnection, competition, QoS/QoE, access, and affordability, that will impact the OTT ecosystem.

5.3.4.2.1 Abuse of market power and competition

As pointed out above, without taking certain traffic management measures, the ISPs may not be able to guarantee certain level of quality of service. Hence, a deviation from the net neutrality guidelines is not, in and of itself, problematic. What is at issue is the potential for abuse by the ISPs and Telcos – the abuse of power intended to limit competition. There are well-documented instances, which BEREC has reported on and the FCC has investigated, which show that the ISPs have abused their market power to disadvantage OTT service providers under the guise of traffic management. In markets where the incumbent has significant market power, these traffic management practices can potentially cause great harm to competitors' to the disadvantage of end-users.

ISPs, insist that Internet capacity is limited, and hence, apps that consume huge bandwidth should pay a premium for the privilege. However, advocacy groups have objected to the fact that users and OTT providers paying the ISPs for usage of the same data, i.e. charging OTTs to send content to users, and charging users to access the content. Of course, without the link provided by the network operators, OTTs will not be able to reach their customers. Further, that the traffic management tools are seemingly not deployed to reduce the costs of access or improve overall service provision.

5.3.4.2.2 Impact on Innovation and small OTTs and App developers

As pointed out in another part of the report (on QoS/QoE section) paid prioritization (ostensibly to improve network performance and guarantee QoS standards) derogates from net neutrality guidelines, which experts, such as Tim Berners-Lee, have argued are the reason the internet has been open and innovative.[86] Thus, the key concern about applying this type of QoS-enhancing measures is not only focused on the derogation from Net Neutrality principles (that promote fair, reasonable and neutral and non-discrimination treatment of traffic flows), but the pernicious commercial incentive that traffic management measures fuel.[87] In other words, network operators are accused of a creating artificial scarcity (of the network resources) in order to extract more payment for providing carrier services. It has also been argued by BEREC that although certain OTTs, such as VOIP-calls enabled through the Skype App, require higher bandwidth (about 25% extra) than normal calls, the pressure on the capacity of the network is relatively small – in fact, so insignificant it should not trigger implementation of heavy-handed traffic management.

Conversely, OTT start-ups that are not able to pay for priority forwarding for their traffic will be disadvantaged in such an environment. Smaller OTTs are being squeezed on both sides – by IPS increasing transactions costs for carrying their traffic, on the one hand, and more established OTT providers channeling an increasing percentage of their traffic on CDNs (and thus, increasing their attractiveness to customers).

5.3.4.2.3 Investment in Infrastructure

Even as regulators concede that traffic management is a necessary tool to manage higher demands for bandwidth, there is a concern that ISPs are not always forward-looking in their approach to

---

[85]   berec.europa.eu/eng/.../0/188-berecs-response-to-the-european-commissi_0.pdf
[86]   https://www.theguardian.com/technology/2017/nov/15/tim-berners-lee-world-wide-web-net-neutrality
[87]   http://archive.oreilly.com/pub/a/network/2002/06/11/platform.html

managing network capacity. In the eyes of advocacy groups and OTTs, investing in extra capacity should be the priority option.

5.3.4.2.4 Increased Demand

Research reports forecast that demand for bandwidth and data will continue to rise. For instance, Ericsson's Mobility Report of November 2016, which forecasts the ICT industry growth trajectory based on current trends, projected that smart phone data demand will continue to grow in *all* regions of the world. In 2016, North America had the biggest demand, averaging 5.1 GB of data per month per user – an increase of almost 40% in a space of just two years. The report projects that, by 2022, North American smartphone user will average a monthly usage of 25GB. The estimates for Central and Eastern Europe are that the current 1.9 monthly demand will balloon to 15 GB. The numbers for the Middle and Africa are forecasted to rise from 1.3 GB to 7.7 GB per month just for smartphone users. Thus, in light of the above, net neutrality will continue to be an issue of robust discussion as the forecasted growth of data-intense and bandwidth-heavy apps put pressure of Internet networks.

5.3.4.3 Good Practice

- Traffic management is critical for the proper functioning of the Internet, but it can also be misused by an ISP to discriminates and create unfair access to the Internet and limit competition.
- Review of regulatory guidelines needed to curb some of the more harmful traffic management practices, such as total blocking and extended throttling, is critical-regulatory action for curbing these practices should be evidence-based and in line with the harm suffered.
- Consistently monitoring of traffic management schedules and provisioning is critical
- Instituting guidelines for user-friendly switching to other providers who are not throttling is important.
- Publication of ISPs that engage in blocking and throttling is bearing fruit in certain markets, i.e. Canada.
- Increasing ISP competition and contestation on access markets is important – where the end users have limited options for an ISP (in a market where there two or less providers, competition is constrained).
- Strengthening transparency guidelines to empower and educate consumers is a great idea.

5.3.4.4 Conclusion

With the demand-surge for data predicted to continue to grow, NN and related issues will be even more critical into the future. Thus, the regulators and policy-makers will need to review, taking into account the specific local market realities, the consequences (on competition, QoS/QoE, interconnection, investment in network capacity, small OTTs/app developers, consumer protection, etc.) of maintaining the status quo, of introducing light touch regulations or tweaks of the current NN rules, or even, of actively enforcing NN bright line regulation.

5.4 DESIRABLE FOR REGULATORY ATTENTION

5.4.1 INTERNATIONAL MOBILE ROAMING

International Mobile Roaming ('IMR') services allow mobile users to continue to use their mobile phone or other mobile device to make and receive voice calls and text messages, browse the internet, and send and receive emails, while visiting another country. The starting point for roaming is an authentication and approval step whereby the visited network recognises the phone, signals back to the home network, and receives approval to allow different categories of roaming. When a roaming customer makes a voice call, the visited network is responsible for establishing the call using its own network and wholesale supplier relationships. Details of the call are passed back to the home network for billing and inter-carrier settlement.

This extension of coverage beyond national borders and beyond the coverage footprint of domestic carriers is enabled by a wholesale roaming agreement between a mobile user's home operator and the visited mobile operator network.[88]

The IMR revenues (paid in USD or Statutory Drawing Rights (SDRs) generated by a number of Commonwealth countries including small island states and countries with high inbound tourism has been important for operator profitability and investment. Unfortunately, in the 2017 ITU report on IMR, reported that the retail price of voice calls, SMS and data usage has decreased in majority of countries.[89] Very few countries have reported an increase in IMR prices. Regulation and the proliferation of OTT services have resulted in significant falls in IMR prices and hence operator and industry revenues.

5.4.1.1 Regulation of IMR prices

Over the past decade, certain regions across the globe have seen steady, incremental movement towards the monitoring and regulation of the high prices of IMR, with a number of countries now regulating IMR prices. Approaches to the regulation of IMR globally range from complete abolishment of all roaming charges, bilateral agreements to introduce price caps between adjacent countries, transparency measures for consumers including investigative reporting and government partnerships with dominant regional operators to abolish all roaming fees with that operator.

The EU's status as the leading early adopter of IMR regulation and integration was part of a greater agenda of European economic integration. Since 2006, the European Commission ('EC') has taken action to address the high roaming charges paid by consumers for using their mobile phones when travelling abroad in other EU Member States.

Following Europe's lead, other regions have implemented agreements to regulate IMR prices including Association of South East Asian Nations ('ASEAN') (eg roaming between Singapore to/from Malaysia), Economic Community of West African States ('ECOWAS'), Gulf Co-operation Council ('GCC'), Closer Economic Relations (Australia-New Zealand) and Caribbean Community ('CARICOM'). Many Commonwealth countries are hence involved. In 2017, the ITU found there has been an increase in regulation and found that 53 out of 124 countries (ie 43 percent) regulate IMR prices.

5.4.1.2 Impact of OTT services on IMR

In addition to the impact of regulation there has concurrently been a significant impact on IMR prices and revenues arising from the proliferation of affordable 3G/4G enabled smartphones which can utilise OTT telecommunications services (eg Whatsapp, Viber, Wechat, Facebook Messenger etc). This is data connectivity allows consumers to avoid roaming charges for voice (charged per minute) and SMS (charged by message) by utilising OTT services. The OTT data channel can be carried over any type of network that provides Internet access.

Exhibit X shows the various levels of data use associated with various types of communications activities. In this context it is important to emphasise that, while undertaken on smartphones, many of these activities are undertaken within a wifi zone at a hotel or at a location that the consumer was visiting. To the extent that wifi zones become more common, faster and more cheaply available, the use of OTT services is obviously less dependent on mobile network operators.

---

[88]   www.gsma.com/publicpolicy/wp-content/uploads/2012/09/Asia-International-roaming-explained-English.pdf
[89]   www.itu.int/en/ITU-D/Regulatory Market/Documents/Roaming/Section11MobileRoamingPart2_2017_web.pdf

Table 5:   Mobile data traffic volumes

Activity	Data traffic use
One hour of instant messaging	0.25 – 1 MB
One hour of web browsing	1.5 – 25 MB
Download 100 emails	1 – 10 MB
100 minutes talk on VoIP video calling	Around 50 MB
Download one photo	0.05 – 2 MB
Download one MP3	3 – 8 MB
One software download	70 – 800 MB
Download one film	700 – 1500 MB
Streaming one hour of video	250 – 500 MB
Streaming one hour of audio	50 – 150 MB

Source: GSMA 'International Roaming Explained' Report[90]

Going forward, while IMR data volumes may increase with the use of OTT apps and video streaming etc, Commonwealth countries should be aware that the number and hence revenue derived from IMR voice and SMS roaming services will continue to fall.

Such falls will also be facilitated and locked-in via various bilateral roaming agreements, operator agreements with mobile roaming clearing houses, competition and regional Government agreements to reduce IMR prices. Commonwealth regulators and operators will need plan for this. It is hoped, however, that IMR revenues will stabilise as usage volumes increase as consumers treat roaming as an extensive of their home network usage.

5.5   TAXATION: COLLABORATIVE REGULATION

5.5.1   TAXATION REGIMES

Different countries levy various taxes – mandatory contributions to the national treasury to fund public services – on ICT companies including corporate taxes on profits, property taxes, and value added taxes on ICT goods. Some of these taxes (e.g. property taxes) are also levied on OTT service providers on the physical assets they own. In addition, as employers, the companies are subject to employee tax on payroll. However, increasingly, taxes on OTT services and applications (e.g. video-on-demand) are being levied, or there are major plans underway to impose surcharges. [91]

In essence, there are two viewpoints on taxing, i.e. the many who are pro-taxation and the just-as-many who are against taxation of digital goods and services. The former advocate for taxation to fund the development of digital services, and the latter argue that the tax exemption on the ICT ecosystem is beneficial to end-users and the greater economy, and these benefits far outweighs the revenue forfeited.

---

[90]   www.gsma.com/publicpolicy/wp-content/uploads/2012/09/Asia-International-roaming-explained-English.pdf

[91]   https://quaderno.io/blog/digital-taxes-around-world-know-new-tax-rules/

Thus, on top of import duties on ICT devices and equipment, some countries also impose taxes specific to the ICT industry – e.g. some countries charge taxes on broadband services (considered a new source of revenue, e.g. Argentina on broadband services and Ghana on broadband modems), while others, such as Malaysia, exempt services and equipment connected to broadband to encourage take-up. On the whole, these taxes are factored-in the cost of providing a service by the tech companies and are passed on to the customers.

