

Study period
2018-2021

Question 3/1

Emerging technologies, including cloud computing, m-services, and OTTs: Challenges and opportunities, economic and policy impact for developing countries

Question 4/1

Economic policies and methods of determining the costs of services related to national telecommunication/ICT networks

Annual deliverable
2019-2020

Economic impact of OTTs on national telecommunication/ICT markets

Executive summary

The big move to data

Changes in network technology and the transition from voice and SMS to a more data-centric business model have paved the way for OTT success, transforming the way people access resources for health, transportation, education, agriculture, government and financial services. Increasingly, mobile network operators (MNOs) are embracing data-centric business models as data drives the ongoing digital revolution in virtually every industry vertical.

How are OTTs impacting MNO demand, revenue and cost?

Demand: The exponential increase in data traffic and use of OTTs results both in new subscribers for broadband services and existing subscribers upgrading their subscriptions for greater speed and bandwidth. In terms of voice and SMS services, the picture is less clear with some countries in Africa showing stable use or even an increase in voice traffic. These trends reflect the reality that network traffic, and demand for legacy services, depend on a multitude of variables, not simply on the prevalence of OTTs.

Revenue: Data services are increasingly important in MNO revenue streams but can business opportunity and risk mitigation boost profitability? How far do OTTs contribute to MNO revenue indirectly by boosting demand? Are changes in business model the way forward – for example OTTs and network operators co-investing?

Cost: Data traffic accounts for a significant share of network costs. In Europe, for example, MNOs are expected to spend hundreds of millions of Euros per year to handle Internet traffic – in addition to incurring costs required to provide traditional services.

How can OTT investment be boosted?

Complementary relationships exist between OTT services and network services. Hyperscale OTT service providers are increasingly investing in infrastructure and connectivity projects to support the availability of high-speed broadband, and many collaborative initiatives exist between operators, development agencies and Internet companies aimed at co-investment in network infrastructure. Despite these gains in connectivity, there is a continuing need for increased and improved broadband network infrastructure. How can OTT investment into extending network connectivity be boosted?

The huge promise of partnership

OTTs and network operators need each other to thrive in today's communications marketplace. OTTs provide the content that drives demand for telecommunication operator services. It is not a "zero-sum game" but rather a symbiotic relationship. OTT applications increase revenues for operators' core access services by driving demand for data services. So direct commercial partnerships between operators and OTTs have vast potential: research suggests such partnering could increase telco free cash-flow by a massive 50 per cent.

OTT platforms: what impact?

OTTs have helped usher in economic and social transformation beyond traditional communications services in the ever-growing digital economy. At the same time, this success has brought with it new challenges – such as increased competition between informal vendors on OTT and physical retailers, or the need to modernize tax codes appropriate to the new digital economy. A number of barriers to connectivity exist in some countries, such as the high cost of Internet data; introduction of additional taxes to raise revenue, including content licence fees and excise taxes; fiscal instruments in some countries, including new forms of taxation on the use of OTTs – measures which may have a detrimental impact on women and their ability to access the digital economy.

Digital transformation of network communications: challenges for regulators

OTTs are a vast and diverse collection of businesses. Regulators need to see the benefits that OTTs deliver while adapting regimes to address new challenges. And while OTT innovation can be rapid, regulation sometimes struggles not only to keep pace but to address large-scale OTT operations outside of the regulator's national mandate, thus a need for improved international cooperation. In addition, a one-size-fits-all approach to regulating OTTs will not work. When new service delivery models disrupt the old, regulation should be informed by evidence rather than fear of the unknown. Is light-touch, flexible regulation the answer?

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1. Introduction

This paper reflects on the growing importance of "over-the-top" applications (OTTs) and their increasing ubiquity and influence in a digital world. It is the product of a workshop that brought together experts and stakeholder groups from regions around the world to consider the "Economic Impact of OTTs on National Telecommunication/ICT Markets".

It is exploratory in nature. With the transition from a voice and SMS-centric business model to a mobile Internet access business model, the paper takes a closer look at mobile network operator (MNO) and application service provider (ASP) relationships, finding that OTTs and network operators need each other to thrive in the contemporary communications marketplace.

The paper also raises a number of important questions: How are OTTs impacting demand, revenue and cost of mobile network operators? How can OTT investment in infrastructure be boosted? What is the social impact of OTT platforms and how can it be measured? How can partnerships between MNOs and OTTs be built for maximum potential? How can ICT regulation transition from past models to keep pace with the new and rapidly changing landscape of OTTs?

Such questions raise complex issues that stakeholders need to navigate together in this decade. This paper then is a valuable first step on the pathway to balanced digital markets that remain innovative and underwrite meaningful connectivity.

Finally, the paper proffers a number of conclusions, extracted from workshop discussions, for governments and regulators to consider. It is hoped that this paper will help stimulate discussion and dialogue as this important debate moves forward.¹

1.1. Context

The impact of OTT applications is currently one of the most discussed and debated topics in the telecommunication/ICT industry. The demand for OTTs has reshaped several aspects of the telecommunication/ICT market and changed the way citizens and businesses consume digital technologies and services across the globe. This impact spans issues of business models, infrastructure development, competitiveness and telecommunication regulations, as well as the changing dynamics of consumer behaviour, social engagement and the resulting social and economic changes.

This paper stems from a workshop held on 1 October 2019 on the topic of "**Economic Impact of OTTs on National Telecommunication/ICT Markets**"², which brought together renowned experts from across the world and across stakeholder groups. The workshop was a joint effort of the management teams of ITU-D Study Group³ 1, working on two topics: Question 3/1, which studies "Emerging technologies, including cloud computing, m-services, and OTTs"; and Question 4/1, which studies "Economic policies and methods of determining the costs of services related to national telecommunication/ICT networks".

¹ Disclaimer based on the discussion and decision of TDAG 2019: This report, like another annual deliverable, will be published on the ITU-D study group website under the auspices of the Chairmen of Study Groups 1 and 2 respectively, under a new section to be added titled "Ongoing Work." This annual deliverable is released to provide ITU membership with timely information on important issues to study group participants.

² Material from the workshop on the Economic Impact of OTTs on National Telecommunication/ICT Markets, 1 October 2019, is available at: https://www.itu.int/en/ITU-D/Study-Groups/2018-2021/Pages/meetings/joint-session-Q3-1-Q4-1_oct19.aspx.

³ <https://www.itu.int/itu-d/study-groups>.

This paper is the product of collaboration between a wide range of stakeholders – academia, governments, private sector, NGOs, independent experts, OTTs, mobile network operators (MNOs), regulators and regional and international organizations – and it reflects a balanced view of the differing perspectives on a range of subjects. As such, the paper seeks to provide insights on the impact of OTTs on ICT markets. Finally, it offers a number of conclusions, extracted from workshop discussions, for governments and regulators to consider. It is also hoped that the paper will foster further dialogue and engagement between OTTs and MNOs.