In Brazil the National Agency of Cinema or Ancine, has been levying a fee, called *Condecine*, on all videos and films for a few years. In 2012, the tax regime was revised to include foreign-made films and content streamed from overseas. In addition, an 11% tax rate is charged on income earned from films and streamed video services. The charge is waived if 3% of the income is invested in local production companies, as mandated by Ancine.[92]

Similarly, Japan instituted a consumption tax on digital goods which required online OTT service providers to register with tax authorities, and thus, to pay taxes in Japan. Likewise, the South African government has started levying taxes on digital goods sold online.

GSMA has found that taxes on ICTs have a negative impact on take-up of digital products and service, i.e. "the analysis and case studies in this report show, high taxes on mobile restrict growth of the sector and the use of networks. Conversely in markets that have (at least partially) reformed taxation such as Uruguay and Kenya, a more balanced taxation structure can encourage the growth of the sector."[93] GSMA also found that lower taxes on mobile services positively impact affordability of ICT services, especially for end-users who are price conscious such as young people and the poor.

5.5.1.1 Policy and Regulation

Taxation of OTTs is proving to be a challenge for some national regulators. Tax authorities are realising that attempting to impose current regulatory frameworks on digital goods and services is complex. The current tax regime, designed for physical products and companies with tangible assets, is a bit outdated. In addition, there is no universally agreed definition of what is a digital service or good, and if these good taxable – e.g. taxes on Netflix are treated differently in various states in the US?

In the US the tax authorities are developing a standard definition of digital products for sales taxed, as it has been observed that there is wide interpretation. The consulting company, Deloitte illustrated that: "For example, if a company streams content to a customer in California, it is not required to collect sales tax, but if it streams that same content to a customer in Ohio, it is required to do so. Streaming that same content to Florida results in a Communication Services Tax, but not a sales tax obligation. And it is not just the states jumping in with sometimes arcane tax policy—it is also cities such as Chicago and its amusement tax."[94]

Furthermore, it is still not clear which taxes should be applicable – the taxes of the jurisdiction where the OTT services is consumed, processed, or from where is it supplied. Even more importantly, what do tax authorities charge – how do they fully capture the value created from an intangible asset? How do authorities treat a (portable) Netflix subscription which may be consumed by different people in one location, or one person in various locations? In the current tax regime, sales taxes are tied to a specific jurisdiction and companies are taxed based on commercial presence in the respective jurisdiction. Thus, OTT services streamed from country A, and then processed in country B, and perhaps, consumed in yet another jurisdiction, country C, pose challenges to the current tax laws.

---

[92]   https://techinbrazil.com/taxation-on-ott-in-brazil
[93]   GSMA (2014) Mobile taxes and fees: A toolkit of principles and evidence, London, p. 5

[94]   https://www2.deloitte.com/us/en/pages/technology-media-and-telecommunications/articles/streaming-tax-over-the-top-tv-services.html

Research shows that OTT service providers will locate their operations in low-tax jurisdictions (even within a single-market setting such as the European Union) in order to limit their income tax liabilities. The tech companies employ various tax strategies and exploiting various tax exemptions to pay the least amount of tax.

Similarly, following major uproar over the revelation that Facebook UK paid only $7 million income tax in 2015 despite a substantial rise in profits and revenues from advertising, the company announced a revision of its tax system. In essence, the revenue derived from advertising sales will no longer be recorded in Ireland but, from 2018, the sales will be accounted "to a local selling structure".[95]

Taxation of digital services is still work in progress – tax directives and excise regulations need to be updated to respond to the digitization of ICT services, including by OTTs. A key policy and regulatory challenge is defining with specificity and clarity the concept of digital services. Further, figuring out what aspects of the service should be taxed, and who should be taxed levied even at an international level.

5.5.1.2 Trends in Taxation

The EU has been at the forefront of drafting regulation which will affect the OTT ecosystem in a profound way – from the $2.9 billion anti-trust fine against Google, to the tax refund payment to Ireland from Apple, from the ruling that Uber is a transport service (and not an App) subject to transportation regulations to the strict rules on privacy and data protection under the General Data Protection Regulation (GDPR).

In January 2015, the EU region, through the VAT directive for business-to-customer services, mandated tax authorities to begin taxing customers instead of service providers – effectively transferring the tax burden from country of supply to the jurisdiction of consumption.

Essentially, when services are purchased online and electronically supplied from a vendor located *in the EU area*, value added tax (VAT) is charged. The surcharge levied is the applicable VAT in the country in which the buyer is located. In instances where the digital service (broadcasting, telecommunications, and ecommerce) is electronically supplied from a retailer located *outside the EU*, value added tax (VAT) are still imposed. Again, the tax collected is the applicable VAT in the country in which the buyer is located. For example, if a customer, who resides in Spain, purchases services from a Canadian on-line library, s/he will pay the VAT applicable in Spain on top of the price of the digital service supplied by the Canadian company. [96]

Recently, several European countries have been making moves to increase the taxes of the OTT companies, including Google, Facebook and Amazon, who have been criticized for not paying their fair share. The French government, supported by Spain, Italy and Germany, has been at the forefront of the effort to revise the EU rules to empower the authorities to tax, between 1-5%, the companies on gross revenues instead of profits (a shift from the current norm of taxing corporate profits. Furthermore, the countries are advocating for efforts to close the tax loopholes, which mandate taxing the companies where they generate the revenue rather than the location of their headquarters. Low-tax countries such as the Netherlands, Luxembourg, and Ireland oppose the proponents of a revised tax arrangement – these countries are adamant that the high taxes would render the EU uncompetitive and unattractive to US tech companies.

More significantly, the EU is defining what it calls, "digital presence" to counter the limits of the current corporate tax regime which levies taxes on companies with physical presence. The new

---

[95]   https://www.theguardian.com/technology/2017/oct/04/facebook-uk-corporation-tax-profit

[96]   https://ec.europa.eu/taxation_customs/individuals/buying-goods-services-online-personal-use/buying-services/electronically-supplied-services_en

concept of digital presence is meant to address the issue of: "Where to tax? – How to establish taxing rights in a country where a business only has a digital presence and no physical presence."[97]

The concept of digital presence follows the ruling by the French administrative court. In July 2017, the court ruled that the government was not entitled to a $1.5 billion tax receipts from Google for back taxes dating from 2005, as the company's Adwords, registered in Ireland, did not have a permanent presence in France. Interestingly, Google did pay the Italian authorities back taxes worth $380 million.

Furthermore, the EU has been attempting to build international consensus on global rules about the digital services taxation, but progress has been slow due to a multiplicity of stakeholders and the range of issues that need to be sorted out. However, the EU has hinted that, if there is no progress on that front, it will institute the tax regime alone through the Single Market under the common consolidated corporate tax base (CCCTB) proposal. In the interim, the EU will institute an "equalisation tax" on revenue for tech companies including OTT service providers which is a tax on all untaxed and/or under-taxed digital sales. In addition, the EU will withhold tax on digital transactions and payments to OTT companies, and finally, a levy on revenues from online advertising or from the digital services.

On 21 March 2018, the European Commission proposes new measures to ensure that all companies pay fair tax in the EU. There are two distinct legislative proposals:

The first initiative aims to reform corporate tax rules so that profits are registered and taxed where businesses have significant interaction with users through digital channels. This forms the EC's preferred long-term solution. The second proposal responds to calls from several Member States for an interim tax which covers the main digital activities that currently escape tax altogether in the EU.

A digital platform will be deemed to have a taxable 'digital presence' or a virtual permanent establishment in a Member State if it fulfils one of the following criteria:

- It exceeds a threshold of €7 million in annual revenues in a Member State
- It has more than 100,000 users in a Member State in a taxable year
- Over 3000 business contracts for digital services are created between the company and business users in a taxable year.

The new rules will also change how profits are allocated to Member States in a way which better reflects how companies can create value online: for example, depending on where the user is based at the time of consumption. Ultimately, the new system secures a real link between where digital profits are made and where they are taxed.

This indirect tax would apply to revenues created from certain digital activities which escape the current tax framework. This system will apply only as an interim measure, until the comprehensive reform has been implemented. The tax will apply to revenues created from activities where users play a major role in value creation and which are the hardest to capture with current tax rules, such as those revenues:

- created from selling online advertising space
- created from digital intermediary activities which allow users to interact with other users and which can facilitate the sale of goods and services between them
- created from the sale of data generated from user-provided information.

Tax revenues would be collected by the Member States where the users are located, and will only apply to companies with total annual worldwide revenues of €750 million and EU revenues of €50 million. This will help to ensure that smaller start-ups and scale-up businesses remain unburdened. An

---

[97]   European Commission (2017) A Fair and Efficient Tax System in the European Union for the Digital Single Market, Brussels, p.

estimated €5 billion in revenues a year could be generated for Member States if the tax is applied at a rate of 3%.

These legislative proposals will be submitted to the Council for adoption and to the European Parliament for consultation.

It has been observed that Donald Trump's recent tax reforms are also intended to persuade US tech companies to repatriate their earnings especially in the wake of the EU's proposed tax regime.[98] Some commentators have also pointed out that the proposed EU tax legislation will potentially violate WTO rules. Furthermore, these proposals, it is argued, will necessitate a renegotiation of a whole host of the double taxation bilateral agreements.

Parallel to these processes, the EU parliament has instituted in March 2018 a special committee, called Tax #, which will also look into issues of tax evasion and tax avoidance in the digital economy. In addition, the committee will review progress by member states in repealing or tackling measures that enable tax avoidance to the detriment of the Single Market. Tax 3, (building on work done by Tax 1 and Tax 2), is constituted by 45 Members of the European Parliament, will conclude its work in 12 months. Tax 3 will also investigate the "national schemes which provide tax privileges for new residents or foreign income" for tax minimization purposes. Portugal, Malta, and the British dependencies have been specifically flagged for investigation regarding the practices.[99]

The Organization for Economic Cooperation and Development (OECD) is also investigating taxation of digital services and products with a view to sketching a new tax regime. The report is expected to be presented at the G20 summit of 2018. The EU has indicated that it "expects a high level of ambition as regards the interim report on the taxation of the digital economy that the OECD will present to the G20."[100]

In Australia, a Commonwealth country, a raft of taxation reforms including the *Multinational Anti-Avoidance Law ('MAAL')* (2015), *Diverted Profits Tax* (2017) and *Treasury Laws Amendment (Income Tax Consolidation Integrity) Act 2018* (passed March 2018) have been promulgated to address some of the above issues.

5.5.1.3 Good Practice

GSMA has conducted extensive research into taxation of ICT services. These studies suggest the following:

- Jurisdictions with simple and transparent tax regimes on ICT goods and services (Kenya and Uruguay) have higher adoption rates.
- Conversely, sector-specific taxes on digital services are fairly distortive and have a negative impact on take up of digital services (taxes on digital services are usually higher than other service sectors such as tourism.
- Higher taxes on digital services disproportionately affect groups sensitive to pricing and affordability of ICT services (i.e. low income groups).
- Transparent, simple, tax regimes are least distortive and disruptive.
- Each government will have to strike a balance between generating revenue from taxation and guarding against the negative impact and risks of taxation on the take-up of digital services

5.5.1.4 Conclusion

The emergence of the global, borderless digital economy has placed international tax rules under considerable strain. The digital economy - characterised by its multi-sided business models, its

---

[98]   htttps://www.politico.eu/article/technology-brussels-digital-tax-move-raises-transatlantic-stakes/
[99]   https://www.accountancyage.com/2017/10/03/eu-divided-radical-tax-reforms-targeting-tech-giants/
[100]   https://ec.europa.eu/taxation_customs/individuals/buying-goods-services-online-personal-use/buying-services/electronically-supplied-services_en

reliance on data and its absence of physical presence - has accelerated the exposure of weaknesses in what are essentially century old, industrial age international tax rules. In particular, the digital economy has fuelled rapid growth in the volume of international transactions and in the number of active traders which has rapidly eroded the effectiveness of such rules.

Often having their principal place of business and registered office in the USA or a low-income tax country or haven, online service providers are able to put in place international tax optimization strategies given the variation in regimes applied by different countries in this regard. The strategies that exploit the difference in treatment of economically equivalent transactions between jurisdictions are known as base erosion and profit shifting ('BEPS'). The Organisation for Economic Co-operation and Development ('OECD') estimates that between 4-10% of global revenue from corporate income tax is lost through BEPS by multinational enterprises ('MNES'), including a majority of online service providers.[101]

Critically, this tax avoidance by multinational OTT providers means that:

- Competition between domestic and multinational online service providers is fundamentally distorted, as multinational entities face lower taxes than their domestic competitors;
- The corporate tax base of many countries is being eroded in a manner that is not intended by domestic policy;
- The fairness and integrity of tax systems is being undermined, alongside voluntary compliance by all tax players. [102]

At the same time, governments across the globe are losing taxes due to declining revenues of their domestic telecommunications operators and broadcasters.[103]

Tax avoidance by OTT players is one of the most critical issues to address in terms of OTT regulation, and is arguably a mandatory fix which is required in relation to the regulatory regime applying to online service providers.[104]

In terms of regulation of both traditional and OTT providers, the question to be addressed relates to taxation and how global OTT offering substitutable services can become subject to similar taxation regimes on revenue and profits as broadcasters and local media companies. For this to occur, taxation and related regulations will need to be analysed and significant updates made in order to ensure that there is not a significant erosion of the tax base. Furthermore, collaboration will be required between telecommunications/ICT sector regulators and domestic taxation authorities in Commonwealth countries.

While not in the Commonwealth, Asian countries such as Indonesia[105] and Thailand[106] have started measures to update their tax regime (including a requirement for commercial presence, either by

---

[101]   OECD, 2015, 'Information brief: summary', see www.oecd.org/ctp/policy-brief-beps-2015.pdf

[102]   www.oecd.org/ctp/beps-about.htm

[103]   www.detecon.com/sites/default/files/detecon_opinion_paper_ott_regulation_options_final.pdf

[104]   An earlier 2015 ITU paper, GSR15 Discussion Paper, The Impact of Taxation on the Digital Economy identified the distortive effect of taxes in the digital eco-system on three levels: (i) Potential disparity in tax burdens imposed on telecommunication operators when compared to other operators of the digital eco-system (for example, digital advertisers, social networks); (ii) Taxes on asymmetry among global players in the digital sector and (iii) In country taxation asymmetry between the telecommunication sector and other providers of other goods and services. Available at www.itu.int/en/ITU-D/Conferences/GSR/Documents/GSR2015/Discussion_papers_and_Presentations/GSR16_Discussion-Paper_Taxation_Latest_web.pdf

[105]   On 6 February 2017, the Director General of Tax issued Circular Letter No. SE – 04/PJ/2017 on Determination of Permanent Establishments for Foreign Tax Subjects which are Providers of Applications and/or Content Services through the Internet ("CL No. 4/2017"). According to CL No. 4/2017, foreign providers of OTT services (which may be an application service or a content service) having a permanent establishment in Indonesia would have to pay tax in Indonesia. A foreign OTT service provider may be regarded as having a permanent establishment in Indonesia if (i) it owns, leases or controls any fixed premises in Indonesia, which may include a computer, a server, a data centre, an

registering a local office or entering into a joint venture with a local company, to operate in the country) to level the playing field. Given the nature of advertising, two-sided markets etc, smaller and emerging Commonwealth countries are not, however, likely to gain much in terms of additional revenue from applying such approaches.

---

electronic agent or other automatic equipment; or (ii) it has employees or parties acting for or on its behalf to conduct business activities in Indonesia

[106] On 17 January 2018, the Thai Revenue Department issued a draft value added tax bill (the Draft VAT Bill) to amend the current VAT law related to services rendered by e-business operators in foreign countries. This VAT specific development follows the draft tax proposal on foreign e-business activities, introduced and opened for a public consultation last year. The amendment primarily focuses on the collection of VAT on services rendered by foreign e-business operators to individuals in Thailand due to the limitations in enforcing a reverse charge mechanism under the current VAT law

REFERENCES

1. European Parliament – Directorate-General for Internal Policies, "Over-the-Top players (OTTs)", Study for the IMCO Committee, 2015
2. International Telecommunication Union, "The Race for Scale: Market Power, Regulation and the App Economy", Geneva, 2016
3. International Telecommunication Union, "Regulatory Challenges and Opportunities in the new ICT Ecosystem", Geneva, 2018
4. International Telecommunication Union, "Building Blocks for Smart Societies in a Connected World: A Regulatory Perspective on Fifth Generation Collaborative Regulation"
5. International Telecommunication Union presentation by Moktar Mnakri at the ITU Regional Economic and Financial Forum of Telecommunications/ICTs for Arab Region, "Over the Top Services: Enablers of Growth and Impacts on Economies", November 2015
6. International Telecommunication Union, "The Challenge of Managing Digital Content, Paper for the ITU-TRAI Regulatory Roundtable", 21-22 August 2017, New Delhi, India
7. International Telecommunication Union, "Guidelines for the Preparation of National Wireless Broadband Masterplans for the Asia-Pacific Region", October 2012
8. Strategy&, "Enabling the OTT revolution: How telecom operators can stake their claim"
9. Telecommunications Authority of Trinidad and Tobago, "Towards the Treatment of Over-the-Top (OTT) Services"
10. Presentation from Commissioner, Indonesian Telecommunication Regulatory Authority (BRTI), "OTT Players: Challenges and Opportunities"
11. Presentation by Telenor, "OTT Players: Challenges and Opportunities"
12. Indian Journal of Science and Technology, Vol 8(S4), February 2015, "Impact of Over the Top Services on Telecom Service Providers
13. Deutsche Telecom Group and DETECON Consulting, "OTT's – Value Killers for Telcos? Focus on African Operators", August 2014

APPENDIX 1: DETAILED SURVEY RESULTS

RESULTS FOR SECTOR 1, 2 AND 3

a) Are your current regulatory regimes, including applicable laws and regulations able to address emerging OTT services?
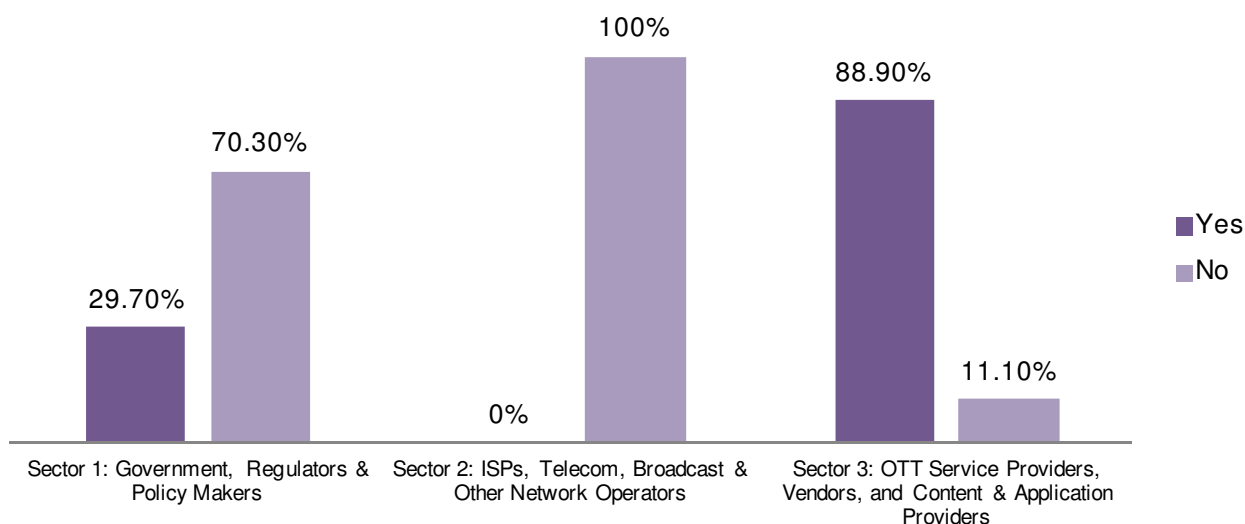

Chart 7: **Whether applicable laws and regulations address emerging OTT services**

b) Do you feel there is a need to develop a regulatory framework for OTT services in your country that could be adapted to changes in the future?
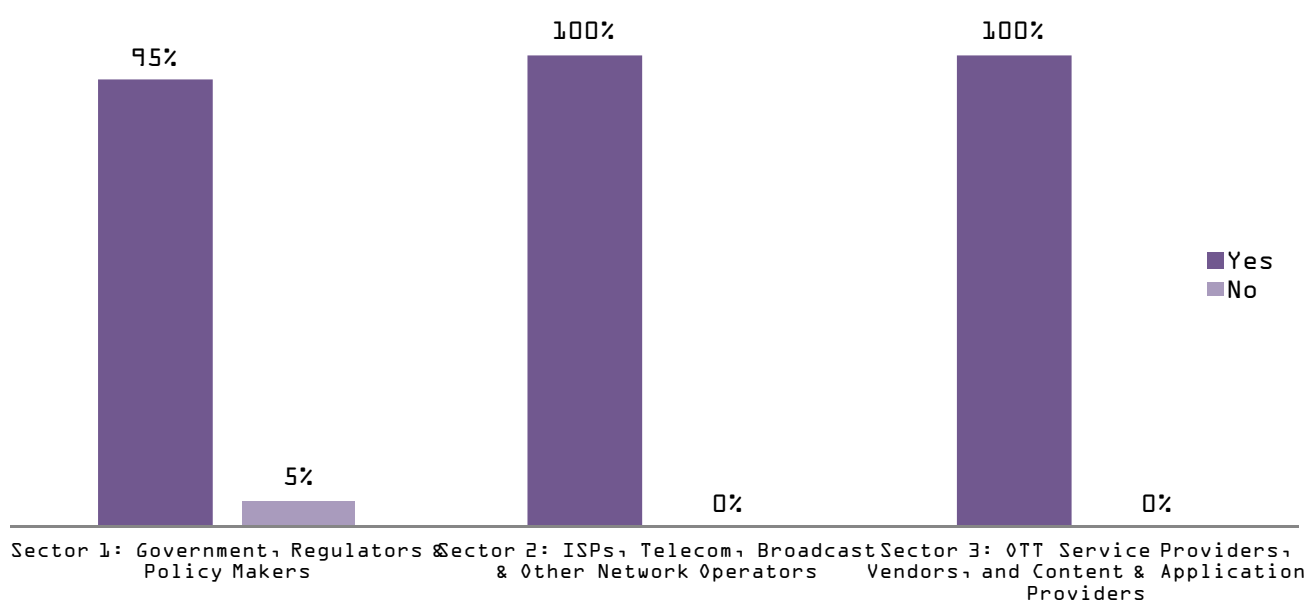

Chart 8: **Need to develop a regulatory framework for OTT services**

c)   Should such a regulatory framework be applied to both local and international OTT service providers offering communication services (such as voice, messaging and video call services through applications) locally?