2. ITU studies on OTT

2.1. ITU-D

A discussion in ITU-D on OTT was started at the World Telecommunication Development Conference in 2014 (WTDC-14) which added the topic for the study period 2014-2017 to the scope of ITU-D Study Group 1 Question 1/1 (Final Report on Question 1/1)⁴. This report includes views on the national experiences of Brazil, Central African Republic and People’s Republic of China with respect to OTTs. WTDC-17 decided to move this topic to Question 3/1.

As part of the work of the secretariat of the ITU Telecommunication Development Bureau (BDT), a Digital Economy portal⁵ was developed to integrate ITU work on policy and regulatory research, data collection on the evolution of the digital ecosystem. Recent research and analysis have also been integrated into the [ITU Global ICT Regulatory Outlook series](#) since 2017.

2.2. ITU-T

Initial ITU studies on OTT were started at ITU-T Study Group 3, “Tariff and accounting principles and international telecommunication/ICT economic and policy issues” (ITU-T SG 3) in the period 2013-2016. For this purpose, the group established Question 9/3: “Economic and regulatory impact of the Internet, convergence (services or infrastructure) and new services, such as OTT, on international telecommunication services and networks”. The first deliverable from the rapporteur group of this Question was a Technical Report⁶ approved in 2017. The goal of this report was to provide details about national experiences relating to OTTs. Subsequently, the group developed ITU-T Recommendation D.262⁷, *Collaborative Framework for OTTs*, which was approved in 2019. Currently, ITU-T SG 3 is studying additional work items related to OTTs, although it has not adopted any other final outputs on the OTT topic.

3. Definitions

There is no universally accepted definition of the term “OTT”. ITU-T Recommendation D.262 includes a working definition for OTTs: “*An application accessed and delivered over the public Internet that may be a direct technical/ functional substitute for traditional international telecommunications services.*” It includes a footnote stating that the definition of OTT is a matter of national sovereignty and may vary among Member States – each country is then

⁴ Final Report on Question 1/1: “Policy, regulatory and technical aspects of the migration from existing networks to broadband networks in developing countries including next-generation networks, m-services, OTT services and the implementation of IPv6”, available at: <https://www.itu.int/pub/D-STG-SG01.01.1-2017>.

⁵ https://www.itu.int/en/ITU-D/Regulatory-Market/Pages/Collaborative_Regulation/App_Economy.aspx.

⁶ Technical Report on Study on Economic Impact of OTTs: <http://handle.itu.int/11.1002/pub/8106272c-en>.

⁷ ITU-T Recommendation D.262 “Collaborative framework for OTTs”: <https://www.itu.int/rec/T-REC-D.262-201905-I>.

free to define the boundaries and scope of OTTs and formulate its own public policies and regulations.

The United Kingdom Office of Communications (Ofcom) defines OTTs as *“a range of services, including messaging services, voice services (VoIP), and TV content services.”*

The Body of European Regulators for Electronic Communications (BEREC) defines OTTs as *“content, a service, or an application that is provided to the end-user over the public Internet”* with three different distinctions:

- *“OTT-0 as electronic communication services (ECS) that are able to terminate on fixed-line or mobile network such as Skype-out calls”*
- *“OTT-1s are not electronic communication services (ECS) but potentially competing with them”*
- *“OTT-2 encapsulates all other OTT services that are not captured by OTT-0 and OTT-1 (e-commerce, video, music streaming, etc.)”.*

Many experts are of the opinion that the term itself “Over the Top”, is not an accurate depiction of the way the Internet is delivered and accessed. Most experts agree that the definition needs to evolve to better reflect the development of the digital world (as discussed below) and an era that sees digital transformation of every sector, domain or discipline. This massive digital transformation will only be possible thanks to the Internet and to various online services delivered and are yet to be developed and delivered over time to consumers and businesses.

Experts use terms such as “digital platform”, “application service provider” (ASP), “online service provider” (OSP) or “content and application providers” (CAPs) to reflect this evolution. While we acknowledge the shortcomings of certain definitions and the popular use of different terms, for simplicity and brevity the following paper uses the term “OTT” to reflect all of these underlying concepts and terms.

4. Move to digital world

For decades, telecommunication carriers operated with a business model in which the main product was voice, the metric of measurement was the minute, and incremental costs (related primarily to time and distance) resulted in incremental charges to the consumer. This has changed. With today’s IP networks, the product is now connectivity, and the metric is bandwidth. The networks are insensitive to time, location and distance, and consumers are either connected or they are not. Under such IP networks, the value chain has evolved.

Such changes in network technology have supported the creation of an ecosystem of ‘online applications’ (OTTs) that introduce completely new use cases including the Internet of Things (IoT), connected cars, smart education, smart health, smart agriculture.

Consumer preferences have switched from traditional legacy services to OTTs, especially in some use cases such as messaging. Telecommunication business models have begun to evolve accordingly. With OTTs used increasingly for voice and message communication, the general trend is a transition from voice and SMS towards data as a primary source of mobile network operators (MNO) revenues. Many operators have decreased their reliance upon voice and SMS charges and have turned towards data-centric business models. Operators who have adopted data-centric tariff structures enjoy benefits such as reduced churn⁸, increased net promoter scores, more stable in-bundle revenue streams, and the

⁸ <https://www.mobileworldlive.com/featured-content/home-banner/rebalancing-value-voice-sms-data/>.

ability to link returns more directly to network investment.

The move from voice to data has smoothed the path for OTTs, enabling easy access to new services – health, transportation, education, agriculture, government and online finance. Result: MNOs are moving to data-centric business models.

The transition from a voice and SMS-centric business model to a mobile Internet access business model is seen by many observers as inevitable and could lead to MNOs eventually becoming essentially “connectivity” providers, distinguishing their products by speed and quality of service (QoS), and competing with other forms of access, such as public Wi-Fi and connectivity in places of work, study and home. Some industry observers predict that eventually MNOs will no longer charge for voice and SMS, and will change their billing model towards one based on bandwidth and/or data consumption. This transition will coincide with the ongoing digital revolution in virtually every industry vertical. Consumers and citizens will access resources for health, transportation, education, agriculture, government and finance online, aided by improved digital networks and data-centric business models. Fittingly, the last decade of mobile network investment has gone into 2.5G, 3G, 4G, 5G technologies, which are all about data.

Other industry observers have suggested that in addition to providing access to the Internet, network operators will seek to diversify their businesses. As illustrated in Figure 1 below, the Internet value chain offers significant commercial opportunities for market participants.

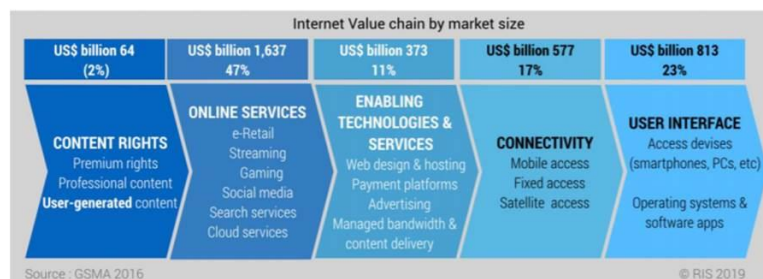


Figure 1: The Internet value chain and market size shares in 2015 (Source: GSMA ⁹)

5. The impact of OTTs on traditional telecommunications

There is ongoing debate on the impact of OTT services in traditional telecommunication/ICT operators. This impact is expected to be more acute for MNOs which are more sensitive to traffic variations. Mobile network operators face their operations being impacted under three main dimensions:

- Demand
- Revenues
- Costs

5.1. Demand

⁹ GSMA “The Internet Value Chain: A study on the economics of the Internet”, May 2016, https://www.gsma.com/publicpolicy/wp-content/uploads/2016/09/GSMA2016_Report_TheInternetValueChain.pdf.