Chart 9:   Need to develop a regulatory framework for OTT services
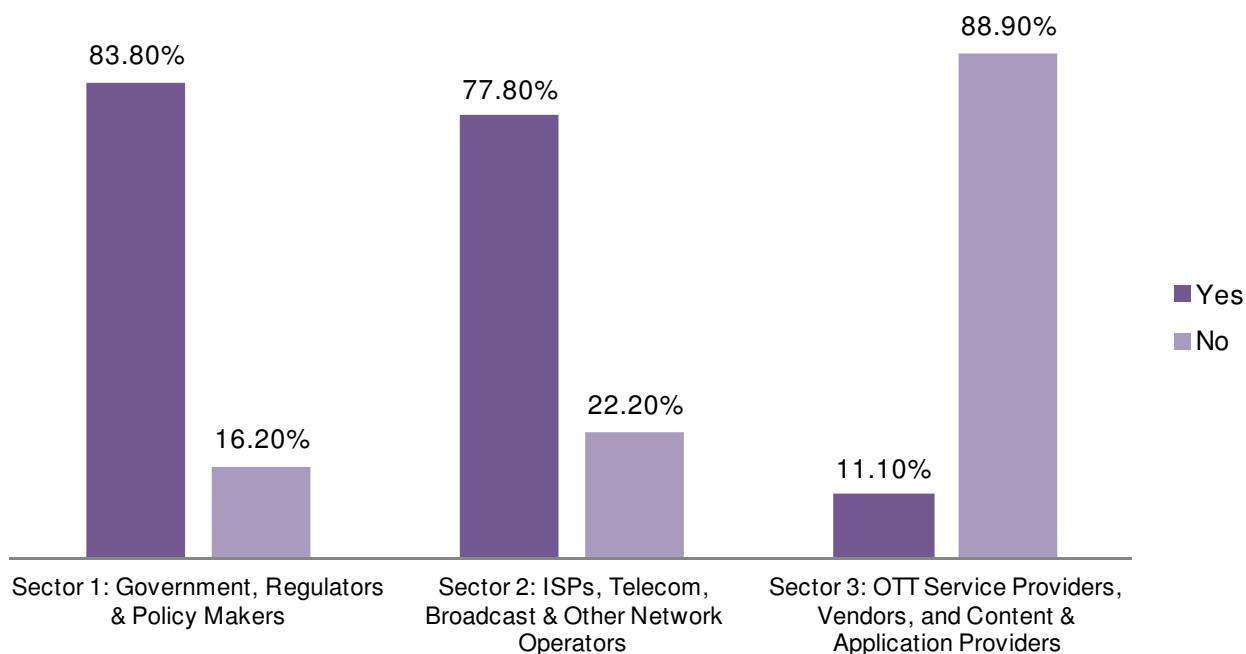
Chart 10:   OTT service providers contributing to the upkeep of the network they utilise

d)   Should OTT service providers contribute to the upkeep of the network(s) they utilize?
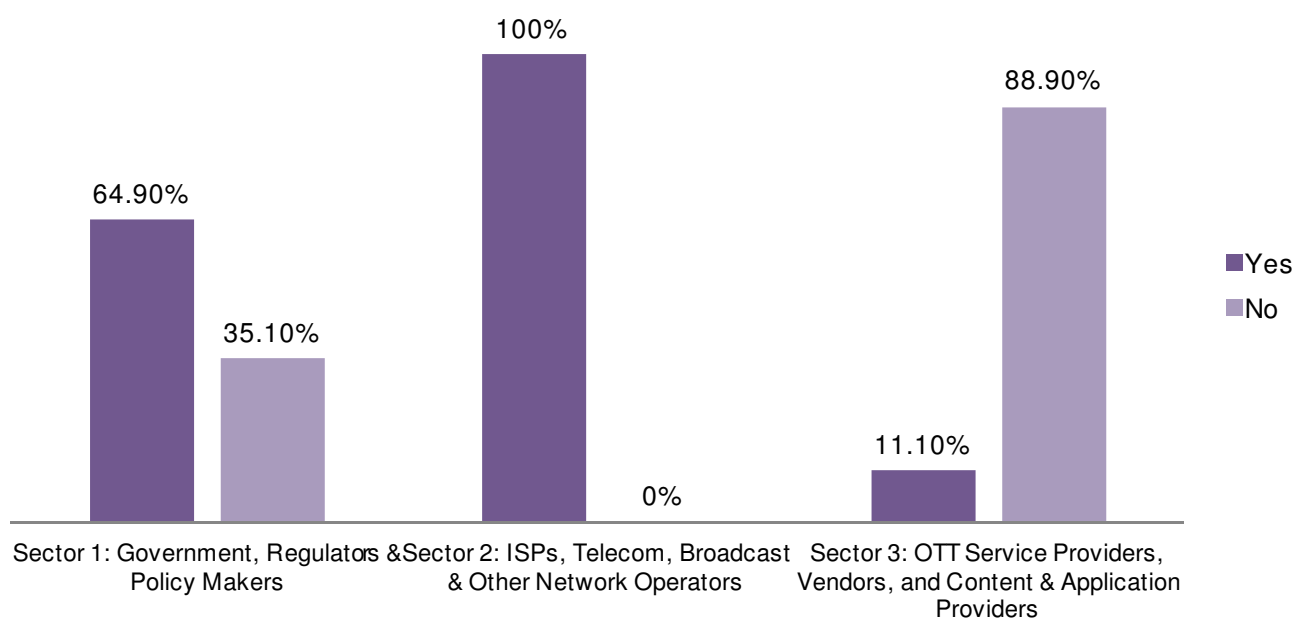
e) Should the OTT service providers be required to contribute to the Universal Service Fund (USF), which is used for network roll-out in un-served and underserved areas, noting that once these areas achieve some connectivity the OTT service providers will have potential customers?

Chart 11: **OTT service providers contributing to Universal Service Fund (USF)**
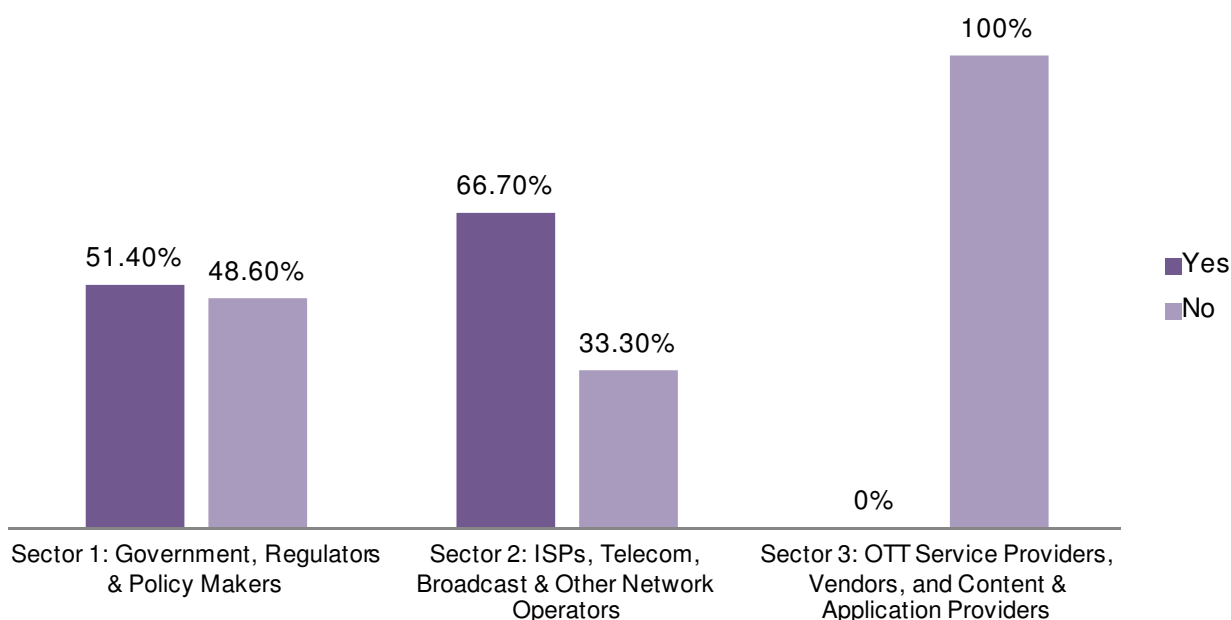
a) Should Net Neutrality be considered as one of the key issues to take into account when addressing the dynamics of OTTs?

Chart 12: **Should Net Neutrality be considered as one of the key issues when addressing OTTs**
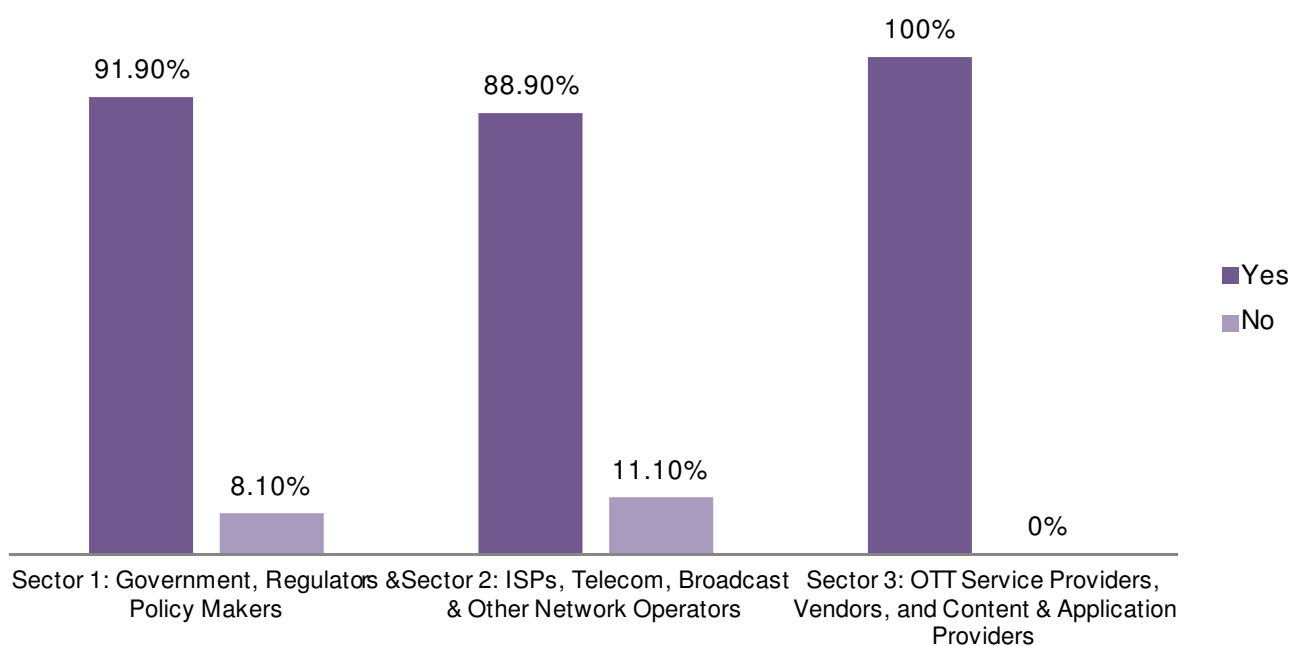
b) Do you consider Safety, Data Protection & Privacy to be important issues in the provision of OTT services?