ICTs mobile network operators have highlighted that consumer demand for OTTs has led to a booming increase in data traffic while traditional telecommunication services (non-IP voice calls and SMS) are becoming less relevant. This demand for OTTs results in both new subscribers for broadband services and existing subscribers upgrading their subscriptions for greater speed and bandwidth.

BEREC states that “ultimately, it is the success of the [content and application providers] [...] which lies at the heart of the recent increases in demand for broadband access (i.e. for the ISPs’ very own access service)”¹⁰. This supports the view that without new and innovative online content and applications, the value of Internet access to users would be severely reduced. In fact, according to a study by Google, 69% of YouTube users say they would upgrade their broadband connection if they thought that it would work faster¹¹.

Data traffic

Global data traffic is growing exponentially, and some market analysts estimate that this is due to the use of OTTs. Ericsson expects that global mobile data traffic will be multiplied by five between 2018 and 2024 (from 28 to 131 Exabytes per month)¹². Growth trends are confirmed by the historical information of data consumption in the case of Airtel Africa¹³, Sonatel Senegal¹⁴ and the overall Zimbabwean market¹⁵. Additionally, there are studies indicating that in many prominent markets, most of the data traffic handled by MNOs is associated with only a few application categories (82 per cent of mobile data traffic is expected to be associated with video and social network applications¹⁶) and a few applications (the three main video applications in terms of traffic account for 42 per cent of mobile traffic while the three main social networking applications account for 22 per cent—see Figure 2).

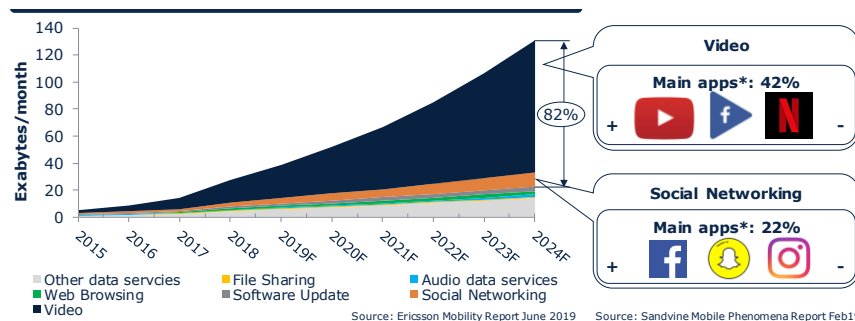


Figure 2: Global mobile data traffic and usage per application

Source: Axon Partners Group from Ericsson and Sandvine’s reports

Note (*): Main apps in terms of traffic. Percentage of global download traffic of the three main apps (in terms of traffic) per category as per Sandvine’s reports¹⁷

¹⁰ Keynote address by Dr R. Pepper, Facebook at ITU workshop on the Economic impact of OTTs on national telecommunication/ICT markets, Geneva, 1 October 2019, available at: https://www.itu.int/dms_pub/itu-d/oth/07/1a/D071A0000040002PDFE.pdf.

¹¹ ICM Research “Broadband Consumption Study, France and Germany”, 2013.

¹² “Ericsson Mobility Report June 2019”: <https://www.ericsson.com/49d1d9/assets/local/mobility-report/documents/2019/ericsson-mobility-report-june-2019.pdf>.

¹³ Submission and presentation by Research ICT Solutions at ITU workshop on the Economic impact of OTTs on national telecommunication/ICT markets, Geneva, 1 October 2019, available at: https://www.itu.int/dms_pub/itu-d/oth/07/1a/D071A0000090001PDFE.pdf and https://www.itu.int/dms_pub/itu-d/oth/07/1a/D071A0000090002PDFE.pdf.

¹⁴ Presentation by Sonatel, Senegal at ITU workshop on the Economic impact of OTTs on national telecommunication/ICT markets, Geneva, 1 October 2019, available at: <https://www.itu.int/oth/D071A00000A/>.

¹⁵ Presentation by POTRAZ, Zimbabwe at ITU workshop on the Economic impact of OTTs on national telecommunication/ICT markets, Geneva, 1 October 2019, available at: <https://www.itu.int/oth/D071A00000F/>.

¹⁶ According to Sandvine’s “The Mobile Internet Phenomena Report February 2019”, the three main video applications in terms of traffic are YouTube, Facebook Video and Netflix. The three main social networking applications are Facebook, Snapchat and Instagram: <https://www.sandvine.com/hubfs/downloads/phenomena/2019-mobile-phenomena-report.pdf>.

¹⁷ Please note that Sandvine information includes only data for the countries in which they work which cover 2.5 billion subscribers (for instance it does not include China and India customers and thus their consumption).

Voice calls and SMSs

In terms of traditional services, there is not such a clear trend. Several MNOs believe that OTTs are associated with a decrease of international calls traffic (such as in the case of Zimbabwe and Sonatel Senegal¹⁸). On the other hand, this effect is not necessarily transposed to the overall voice traffic. In particular, the following behaviours have been reported:

- In the case of Zimbabwe¹⁹, overall voice traffic nearly halved between 2014 and 2016, showing some recovery in 2018.
- Airtel Africa shows a steady increase in voice traffic from 2012 to 2018²⁰.
- ECTEL countries show a relevant decrease of voice traffic from 2014 to 2017, and a slight increase in 2018²¹.
- These trends indicate that network traffic, and demand for legacy services, depend on a multitude of variables, not exclusively on the prevalence of OTTs.

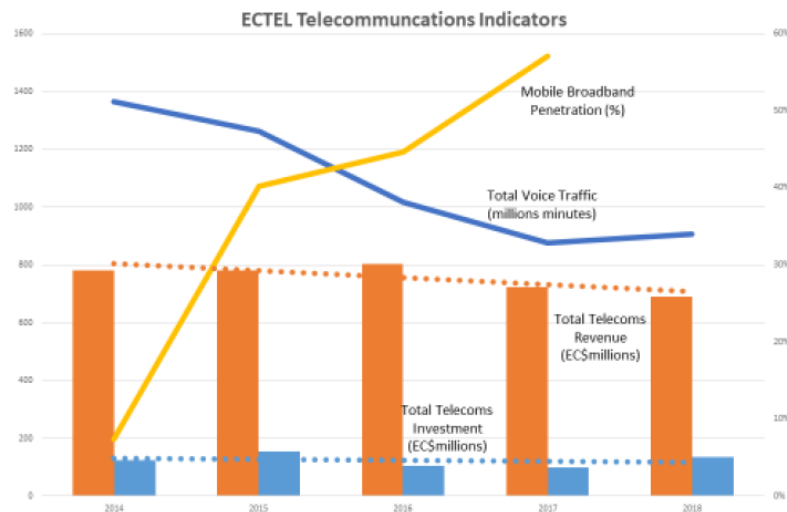


Figure 3: Evolution of voice traffic in comparison with revenues, investments and mobile broadband penetration

Source: Digicel from ECTEL indicators

5.2. Revenues

In terms of revenues, there is agreement that data services are typically increasing their share in MNO revenue streams. This trend was confirmed in the case of the Zimbabwean market as well as MTN Nigeria, Airtel Nigeria and MTN Ghana²².