Chart 13: **Consider Safety, Data Protection & Privacy to be important in provision of OTTs**
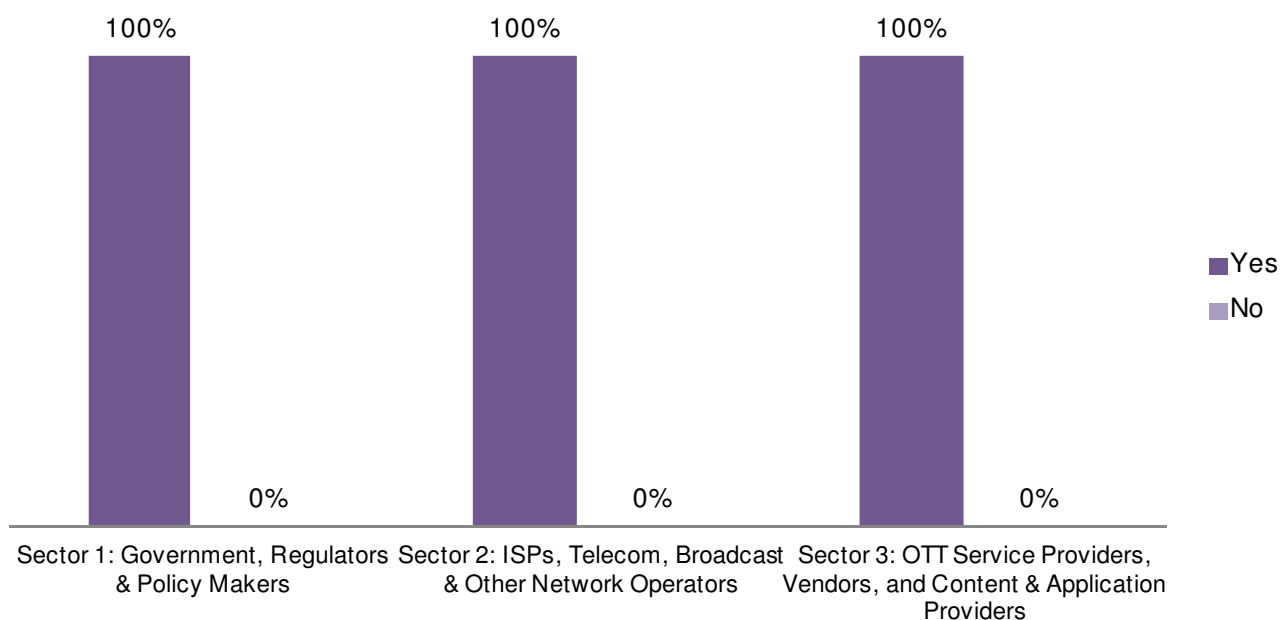
c) Do you think OTT services will continue to significantly impact voice revenues of traditional networks in the next 3-5 years?
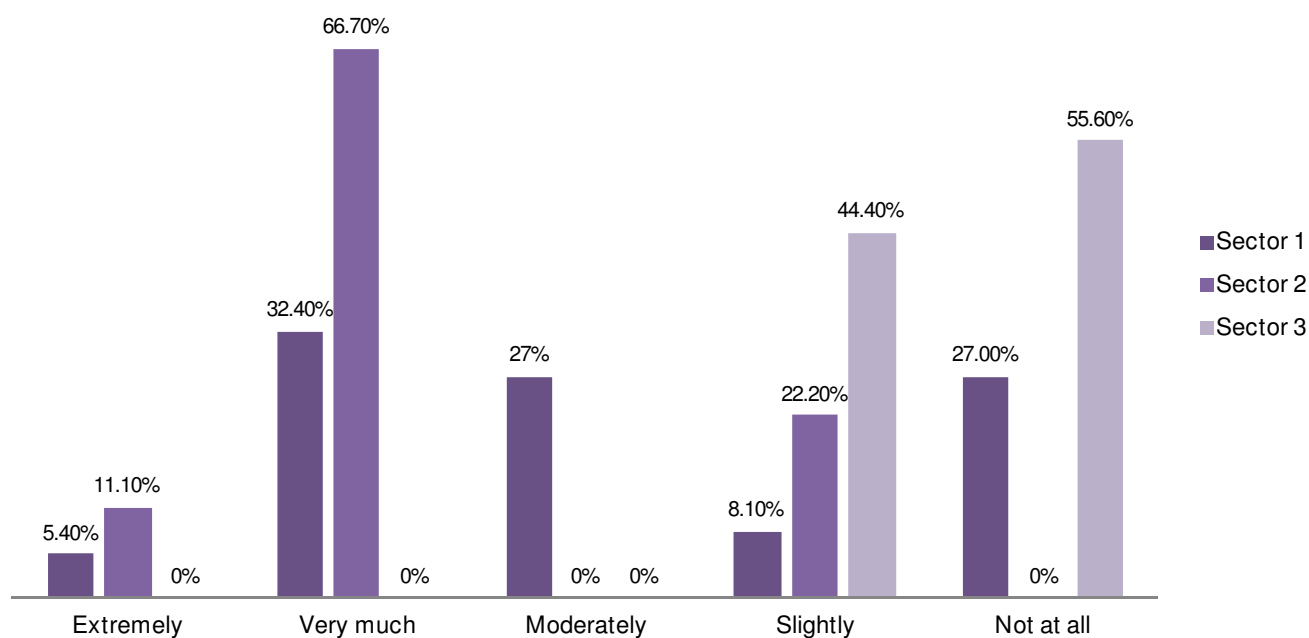
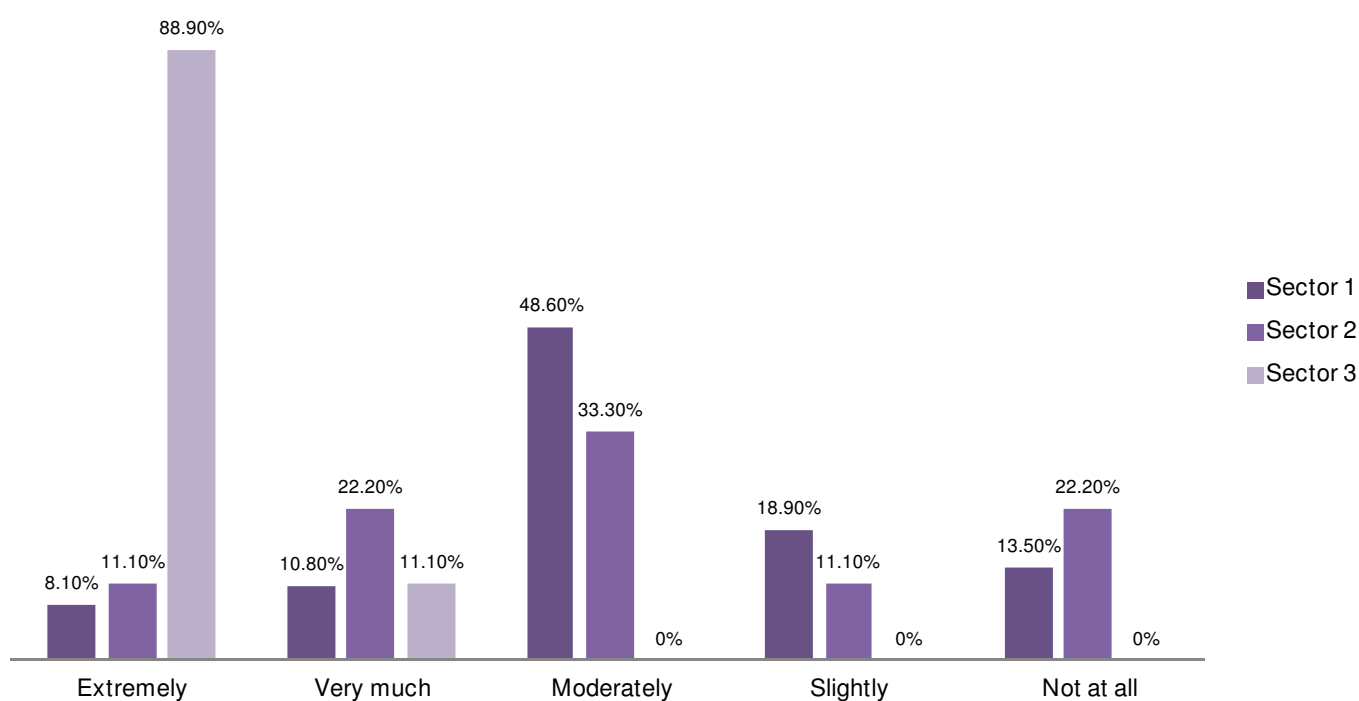**Chart 14:** **OTT services will continue to significantly impact voice revenues**
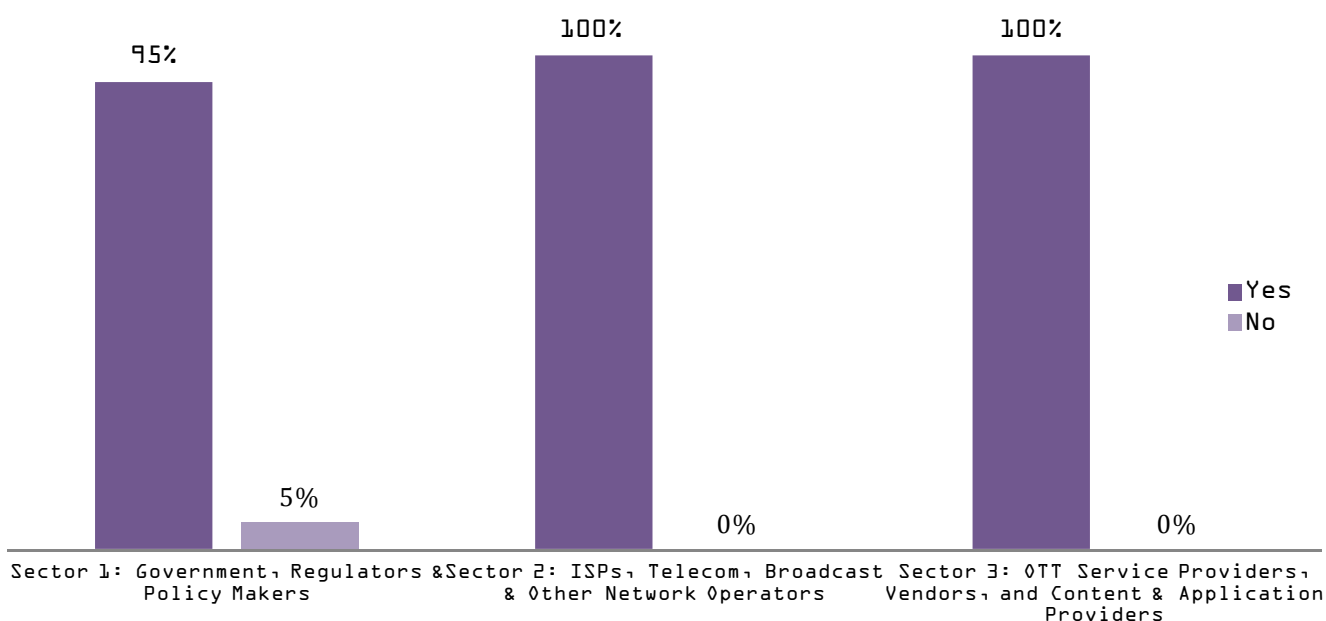
d)   To what extent do you believe changes to regulation might stifle OTT innovation?