¹⁸ Presentation by Sonatel, Senegal at ITU workshop on the Economic impact of OTTs on national telecommunication/ICT markets, Geneva, 1 October 2019, available at: <https://www.itu.int/oth/D071A00000A/>.

¹⁹ Presentation by POTRAZ, Zimbabwe at ITU workshop on the Economic impact of OTTs on national telecommunication/ICT markets, Geneva, 1 October 2019, available at: <https://www.itu.int/oth/D071A00000F/>.

²⁰ Submission and presentation by Research ICT Solutions at ITU workshop on the Economic impact of OTTs, Geneva, 1 October 2019, https://www.itu.int/dms_pub/itu-d/oth/07/1a/D071A0000090001PDFE.pdf and https://www.itu.int/dms_pub/itu-d/oth/07/1a/D071A0000090002PDFE.pdf.

²¹ Presentation by Digicel at ITU workshop on the Economic impact of OTTs on national telecommunication/ICT markets, Geneva, 1 October 2019, available at: <https://www.itu.int/oth/D071A000003/>.

²² Submission and presentation by Research ICT Solutions at ITU workshop on the Economic impact of OTTs, Geneva, 1 October 2019, https://www.itu.int/dms_pub/itu-d/oth/07/1a/D071A0000090001PDFE.pdf and https://www.itu.int/dms_pub/itu-d/oth/07/1a/D071A0000090002PDFE.pdf.

In absolute terms, some markets are reporting revenue decay (such as in the case of ECTEL countries, with telecommunication services revenues falling from 2014 to 2018²³, or in the figure reported by McKinsey pointing to European operators losing 25 per cent of revenues in the period).

On the other hand, some operators are reporting revenue increases (such as MTN in 13 out of 15 African operations).

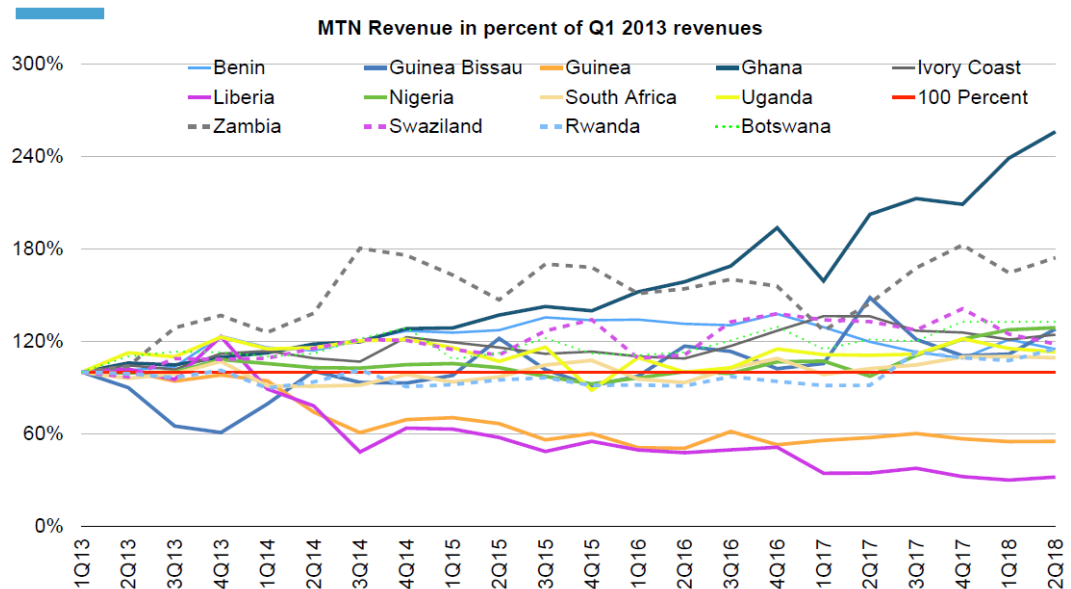


Figure 4: MTN’s revenues evolution by country

Source: Research ICT Solutions

Therefore, it is expected that operators’ revenues and profitability associated with Internet traffic are to some extent subject to the operator’s ability to seize revenue opportunities and mitigate risks. Some workshop participants indicated that OTTs do contribute to MNOs’ revenues and investment indirectly by boosting demand. However, it may be the case that increasing costs associated with Internet traffic can be recovered by subscribers’ contributions, requiring other revenue streams and further evolution of operator business models (such as co-investment programmes between OTTs and network operators).

5.3. Costs

There is little public information available on the impact of OTT Internet traffic on mobile network operators’ costs. It is safe to affirm that OTT data traffic accounts for a share of the network costs, although the actual level and relevance for operators’ financials will significantly depend on the specificities of each operator (such as coverage levels, country’s geographic and topographic characteristics, demand density, etc.).

²³ Presentation by Digicel at ITU workshop on the Economic impact of OTTs on national telecommunication/ICT markets, Geneva, 1 October 2019, available at: <https://www.itu.int/oth/D071A000003/>.

A recent assessment from Axon Partners Group indicates that the cost for a hypothetical generic operator in Europe can amount to tens of Euros per year and per subscriber²⁴, on top of costs associated with the provision of traditional services. In absolute terms, this means that MNOs are expected to spend hundreds of millions of Euros per year to handle Internet traffic in addition to the costs required to provide traditional services, which is generally in line with historical trends for capital expenditures.

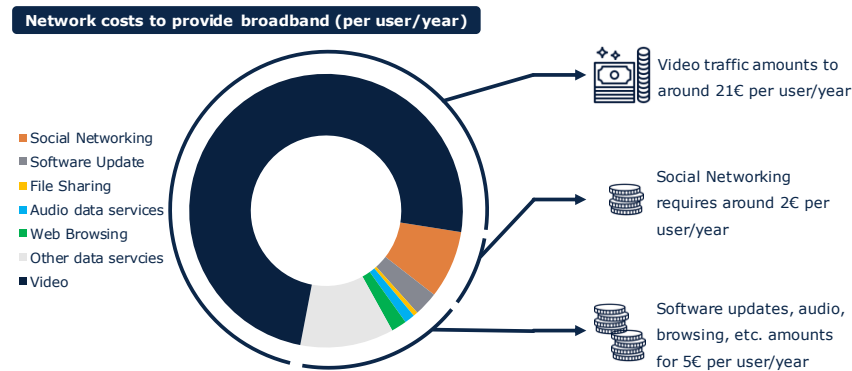


Figure 5: Estimation of costs associated to mobile broadband traffic

Source: Axon Partners Group based on European Commission's public model and Ericsson's report

Moreover, as indicated above, data services are growing their share in operators' revenue streams and, therefore, they should expect to recover a bigger share of fixed and common costs than were recovered by traditional services in the past.

How are OTTs impacting MNO demand, revenue and cost?

Demand: While OTT use is driving increased broadband subscription, some African countries report voice traffic as stable or increasing.

Conclusion: increased network traffic arises from several drivers, not exclusively from OTTs.

Revenues: Yes, data services are increasingly important in MNO revenue streams but can business opportunity and risk mitigation boost profitability? How far do OTTs contribute to MNO revenue indirectly by boosting demand? Are changes in business models the way forward – for example OTTs and network operators co-investing?

Costs: Data traffic accounts for significant network cost. For example in Europe, MNOs spend hundreds of millions of Euros annually on top of costs of traditional services.

²⁴ Estimation by Axon Partners Group (see <https://www.itu.int/oth/D071A000001/>) based on the model developed for the European Commission and published on its webpage: <https://ec.europa.eu/digital-single-market/en/news/finalisation-mobile-cost-model-roaming-and-delegated-act-single-eu-wide-mobile-voice-call>.

6. OTT infrastructure investment

It has been recognized that a complementary relationship exists between OTT services and network services. While telecommunication service providers highlight the need to increase investments in infrastructure, some or a large portion of this need is generated by the data demand spurred by consumer use of OTT applications and services.

Traditional telecommunication network providers have expressed concerns about revenue streams shifting away from voice traffic subscriptions and towards mobile broadband subscriptions and the investments that they have made in the ICT sector. As noted, the roll out of telecommunication infrastructure has generally resided with telecommunication providers, resulting in significant network investments by such providers. However, the nature of infrastructure demand and deployment is shifting.

While most sub-scale OTTs rely on MNO infrastructure for last-mile delivery to customers, hyperscale OTT service providers such as Facebook and Google are increasingly investing in infrastructure and connectivity projects around the world. During the workshop, many operators, such as Digicel and the SAMENA Telecommunications Council, acknowledged the ASP infrastructure investments while calling for consideration of additional partnership and financing methods to spur OTT investment into extending network connectivity.

Given the high data use of their customers, OTT providers have a growing vested interest in supporting the availability of high-speed broadband for users around the world. As such, they are increasingly investing in network infrastructure. According to Analysys Mason, from 2014-2017, OTTs invested over USD 23 billion in Internet infrastructure for transit and delivery, including terrestrial fibre networks, international submarine cables, and delivery networks. Analysys Mason indicates that the average annual OTT investment has increased from USD 33.2 billion per year (2011-2013) to USD 75.5 billion throughout 2014-2017. Investment is increasing all over the world, although at different rates. As illustrated below, from 2014-2017 average annual total investment in North America increased by 190 per cent whereas in the Middle East and Africa, it increased by 150 per cent.

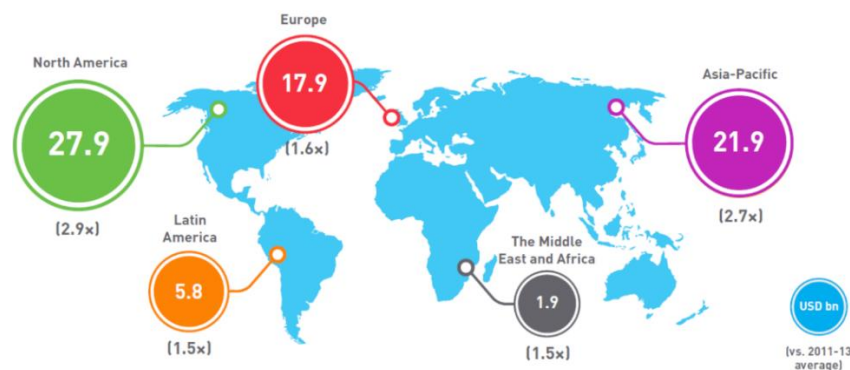


Figure 6: Average annual total investment by region (USD billion, 2014-2017)

Source: Analysys Mason

Additionally, numerous collaborative initiatives exist between operators and Internet companies aimed at co-investment in network infrastructure. For example, Telxius deployed a submarine cable between the US and the EU ("Marea") in collaboration with Microsoft, Facebook and, later, Amazon. Telefónica Perú launched the initiative *Internet para Todos* (Internet for Everyone) in collaboration with Facebook, Corporación Andina de Fomento (CAF) and International Development Bank (IDB) to bring Internet connectivity to several rural areas. Despite significant gains in connectivity, there is a continuing need for increased

and improved broadband network infrastructure. Telecommunication service providers are challenged in increasing their investments, given their shifting revenue streams impacted by lower voice traffic revenue and coming instead primarily from data services demand. OTTs feel direct pressure to increase network infrastructure too, because the more affordable and better broadband access is, the easier it is for people to use their services.

*As mobile broadband subscriptions increase, telecommunication providers face the need for increased infrastructure investment.
So – **how can OTT investment be boosted?***

7. MNO and OTT relationships

The effect of OTTs on network operator profits is a matter of some debate. Operator revenues depend on a wide variety of factors including economic factors and regulatory environment, but critically also on an operator's ability to seize revenue opportunities and mitigate risk. Operators may benefit from increased use of OTTs and roll out faster broadband networks to grow data revenues or, conversely, maintain the analogue voice minute and SMS business model for as long as they can. While this is ultimately a business decision, trends suggest that the former course of action is best suited for long-term viability.

Simply put, OTTs and network operators need each other to thrive in the contemporary communications marketplace. OTTs provide the content that drives demand for telecommunication operator services. Telecommunication operators provide the connectivity and coverage that enable access to OTTs. It is not a "zero sum game" but rather a symbiotic relationship: without each other, users would be left looking at blank screens.

There is a virtuous circle of content and access – more content brings more people online, which drives revenue for access providers, which further increases available and relevant content. OTT applications increase revenues for operators' core access services by driving demand for data services. Users also see value in faster connectivity. For example, 69 per cent of users would upgrade their service if they thought it would make YouTube work better²⁵. Research in African markets²⁶ suggests that a strategy of lower unit costs – providing prepaid products that resemble flat rate services – is the best way to maintain operator revenues.

As mentioned above, some operators have said that consumer demand for OTTs is responsible for decreasing volumes of international voice calling and a subsequent thinning of their high operating margins.

Much contemporary research does not support claims that operators are either losing voice traffic money because of OTTs. For example, voice traffic has grown every year on Airtel's African network since 2012. In many markets the lack of mobile broadband coverage and low smartphone penetration are the primary reasons why many MNOs in Africa still see increasing voice and SMS traffic²⁷.

²⁵ ICM Research, "Broadband Consumption Study, France and Germany", 2013.

²⁶ Christoph Stork, Steve Esselaar, Chenai Chair and Safia Kahn - "OTTs - Threat or opportunity for African Telcos?", March 2016.