Chart 15:   Changes to regulation might stifle OTT innovation

e)   To what extent does the provision of OTT services affect QoS of network providers?
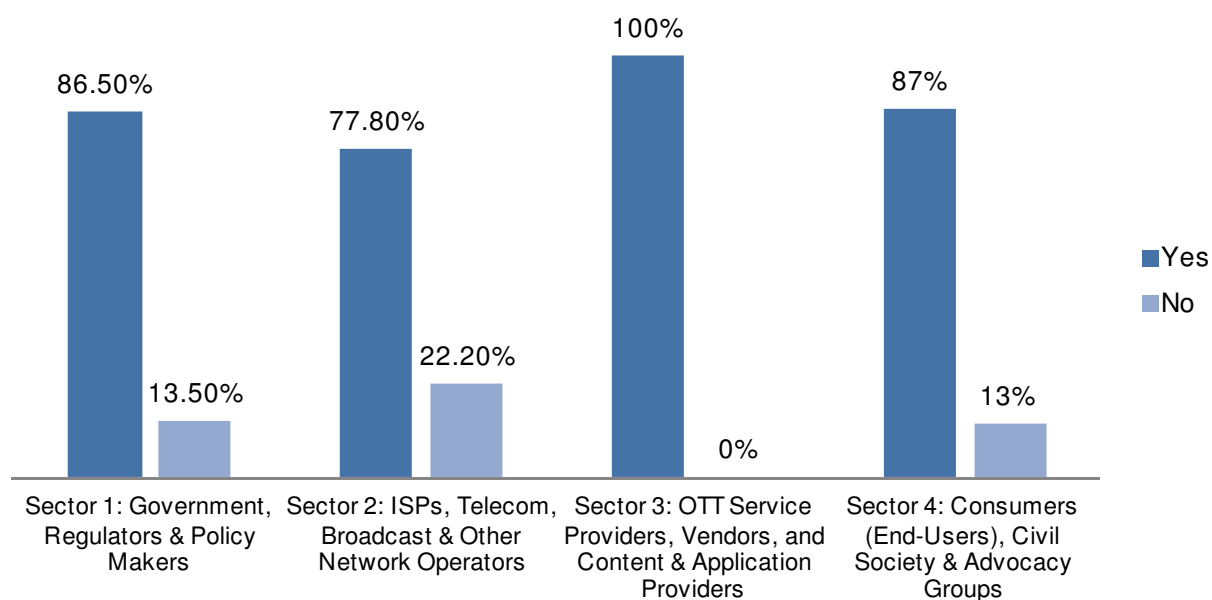
Chart 16:   Extent does provision of OTT services affect QoS
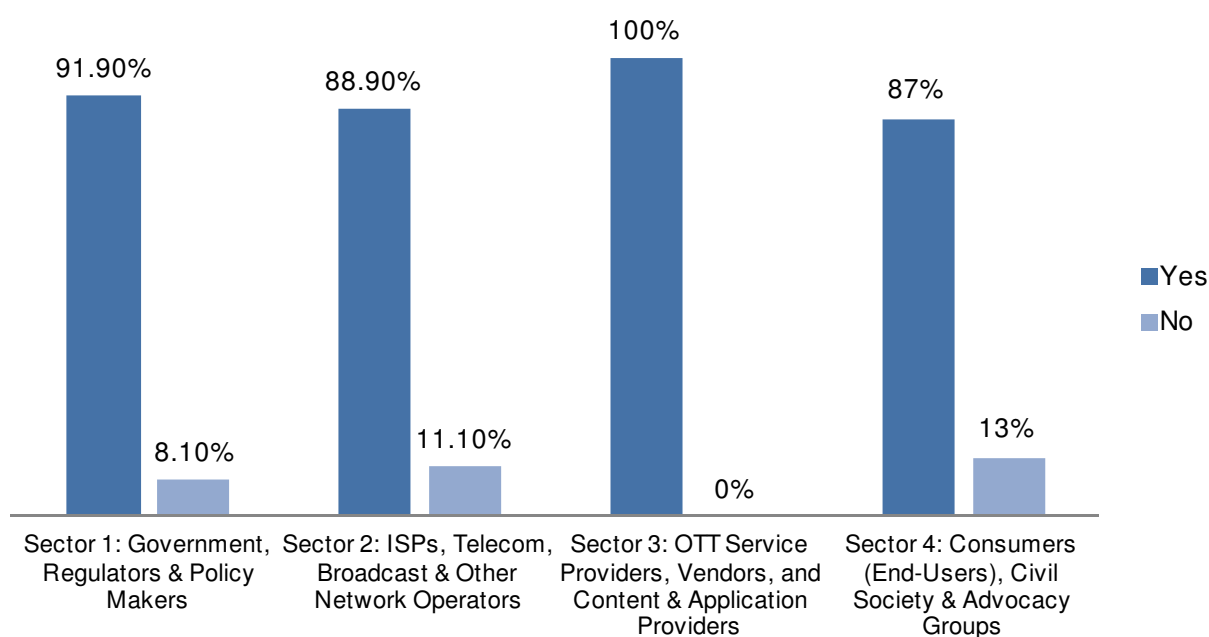
RESULTS FOR SECTOR 1, 2, 3 AND 4

a)   Are traditional network services and OTT services interdependent, given that consumer demand for OTT services drives demand for data services?

Chart 17:   Interdependencies between OTT services and traditional network services

b)   Do you agree that the rapid consumer adoption of OTT services is largely due to the innovative nature of OTT services?

Chart 18:   Consumer adoption of OTT services

RESULTS FOR SECTOR 4

a) Should OTT service providers offering communications services (such as voice, messaging and video call services through applications) resident locally or internationally be registered in your country? Appendix 1:
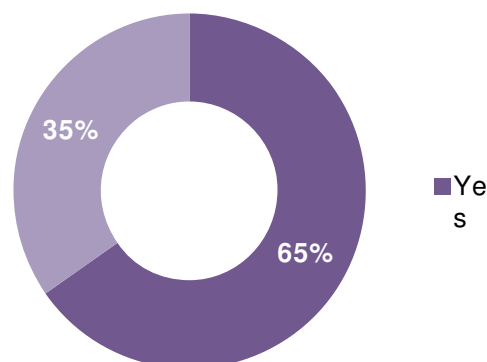

35%

65%

■Ye
s

Chart 19: **Should OTT service providers be registered in operating countries**

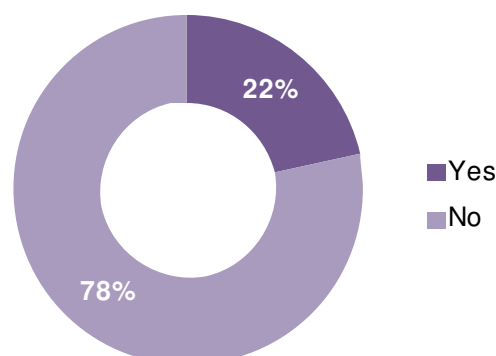b) Is it too early to establish a regulatory framework for OTT services in your country?

22%

78%

■Yes
■No

Chart 20: **Establishing a regulatory framework for OTT services**

c) Should OTT service providers (based either internationally or locally) be made to pay some form of levy, fees, or taxes in countries where they provide their services and are not domiciled?
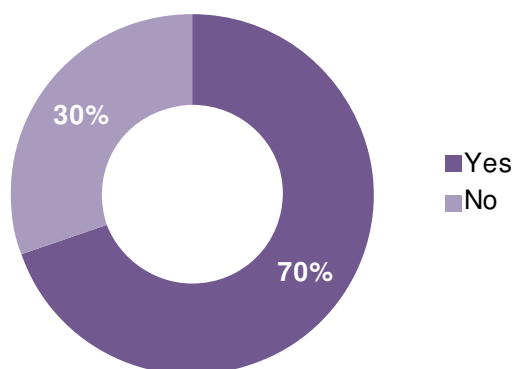

30%

70%

■Yes
■No

Chart 21: **OTT service providers being made to pay levy, fees or taxes**

d) Are you aware of any measures taken by OTT service providers to address any Quality of Service issues?
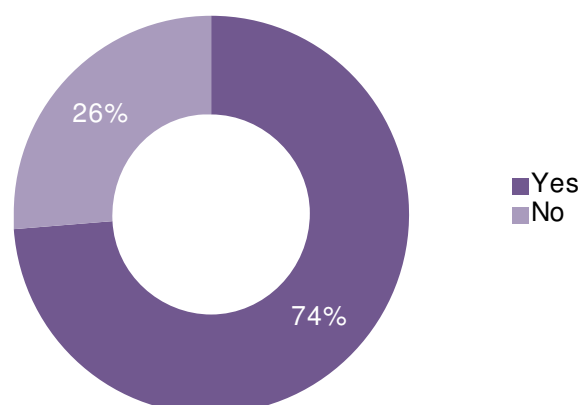

Yes
No

74%
26%

Chart 22: OTT service providers balancing QoS issues

e) Do you have any Cybersecurity and data protection concerns regarding your use of OTT services?
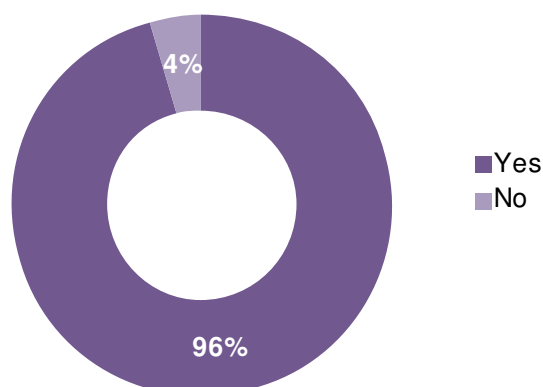

Yes
No

4%
96%

Chart 23: Cybersecurity and data protection

f) Do you agree that the provision of and uptake of OTT services positively impacts on Internet penetration?
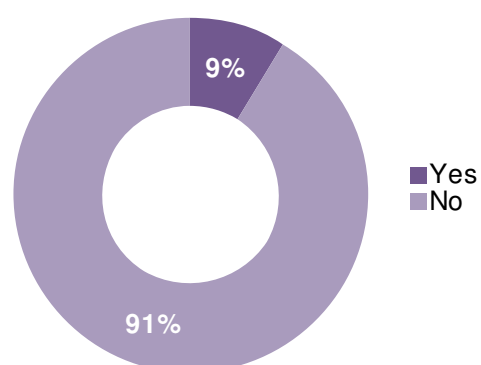

Yes
No

9%
91%

Chart 24: OTT services positively impacts on Internet penetration

APPENDIX 1: OTT SURVEY QUESTIONNAIRES

SECTOR 1 QUESTIONNAIRE

COMMONWEALTH TELECOMMUNICATIONS ORGANISATION

Over-The-Top (OTT) Study Survey- Sector 1

1. Welcome to the CTO OTT Survey

This questionnaire should be completed by authorised representatives of Government Ministries, Policy Makers, ICT/Telecom & Broadcast Regulators, Competition Authorities, Data Protection Authorities and related Entities.