²⁷ Presentation by Research ICT Solutions at ITU workshop on the Economic impact of OTTs on national telecommunication/ICT markets, Geneva, 1 October 2019, available at: https://www.itu.int/dms_pub/itu-d/oth/07/1a/D071A0000090001PDFE.pdf and https://www.itu.int/dms_pub/itu-d/oth/07/1a/D071A0000090002PDFE.pdf.

As a further example, since 2013, revenues have increased in 11 of the 13 African markets in which MTN operates. The two exceptions to this general picture, MTN Liberia and MTN Guinea, can be explained by the impact of external macroeconomic shocks, not to OTT popularity. MTN's revenue developments demonstrate two important points: one, the general revenue trends are positive despite growing numbers of OTT users and OTT traffic; and two, revenues and profitability are mainly the results of an operator's ability to seize revenue opportunities and mitigate risk.

The French telecommunication consultancy IDATE conducted research on the revenue relationships between OTTs and telecommunication operators for Europe²⁸ and Africa²⁹.

They found:

- Decreases in SMS revenues have been balanced by overall increases in revenue from data tariffs – driven by consumer demand for services such as VoIP and instant messaging.
- The biggest challenges for operators have come from regulation and internal competition in the telecommunication industry.
- The fastest shifts from SMS to alternate messaging platforms occurred in countries with the highest rates for SMS. Where SMS unit costs were lower, SMS volumes remain high.

While the indirect effect of OTTs on operators' revenues is a matter of debate, it is widely accepted that direct commercial partnerships between operators and providers of OTTs have vast potential for both sectors.

Such partnerships may include:

- Value-added services bundling – including OTT music or video streaming services in operator packages – can generate new revenues, as well as increase data usage.
- Rich communications services (RCS) – the next generation of SMS, enabling B2B2C revenues from businesses interacting with consumers through carrier channels.
- Carrier billing – enabling operators to use their strengths in customer and billing relationships to provide billing capabilities for CAPs app stores and content.

Analysys Mason estimates that if OTTs and telecommunication operators partnered more closely together, it could increase telco operational free cash flow by almost 50 per cent – or more than EUR 15 billion – in Europe, the Middle East and Africa³⁰. The World Bank's Digital Development Partnership has encouraged regulators to “favour operators' initiatives to bundle or develop partnerships with OTT service operators. This could be done with a changed regulatory framework temporarily applied to new initiatives and development”³¹. Digital service taxes (DST) have been proposed in a number of jurisdictions and some MNOs, like Digicel, support the idea that earmarking a percentage of any new DST for an infrastructure fund could be considered. Individual countries might also come up with their own models to balance ICT infrastructure investment from various sources; one such example is Vanuatu's Universal Service Fund “Pay or Play” model under which the regulator can agree roll-out commitments and forego levy payments.³²

²⁸ IDATE, “The impact of VoIP and instant messaging on traditional communication services in Europe”, September 2015.

²⁹ IDATE, “Impact of online communication services on the telecommunications market in Africa”, July 2017.

³⁰ Analysys Mason, “Digital Transformation through Partnerships”, April 2017.

³¹ Digital Development Partnership, *ECOWAS ICT African Regulatory Watch Initiative on Licensing Regimes, OTTs, and International Gateway Liberalization*. March 2019.

³² Presentation by Digicel at ITU workshop on the Economic impact of OTTs on national telecommunication/ICT markets, Geneva, 1 October 2019, available at: <https://www.itu.int/oth/D071A000003/>.

The huge promise of partnership

OTTs and network operators need each other: content drives up demand and revenue. So direct commercial partnerships between operators and OTTs have vast potential: research suggests such partnering could increase telco free cash-flow by a massive 50 per cent.

8. Measuring social impact of OTT platforms

OTTs offer essential economic and social features beyond traditional communications services, helping an entire ecosystem to take root and expand in the new digital economy. OTT opens up an alternative for reducing unemployment. For example, Côte d'Ivoire observes an increase in sales of products from Togo, Morocco, Turkey, – United Arab Emirates and China using OTT, thus creating a new trade axis. Barriers to social and business development raised by expensive legacy communications prices have been broken by using data.

Looking at how OTTs are used by populations, communities and businesses, there is clear evidence that they have social and economic impact on those who use them. OTTs have become marketplaces for the “gig economy”, helping young entrepreneurs leverage the power of the platform to create new P2P (peer-to-peer) retail businesses, reducing time-to-market or the need for a physical store. OTTs are used widely for socially relevant activities such as petitions, status and ratings. Craftsmen or merchants (sometimes with low literacy rates) can use OTTs to showcase their skills, and to advertise goods and services.

At the same time, this success creates new challenges – such as increased competition between informal vendors on OTT and physical retailers, or modernizing tax codes to account for the new digital economy.

It is difficult to measure this impact and the findings of the impact assessment would depend on the set of criteria chosen. Some analysts are calling for a set of universal key performance indicators (KPIs) that could measure the socio-economic impact of OTTs.

While the high cost of Internet data remains a major part of the connectivity challenge, there is a trend in countries in East and Southern Africa to introduce additional taxes to raise revenue, including content licence fees and excise taxes. Such policies make data yet more expensive, putting Internet access further out of reach for many³³.

³³ Sarpong, 2018: http://webfoundation.org/docs/2018/08/Advancing-Womens-Rights-Online_Gaps-and-Opportunities-in-Policy-and-Research.pdf. See also: <https://a4ai.org/why-is-africa-taxing-online-services>.

On another front, experience shows that policy and regulatory decisions are not neutral in their impact on populations. Recent research by the Web Foundation³⁴ highlighted how fiscal instruments have impacted Internet users in a number of countries (also confirmed in the research of Cenerva³⁵ on countries including Tanzania, Uganda, Benin, Colombia, and Zambia where new forms of taxation on the use of OTTs have been implemented or proposed). The Web Foundation was particularly interested in the impact of these taxes on women. Women are less likely to access and use the Internet³⁶, and yet there is little research looking at how they are affected by ICT-related tax policy. Such research is important to help inform fiscal and universal access policies.

The Web Foundation carried out research on the impacts of social media taxation in Africa (featuring expert interviews and focus groups conducted in Tanzania, Uganda and Zambia). Based on the experience of the participants surveyed for the study³⁷ and existing research on the impact of consumer-focused Internet taxes, governments in East and Southern Africa, and elsewhere, are encouraged to consider four significant things in evaluating their ICT fiscal policies:

- First, tax policy related to Internet access (and fiscal policy in general) is not gender neutral. Governments should therefore pay particular attention to how taxes impact women and other groups who use the Internet less frequently than others. It is therefore imperative that taxation policies are gender-responsive – meaning they actively consider gender issues and the gender gap in Internet access – from conception to implementation and monitoring.
- Second, fiscal policies that tax use of social media and other related Internet-based services distort people's use of the Internet. Governments should reassess the introduction of taxes, including conducting sensitivity and gender-responsive analysis of tax measures, considering potential harms to citizens and businesses, and re-evaluating their revenue and behavioural targets. Failing to consider potential harms of taxes on citizens and businesses may ultimately lead to large social costs.
- Third, social media taxes appear to contribute to the shrinking of civil society space. Governments must recognize that effective policy development, and the functioning of society in general, depends on a strong and active civil society, including women's rights groups. For many of these organizations, social media and the Internet are crucial tools for organizing and operating and such taxes undermine their work.

Finally, tax policies, when poorly designed, can have an adverse effect on the objective of revenue generation; harming taxpayers and failing to achieve revenue targets. Governments should undertake proper and representative stakeholder consultations, seeking input from varied stakeholder groups before rolling out such fiscal measures. The lack of awareness and confusing communication on such taxes and their rationale have eroded trust. Governments should also pursue evidenced-based principles in the imposition of taxes and must evaluate all revenue measures against a number of criteria – neutrality, efficiency, certainty, simplicity, effectiveness, fairness, flexibility, and equity.

³⁴ Presentation by Web Foundation at ITU workshop on the Economic impact of OTTs on national telecommunication/ICT markets, Geneva, 1 October 2019, available at: https://www.itu.int/dms_pub/itu-d/oth/07/1a/D071A0000100001PDFE.pdf.

³⁵ Presentation by Cenerva at ITU workshop on the Economic impact of OTTs on national telecommunication/ICT markets, Geneva, 1 October 2019, available at: <https://www.itu.int/oth/D071A000007/>.

³⁶ Sambuli et al., 2018: http://webfoundation.org/docs/2018/08/Advancing-Womens-Rights-Online_Gaps-and-Opportunities-in-Policy-and-Research.pdf.

³⁷ Report available at <https://webfoundation.org/research/who-wins-who-loses-understanding-womens-experiences-of-social-media-taxation-in-east-and-southern-africa/>.

OTT platforms: what impact?

OTT success brings new challenges – like “click versus brick” in retail or the need to modernize tax codes. Perhaps we should exercise caution: some countries introduced taxes with unintended consequences – hampering connectivity in general and penalizing women in particular.

9. Role of regulation

9.1. Regulatory considerations

How, and if, regulatory frameworks and processes should respond to the emergence of OTTs and the digital transformation of network communications is the subject of debate among regulators and policy-makers.

For many years, telecommunication regulatory frameworks were built around telecommunication operators that owned and controlled underlying network infrastructure, were guarded by high barriers to market entry, and were granted use of scarce public resources such as radio spectrum. Accordingly, telecommunication regulation was intended to prevent consumer harm stemming from these unique market conditions.

However, with the transformation of networking technology, the emergence of OTTs, and the interaction between the telecommunication network operators and many other different markets where OTTs operate, regulators have started to consider how appropriate and applicable such regulations are in the modern communications landscape. Regulators have observed the need to recognize that OTTs and telecommunication network operators are very different types of business. Accordingly, new regulatory paradigms may require a clear acknowledgement and understanding of the fully transformed value chain in the telecommunication sector, and hence the need to rethink telecommunication regulation in the new world of the IP-based Internet value chain. OTTs are just one aspect of this much-needed rethinking, not the cause itself. Some have suggested that a “fresh look” at regulation of services, regardless of the medium, may be the answer.

It is vital that regulators consider both the benefits that OTTs have brought to consumers, societies, and economies at large, in addition to the challenges they bring. OTTs have facilitated positive transformation by bringing connectivity and new content that has transformed lives around the planet for the people who have access. In many markets, people cannot imagine life without their favourite OTTs. They depend upon OTTs to search for information, shop, plan holidays, commute, keep in touch with friends, stream music and video, and improve career prospects. Although some incumbent network operators may at times bristle against the reshaping communications market, the reality is that consumers and citizens enjoy the positive externalities of this new value chain. Simply put, at the time of writing, the good that OTTs have delivered seems to outweigh the valid concerns they actually raise. Even in scenarios where certain OTT platforms have established a dominant market position, there is still an open debate about whether there is tangible evidence of consumer harm as a result.

However, regulators must also consider the many new responsibilities that arise with the emergence of OTTs in the context of the entire communication ecosystem. Depending on the market or the OTT in question, these challenges may include negative externalities such as increased competition in some markets or increased barriers to entry in others,

cybercrime and fraud, harmful content, fake news, potential for data breaches, or the loss/lack of control by regulators of players in their markets. Regulators must adapt their regimes to address new challenges to security, consumer protection, and taxation.

Regulators have been tuning their perspective to the new market realities and have identified some of the key challenges in adapting regulations to accommodate the growth of OTTs. However, many regulators are lacking an adequate understanding of how OTT applications operate. This results in an information asymmetry that is not easily overcome, given the magnitude, scale, and diversity of OTTs. This is a particularly challenging issue in developing countries.

In addition, there is a challenge of speed. Innovation spurred by competition in the OTT sector moves at an order of magnitude faster than regulation. Regulation is a lengthy process, as regulators need to evaluate information and assess complex trade-offs and their net impact on consumers' welfare. These long-term decision processes did not pose great challenges in the era of traditional telecommunication regulation; however, they do today in the digital ecosystem. A further challenge is the fact that some of the most popular OTTs operate internationally, and regulatory bodies have national jurisdiction. Complying with cultural and regulatory standards of speech and content is a particularly acute challenge for many OTTs, as they vary wildly between jurisdictions.

On top of those challenges, regulators must also keep in mind that OTTs are a vast and diverse collection of businesses. A search engine is not the same as an app-store, a subscription movie service is not the same as a social network. In a world where a substantial proportion of all business is transacted over the Internet, it would be absurd for the nature of regulation to be determined by a one-size-fits-all approach. An additional source of complexity lies in the functional differentiation of many different roles playing simultaneously within the network infrastructure, and enormous geographical variation, between and within countries and regions – that could affect incentives towards all dimensions of competition, innovation and choice. For example, this is reflected in the distribution of different ARPUs across countries, because of geography, urban features, legacy infrastructures and disposable incomes.

Hence, when discussing the relevant regulatory framework, it is essential to understand that an OTT is not merely a player in a network of simple value chain relations that regulation of access terms and conditions can address. On the contrary, the entire set of interrelations shaping the ecosystem has to be taken into consideration to assess the possible intended and unintended consequences of regulation.

Let's see past the challenges and keep the benefits

Regulators need to see the benefits that OTTs deliver while adapting regimes to address new challenges. And while OTT innovation can be rapid, regulation sometimes struggles not only to keep pace but to address large-scale OTT operations outside of the regulator's national mandate. In addition, a one-size-fits-all approach to regulating OTTs will not work. When new service delivery models disrupt the old, regulation should be informed by evidence rather than fear of the unknown. Is light-touch, flexible regulation the answer?

9.2. Possible objectives for regulatory action

Workshop presentations addressed the issue of what should be included in the key regulatory objectives for ICT markets and for OTTs. As in other industries, these should aim to achieve sufficient levels of competition, consumer choice, innovation and investment. The different roles played by OTTs within the communications ecosystem imply that their actions and decisions can affect each of these key objectives. Hence, there was a view that the role and impact of OTTs should be considered holistically from a regulatory perspective, and not from a narrow market segmented perspective.