* 1. Are you an authorised representative of a Government Ministry, Policy Maker, ICT/Telecom & Broadcast Regulator, Competition Authority, Data Protection Authority and other related Entities.

○ Yes ○ NO

1

COMMONWEALTH TELECOMMUNICATIONS ORGANISATION

C T O

Over-The-Top (OTT) Study Survey- Sector 1

2. SECTOR: Governments, Policy Makers & Regulators

* 1. What are your general views on OTTs ?

* 2. Are your current regulatory regimes, including applicable laws and regulations able to address emerging OTT services?

○ Yes ○ No

If No, please provide the gaps

* 3. Do you feel there is a need to develop a regulatory framework for OTT services in your country that could be adapted to changes in the future?

○ Yes ○ No

If Yes, what are the key considerations the framework should address

2

* 4. Should such a regulatory framework be applied to both local and international OTT service providers offering communication services (such voice, messaging and video call services through applications) locally?

○ Yes ○ No

Please provide brief justification

* 5. To what extent do you believe changes to regulation might stifle OTT innovation?

○ Extremely ○ Very much ○ Moderately ○ Slightly ○ Not at all

* 6. Should OTT service providers contribute to the upkeep of the network(s) they utilize?

○ Yes ○ No

If Yes, please recommend how

* 7. Should the OTT service providers be required to contribute to the Universal Service Fund (USF), which is used for network roll-out in unserved and underserved areas, noting that once these areas achieve some connectivity, the OTT service operators will have potential customers?

○ Yes ○ No

Please provide brief justification

8. How can governments and regulators support or encourage the growth of local OTTs?

3

* 9. Are there QoS parameters currently in place in your jurisdiction for OTT service providers?

◯ Yes ◯ No

If not, what parameters should be adopted if any?

[ ]

* 10. To what extent does the provision of OTT services affect the QoS of network providers?

◯ Extremely ◯ Very much ◯ Moderately ◯ Slightly ◯ Not at all

* 11. Should Net Neutrality be considered as one of the key issues to take into account when addressing the dynamics of OTTs?

◯ Yes ◯ No

* 12. Do you consider Safety, Data Protection & Privacy to be important issues in the provision of OTT services?

◯ Yes ◯ No

* 13. Are traditional network services and OTT services interdependent, given that consumer demand for OTT services drives demand for data services?

◯ Yes ◯ No

If not, briefly provide a brief comment

[ ]

* 14. Do you agree that the rapid consumer adoption of OTT services is largely due to the innovative nature of OTT services?

◯ Yes ◯ No

* 15. Do you think OTT services are significantly impacting the revenues of traditional networks in your country?

◯ Yes ◯ No

Please provide a brief justification

[ ]

4

* 16. Do you think OTT services will continue to significantly impact voice revenues of traditional networks in the next 3 - 5 years?

○ Yes ○ No

Please provide a brief justification

[ ]

* 17. How will OTT services impact data revenues of traditional networks in the next 3 - 5 years?

○ Positively (increase in revenues) ○ Negatively (decrease in revenues) ○ No impact at all

Please provide a brief comment

[ ]

* 18. What method(s) do you recommend for the collection of data on OTT service subscription & usage?

[ ]

19. How do you recommend addressing competition and market power issues in relation to OTT service providers versus other service providers?

[ ]

* 20. Can increase in OTT services uptake have a socio-economic impact on a country?

○ Yes ○ No

Please provide a brief justification

[ ]

5

21. Do you believe OTTs contribute to the national economy similar to other communications service providers?

○ Yes ○ No

If Not, what method would you like to adopt to ensure OTTs contribute to the national economy?

22. With regards to taxation, do you believe OTTs recognise your jurisdiction?

○ Yes

○ No

If Not, what measures do you recommend to encourage them to recognise jurisdiction?

23. Any other comments:

6

SECTOR 2 QUESTIONNAIRE

COMMONWEALTH TELECOMMUNICATIONS ORGANISATION

Over-The-Top (OTT) Study Survey- Sector 2

1. Welcome to the CTO OTT Survey

This questionnaire should be completed by authorised representatives of Mobile & Fixed Network Operators, Internet Service Providers, Broadcasting & Other Network Operators and Entities.

* 1. Are you an authorised representative of a Mobile & Fixed Network Operator, Internet Service Provider, Broadcasting and Other Network Operators.

◯ Yes ◯ NO

1

COMMONWEALTH TELECOMMUNICATIONS ORGANISATION

Over-The-Top (OTT) Study Survey- Sector 2

2. SECTOR: ISPs, Telecom, Broadcast & Other Network Operators and related Entities

* 1. What are your general views on OTTs?

* 2. Are the current regulatory regimes, including applicable laws and regulations able to address emerging OTT services?

◯ Yes ◯ No

* 3. Do you feel there is a need to develop a regulatory framework for OTT services in your country that could be adapted to changes in the future?

◯ Yes ◯ No

If Yes, what are the key considerations the framework should address

2

* 4. Should such a regulatory framework be applied to both local and international OTT service providers offering communication services (such voice, messaging and video call services through applications) locally?

○ Yes ○ No

Please provide brief justification

[ ]

* 5. To what extent do you believe changes to regulation might stifle OTT innovation?

○ Extremely ○ Very much ○ Moderately ○ Slightly ○ Not at all

* 6. Should OTT service providers bear part of the cost incurred in the provision of OTT services over local telecommunications infrastructure?

○ Yes ○ No

If Yes, please recommend how it can be achieved.

[ ]

* 7. Should the OTT service providers be required to contribute to the Universal Service Fund (USF), which is used for network roll-out in unserved and underserved areas, noting that once these areas achieve some connectivity, the OTT service operators will have potential customers?

○ Yes ○ No

Please provide brief justification

[ ]

* 8. Have you developed any OTT service(s) locally?

○ Yes ○ No

If Yes, has it been successful? Please provide brief comment

[ ]

3

* 9. How can governments and regulators support/encourage the growth of local OTTs?

* 10. Are there QoS parameters currently in place for measuring the level of service offered by OTT service providers?

  ◯ Yes ◯ No

  If No, is there any need for such parameters to be set? Please give a brief justification.

* 11. To what extent does the provision of OTT services affect the QoS of your network?

  ◯ Extremely ◯ Very much ◯ Moderately ◯ Slightly ◯ Not at all

* 12. Should Net Neutrality be considered as one of the key issues to take into account when addressing the dynamics of OTTs?

  ◯ Yes ◯ No

* 13. Will the uptake of OTT services by your customers affect the current levels of investment in your network infrastructure?

  ◯ Yes ◯ No

  If Yes, please provide brief comment

* 14. Do you consider Data Protection & Privacy to be an important issue in the provision of OTT services?

  ◯ Yes ◯ No

4

* 15. Do you consider traditional network services and OTT services to be interdependent, given that consumer demand for OTT services drives demand for data services?

◯ Yes ◯ No

If not, briefly provide a brief comment

* 16. Do you agree that the rapid consumer adoption of OTT services is largely due to the innovative nature of OTT services?

◯ Yes ◯ No

* 17. Do you agree that the provision and uptake of OTT services positively impacts on Internet penetration?

◯ Yes ◯ No

* 18. What method(s) do you recommend for the collection of data on OTT service subscription & usage?

* 19. How do you recommend addressing competition and market power issues in relation to OTT service providers?

* 20. Are traditional network services and OTT services interdependent, given that consumer demand for OTT services drives demand for data services?

◯ Yes ◯ No

If not, briefly provide a brief comment

5

* 21. Do you think OTT services will significantly impact voice revenues of traditional networks in the next 3 - 5 years?

○ Yes ○ No

Please provide a brief justification

[ ]

* 22. How will OTT services impact data revenues of traditional networks in the next 3 - 5 years?

○ Positively (increase in revenues) ○ Negatively (decrease in revenues) ○ No impact at all

Please provide a brief comment

[ ]

23. What is the % contribution of voice & messaging services to your total revenue?

| 0 | Percentage Contribution | 100 | |

* 24. What do you estimate to be the impact of OTT services on your total revenues over the last 3 years?

[ ]

* 25. What do you forecast to be the impact of OTT services (on voice & data) on your total revenues over the last 3 - 5 years?

[ ]

* 26. What impact (if any) does OTT services have on your pricing models & decisions?

[ ]

* 27. What is the operational model you believe is fair to you, OTTs and consumers?

[ ]

6

28. Any other comments:

92

7

SECTOR 3 QUESTIONNAIRE

COMMONWEALTH TELECOMMUNICATIONS ORGANISATION

Over-The-Top (OTT) Study Survey- Sector 3

1. Welcome to the CTO OTT Survey - Sector 3

This questionnaire should be completed by authorised representatives of Over The Top Service Providers, Vendors, Content & Application Provider, and other related Entities.

* 1. Are you an authorised representative of an Over The Top Service Provider, Vendor, Content & Application Provider, and other related Entities.

◯ Yes ◯ NO

1

COMMONWEALTH TELECOMMUNICATIONS ORGANISATION

Over-The-Top (OTT) Study Survey- Sector 3

2. SECTOR: OTT Service Providers, Vendors, Content & Application Providers and other related Entities

* 1. What are the key benefits offered by OTTs to consumers?

* 2. Are the current regulatory regimes, including applicable laws and regulations able to address emerging OTT services?

○ Yes ○ No

* 3. Should there be considerations now for a regulatory framework that could be adapted to changes in the future?

○ Yes ○ No

* 4. Should such a regulatory framework be applied to both local and international OTT service providers offering communication services (such voice, messaging and video call services through applications) locally?

○ Yes ○ No

Please provide brief justification

2

* 5. What impact will regulatory interventions have on the provision, deployment and uptake of OTT services?