When considering regulation at all, regulators are encouraged to consider the aim of regulation in general. These are twofold: 1) to seek to achieve those desirable and justified objectives for consumers and citizens that do not arise naturally from the market; and 2) regulate where there is "market failure" and where the result brings net benefits.

Implicit in these objectives is that regulation could be enacted when problematic behaviour or proof of harm is found, not as a general blanket rule. In fact, regulators should not over-regulate new markets "just in case". Regulation should be based on evidence. For example, there are clear calls from many stakeholder groups to "control" or regulate OTTs, yet typically some proponents neither point to any market failure nor to any evidence of consumers and citizens being unhappy with their OTT services. A claim like MNOs lose revenues – whether accurate or not – would not count as a good reason to regulate against significant consumer and citizen benefits of OTT services when tested against the above key purposes of regulation. The lesson from history is that abstract or ideologically motivated approaches are rarely a good basis for policy.

New disruptive models of service delivery should not be regulated merely because they threaten an existing model, since such innovation and competition serve consumer interest. Regulators must also be cautious about the impact of their actions on innovation and competition. While important public policy considerations need to be addressed, regulation of OTTs driven solely by the motivation of "levelling the playing field" between traditional and digital modes of service delivery would be detrimental to consumer interests. As noted previously, recently implemented taxes on OTTs, social media applications, VoIP phone calls, and data services without conducting sufficient impact assessments have led to decreases in Internet access, social unrest, and economic disruption rather than achieving policy objectives or recouping telecommunication revenues.

There is an increasingly relevant debate on platform regulation. This includes contributions such as the Furman Review³⁸, which proposed the creation of a new "Digital Markets Unit" in the United Kingdom to consider competition issues raised by powerful online platforms, and a proposal from the UK Government that online platforms should have a new duty of care, in order to protect users from harmful content. This proposal, however, has not yet been implemented in UK legislation. Some experts also urged regulators to consider OTTs in the context of a long history of regulation punctuated by cases of regulatory failures. This risk is particularly relevant now, since all OTTs are different, and it is important that regulation should be informed by actual evidence rather than fear of the unknown.

³⁸ "Unlocking digital competition, Report of the Digital Competition Expert Panel", ISBN 978-1-912809-44-8, PU2242: <https://www.gov.uk/government/publications/unlocking-digital-competition-report-of-the-digital-competition-expert-panel>.

9.3. Looking ahead

The Chair of BEREC shared his view that the most appropriate form of regulation to address these complex issues remains unclear. In Europe, EU Access regulation keeps access networks open, mandating companies owning the physical infrastructures with significant market power (SMP) to allow other retail service providers (RSP) to access the network elements required to reach end users. This is essential to allow RSPs to provide bundling like television and telecommunication services. Similarly, relevant, is the EU net neutrality regulation³⁹. The new European Electronic Communications Code marginally addresses the role of OTTs, mainly focusing on user protection provisions regulations that will apply to all the elements of bundling, including OTTs and not simply to telecommunication services. As mentioned above, further critical contributions towards regulatory approaches can be found in the Furman Review, commissioned by the UK Government, which proposes the creation of a new "Digital Markets Unit" to assess competition issues raised by powerful online platforms.

There are several different facets and features of new regulatory frameworks. Many regulators believe that the best route forward is for a light-touch, flexible approach to regulation. Such an approach is based more on principles – including consumer protection, investment promotion, and competition – than on codified rules that require strict adherence. Interestingly, some have argued that if governments were to design new models of regulation that are light-touch, flexible, and recognize the scale and quantity of market impact of an OTT player, they may encourage more OTT players to conform to regulation. For regulation to be effective, however, it is crucial to include an ethical dimension and to assess the main barriers and limits to its implementation. Others have highlighted the value of OTT companies voluntarily self-regulation and collaborating with governments to prevent online harm. Such an example is WhatsApp's collaboration with the Indian Government to combat fake news and misinformation⁴⁰. Observers have noted such programmes can actually reduce the tendency to over-regulate online services in response to real or perceived harm.

Many have pointed to the need for improved international cooperation. Some suggest that multi-country agreements on handling of data may be helpful, while others point out that an improved degree of standardization and harmonization of data protection regimes could help governments and reduce the compliance burden on OTTs as well. Others have identified the need for regulatory capacity building for developing countries.

10. Conclusions

Discussions resulting from the 1 October 2019 workshop organized jointly by the Rapporteur Groups for Questions 3/1 and 4/1 of ITU-D Study Group 1, as well as the analysis of the information provided on the issue of the economic impact of OTTs on national telecommunication/ICT markets, highlighted the need to be able to draw up guidelines for the various stakeholders.

Also, the reflection deserves to be continued within the framework of the final reports on the studies of Question 3/1 and Question 4/1 to provide a deliverable as for the requested guidelines.

But already, some relevant lessons can be learned:

³⁹ <https://bereg.europa.eu/eng/netneutrality/>.

⁴⁰ <https://www.gadgetsnow.com/tech-news/whatsapp-vs-govt-of-india-all-you-need-to-know/articleshow/65541717.cms>.

10.1. Regulators and decision-makers

- Regulators are invited to develop their digital skills, in order to better understand and assess the development of the telecommunication /ICT market in the context of OTTs.
- Regulators are invited to consider the evolution of the Internet value chain and assess the telecommunication /ICT market as a whole in order to consider relevant measures in line with market realities.
- OTT regulations should be based upon actual evidence of harm from OTTs. It should also be based on a quantitative analysis of the socio-economic effects of such regulation.
- Governments should assess in advance the potentially negative effects of taxes on OTTs for vulnerable communities, businesses and citizens in order to avoid high social costs.
- Governments are encouraged to engage in real dialogue with and consult with different stakeholder groups before adopting new policies and regulations.

10.2. Telecommunication operators and OTT providers

- Telecommunication operators are encouraged to adopt data-driven business models and to rebalance their rate grids in order to reduce their dependence on telephone and SMS services.
- OTT providers and telecommunication operators need each other, so these two stakeholders should explore different models of partnerships and agreements including investments in network infrastructure and provide insight into these partnership agreements to regulators.

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For further information, please consult:

Thematic workshop on the topic of “Economic Impact of OTTs on National Telecommunication/ICT Markets”, held on 1 October 2019: https://www.itu.int/en/ITU-D/Study-Groups/2018-2021/Pages/meetings/joint-session-Q3-1-Q4-1_oct19.aspx

Study groups within the ITU Telecommunication Development Sector prepare reports, guidelines and recommendations to support the development of ICTs around the world. ITU-D Study Group 1: <https://www.itu.int/net4/ITU-D/CDS/sg/index.asp?lg=1&sp=2018&stg=1>

Q3/1 Final Report for the 2014-2017 study period: “Access to cloud computing: challenges and opportunities for developing countries”: <https://www.itu.int/pub/D-STG-SG01.03.1-2017>

Q4/1 Final Report for the 2014-2017 study period “Economic policies and methods of determining the costs of services related to national telecommunication/ICT networks including next-generation networks”: <https://www.itu.int/pub/D-STG-SG01.04.1-2017>



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