* 6. To what extent do you believe changes to regulation might stifle OTT innovation?

○ Extremely ○ Very much ○ Moderately ○ Slightly ○ Not at all

* 7. Should OTT service providers bear part of the cost incurred in the provision of OTT services over local telecommunications infrastructure?

○ Yes ○ No

If Yes, please recommend how it can be achieved.

* 8. Should the OTT service providers be required to contribute to the Universal Service Fund (USF), which is used for network roll-out in unserved and underserved areas, noting that once these areas achieve some connectivity, the OTT service operators will have potential customers?

○ Yes ○ No

Please provide brief justification

* 9. Other than the country where your business is registered, do you currently pay taxes in other jurisdictions abroad as a results of providing OTT services?

○ Yes ○ No

Please provide a brief comment

3

* 10. How will the imposition of either fees, levies, or taxes impact on your provision of OTT services globally?

○ Impact Positively ○ Impact Negatively ○ No impact at all

Please provide a brief comment

[ ]

* 11. Should changes be made to the way network operators and service providers are currently regulated in order for them to deliver better service to consumers?

○ Yes ○ No

If Yes, please provide brief comment

[ ]

* 12. How are customer service issues and quality assurance concerns addressed by the OTT service providers?

[ ]

* 13. To what extent does the provision of OTT services affect the QoS of traditional network providers/owners?

○ Extremely ○ Very much ○ Moderately ○ Slightly ○ Not at all

* 14. Should Net Neutrality be considered as one of the key issues to take into account when addressing the dynamics of OTTs?

○ Yes ○ No

* 15. Do you consider Data Protection & Privacy to be an important issue in the provision of OTT services?

○ Yes ○ No

4

* 16. Do you consider traditional network services and OTT services to be interdependent, given that consumer demand for OTT services drives demand for data services?

○ Yes ○ No

If not, briefly provide a brief comment

[   ]

* 17. Do you agree that the rapid consumer adoption of OTT services is largely due to the innovative nature of OTT services?

○ Yes ○ No

* 18. Do you agree that the provision and uptake of OTT services positively impacts on Internet penetration?

○ Yes ○ No

* 19. Can increase in OTT services uptake have a socio-economic impact on a country?

○ Yes ○ No

Please provide a brief justification

[   ]

* 20. What method(s) do you recommend for the collection of data on OTT service subscription & usage?

[   ]

* 21. How do you recommend addressing competition and market power issues in relation to OTT service providers?

[   ]

5

* 22. Do you think OTT services have an impact on voice & data revenues of traditional networks?

⬭ Yes ⬭ No

Please provide brief justification

23. Any other comments:

6

SECTOR 4 QUESTIONNAIRE

COMMONWEALTH
TELECOMMUNICATIONS
ORGANISATION

Over-The-Top (OTT) Study Survey- Sector 4

1. Welcome to the CTO OTT Survey - Sector 4

This questionnaire should be completed by consumers of over-the-top services, representatives of civil society, consumer advocacy groups and other related entities.

1

COMMONWEALTH TELECOMMUNICATIONS ORGANISATION

C T O

Over-The-Top (OTT) Study Survey- Sector 4

2. SECTOR: Consumers (End-Users), Civil Society & Advocacy Groups

* 1. Do you use any OTT services?

◯ Yes ◯ No

* 2. As an OTT services consumer, how would you classify yourself?

☐ Individual Private End-User   ☐ Commercial End-User

☐ Civil Society or Advocacy Group

☐ If not captured above, please specify

[   ]

* 3. How would you rate the impact caused by OTT services on your day-to-day life?

◯ Positive impact ◯ Negative impact ◯ No impact at all

If Impact is Positive, please briefly provide key benefits

[   ]

* 4. Should OTT service providers offering communication services (such voice, messaging and video call services through applications) resident locally or Internationally be regulated in your Country?

◯ Yes ◯ No

Please provide brief justification

[   ]

2

* 5. Is it too early to establish a regulatory framework for OTT services in your country?

○ Yes ○ No

Please provide brief justification.

* 6. What impact will regulatory interventions have on the provision, deployment and uptake of OTT services?

* 7. Should OTT service providers (based either Internationally or Locally) be made to pay some form of levy, fees or taxes in countries where they provide their services and are not domiciled?

○ Yes ○ No

Please provide brief justification

* 8. Do you agree that the rapid consumer adoption of OTT services is largely due to the innovative nature of OTT services?

○ Yes ○ No

* 9. Do you know the difference between a locally based OTT service provider (registered in your country) and those based in other jurisdiction (registered abroad) that provide OTT services in your country?

○ Yes ○ No

Please provide a brief comment

3

* 10. How often do you use the following OTT services ?

	1 (Least)	2	3	4	5 (Most)	N/A
Voice Services	○	○	○	○	○	○
Messaging Services	○	○	○	○	○	○
Video Conference/ Chat	○	○	○	○	○	○
Video Streaming	○	○	○	○	○	○
Data Backup	○	○	○	○	○	○
Cloud Applications	○	○	○	○	○	○

* 11. Are you aware of any measures taken by OTT service providers to address any Quality of Service issues?

○ Yes ○ No

If Yes, please provide a brief comment

* 12. Do you have any Cybersecurity and data protection & privacy concerns regarding your use of OTT services?

○ Yes ○ No

If Yes, please provide a brief comment

* 13. How would you generally rate the service(s) you've received from different OTT service providers?

	Extremely Satisfied	Very Satisfied	Moderately	Very Unsatisfied	Extremely Unsatisfied
Cost	○	○	○	○	○
Quality of Service	○	○	○	○	○
Customer Care / Service	○	○	○	○	○
Data Protection and Privacy	○	○	○	○	○

4

* 14. Do you consider traditional network services and OTT services to be interdependent, given that consumer demand for OTT services drives demand for data services?

○ Yes ○ No

If not, briefly provide a brief comment

[ ]

* 15. Do you agree that the provision and uptake of OTT services positively impacts on Internet penetration?

○ Yes ○ No

Copyright (C) The Commonwealth Telecommunications Organisation 2016

16. Any other comments:

[ ]

5

APPENDIX 2: DETAILED QUESTIONNAIRE RESPONSE

Questions	Sector 1		Sector 2		Sector 3		Sector 4	
	Yes	No	Yes	No	Yes	No	Yes	No
Are your current regulatory regimes, including applicable laws and regulations able to address emerging OTT services?	29.7%	70.3%	0%	100%	88.9%	11.1%		
Do you feel there is a need to develop a regulatory framework for OTT services in your country that could be adapted to changes in the future?	89.2%	10.8%	88.9%	11.1%	22.2%	77.8%		
Should such a regulatory framework be applied to both local and international OTT service providers offering communication services (such as voice, messaging and video call services through applications) locally?	83.8%	16.20%	77.8%	22.2%	11.1%	88.9%		
Should OTT service providers contribute to the upkeep of the network(s) they utilise?	64.9%	35.1%	100%	0%	11.1%	88.9%		
Should the OTT service providers be required to contribute to the Universal Service Fund (USF), which is used for network roll-out in un-served and underserved areas, noting that once these areas achieve some connectivity the OTT service providers will have potential customers?	51.4%	48.6%	66.7%	33.3%	0%	100%		
Are there QoS parameters currently in place in your jurisdiction for OTT service providers?	2.7%	97.3%	0%	100%				
Should Net Neutrality be considered as one of the key issues to take into account when addressing the dynamics of OTTs?	91.9%	8.1%	88.9%	11.1%	100%	0%		

Do you consider Safety, Data Protection & Privacy to be important issues in the provision of OTT services?	100%	0%	100%	0%	100%	0%		
Are traditional network services and OTT services interdependent, given that consumer demand for OTT services drives demand for data services?	86.5%	13.5%	77.8%	22.2%	100%	0%	87%	13%
Do you agree that the rapid consumer adoption of OTT services is largely due to the innovative nature of OTT services?	91.9%	8.1%	88.9%	11.1%	100%	0%	87%	13%
Do you think OTT services are significantly impacting the revenues of traditional networks in your country?	83.8%	16.2%						
Do you think OTT services will continue to significantly impact voice revenues of traditional networks in the next 3-5 years?	94.6	5.4	100%	0%	100%	0%		
Have you developed any OTT Service(s) locally?			22.2%	77.8%				
Will the uptake of OTT services by your customers affect the current levels of investment in your network infrastructure?			88.9%	11.1%				
Do you agree that the provision and uptake of OTT services positively impacts on Internet penetration?			88.9%	11.1%	100%	0%	95.7%	4.3%
Can increase in OTT services uptake have a socio-economic impact on a country?	97.3%	2.7%			100%	0%		
Do you believe OTTs contribute to the national economy similar to other communications service providers?	61.1%	38.9%						
With regards to taxation, do you believe OTTs recognise your jurisdiction?	87.9%	12.1%						
Other than the country where your business is registered, do you currently pay taxes in other jurisdictions abroad as a result of providing OTT services?					88.9%	11.1%		

To what extent do you believe changes to regulation might stifle OTT innovation?					
	Extremely	Very much	Moderately	Slightly	Not at all
Sector 1	8.1%	10.8%	48.6%	18.9%	13.5%
Sector 2	11.1%	22.2%	33.3%	11.1%	22.2%
Sector 3	88.9%	11.1%	0%	0%	0%

To what extent does the provision of OTT services affect QoS of network providers?					
	Extremely	Very much	Moderately	Slightly	Not at all
Sector 1	5.4%	32.4%	27%	8.1%	27.0%
Sector 2	11.1%	66.7%	0%	22.2%	0%
Sector 3	0%	0%	0%	44.4%	55.6%

How will OTT services impact data revenues of traditional networks in the next 3-5 years?			
	Positively (Increase in revenues)	Negatively (decrease in revenues)	No Impact at all
Sector 1	83.8%	10.8%	5.4%
Sector 2	66.7%	33.7%	0%
How will the impositions of either fees, levies, or taxes impact on your provision of OTT services globally?			

	Positively	Negatively	No Impact at all
Sector 3	0%	100%	0%

Responses by Sector 4

Questions	YES	NO
Should OTT service providers offering communications services (such as voice, messaging and video call services through applications) resident locally or internationally be registered in your country?	65.2%	34.8%
Is it to early to establish a regulatory framework for OTT services in your country?	21.7%	78.3%
Should OTT service providers (based either internationally or locally) be made to pay some form of levy, fees, or taxes in countries where they provide their services and are not domiciled?	69.6%	30.4%
Do you agree that the rapid adoption of OTT services is largely due to the innovative nature of OTT services	87.0%	13.0%
Are you aware of any measures taken by OTT service providers to address any Quality of Service issues?	8.7%	91.3%
Do you have any Cybersecurity and data protection concerns regarding your use of OTT services?	73.9%	26.1%
Do you consider traditional network services and OTT services to be interdependent, given that consumer demand for OTT services drives demand for data services?	87.0%	13.0%
Do you agree that the provision of and uptake of OTT services positively impacts on internet penetration?	95.7%	4.3%
How would you rate the impact caused by OTT services on your day-to-day life?	95.7% positive	4.3% negative