

REGULATORY AND MARKET ENVIRONMENT

REGULATORY CHALLENGES AND OPPORTUNITIES IN THE NEW ICT ECOSYSTEM



Regulatory challenges and opportunities in the new ICT ecosystem

Acknowledgements

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The new ICT ecosystem has unleashed a virtuous cycle, transforming multiple economic and social activities on its way, opening up new channels of innovation, productivity and communication. The rise of the app economy and the ubiquity of smart mobile devices create great opportunities for users and for companies that can leverage global scale solutions and systems. Technology design deployed by online service providers in particular often reduces transaction costs while allowing for increasing economies of scale. The outlook for both network operators and online service providers is bright as they benefit from the virtuous cycle – as the ICT sector outgrows all others, innovation continues to power ahead creating more opportunities for growth.



The hallmark of the new ICT ecosystem is ever deepening interconnectivity – everything is connected to everything else and more so every day. Regulation that has evolved in the world of twentieth century ‘industrial silos’ is now obsolete. New forms of regulatory co-operation across industries and across the globe are the only way to ensure that the positive dimensions of the new ICT ecosystem are enjoyed by consumers who are assured protection against its negative potential.

This presents both opportunities and challenges for regulators. Governments and sector regulators need to find a balance between maximizing the benefits of the new ICT ecosystem and securing optimal policy and regulatory objectives designed to address potential and actually negative consequences of a changed landscape such as abuse of market power, abuses of consumer rights and lack of development of local content production. Such a balance needs to optimise sector-specific regulation while also creating an enabling environment that contributes to innovation and investment.

I commend this report for its insights and useful guidance as well as the new ITU work stream on regulatory challenges and opportunities in the ICT ecosystem. I therefore also invite ITU membership to both contribute to this work and benefit from it.

A handwritten signature in blue ink, appearing to read 'Brahima Sanou'.

Brahima Sanou

Director, ITU Telecommunication Development Bureau

Executive Summary

On 29 June 2017 the app economy¹ celebrated its tenth birthday – one decade since Steve Jobs launched the Apple iPhone. While the development of information and communications technology is an ongoing process that has been in train for more than a century, the last decade has been spectacular and disruptive.

In the third quarter of 2016, the five largest publicly traded companies in the world by market capitalisation were, in order, Apple, Alphabet, Microsoft, Facebook and Amazon. At the time of the iPhone launch the only technology company in the top 10 publicly traded companies was Microsoft. But the ascendancy of the app-driven technology companies is only part of the app economy story. The word ‘disruptive’ has entered common parlance, being used as a description of how app-based companies and business models are rapidly displacing the traditional incumbents across a wide range of industries.

In the telecommunication and media sectors disruption abounds. Telecommunication carriers are faced with changing business models due to the appearance of over-the-top (OTT) communication services such as Skype, WhatsApp, Facebook, Instagram and Viber that compete directly with traditional voice and SMS services offered by carriers.

In reality, OTT services are no longer over-the-top in terms of their contribution to the telecommunication/ICT sector future. Although seen as disruptive to previous business models and markets, they have become an integral and important part of the global move to the app economy. In the media sector, the drain on revenues that began with the rise of the Web in the 1990s has been catalysed by the emergence of the app economy and new business models. Falling advertising revenues for newspapers and magazines have now spread to commercial free-to-air television as the video streaming revolution including players like Netflix delivers on-demand choices to televisions, tablets and even smartphones making the ‘appointment viewing’ model of the broadcasters suddenly anachronistic.

The breadth of social and economic issues arising from this technology-driven upheaval is daunting. Many of these issues such as the fate of professional news reporting and journalism, the quality of political reporting and commentary, and the problem of ‘fake news’ are beyond the scope of this report. Even so, the nature and scope of regulatory issues encompassed by the impact of the app economy on traditional telecommunications and media, particularly broadcasting, seems at best challenging and at worst baffling.

The starting point in defining regulatory responses to the app economy often calls for a more level playing field. In some areas, perhaps most obviously relating to inequalities in the taxation of online service providers and network operators, what ‘a level playing field’ actually means can at least be conceptualised. In other areas, universal service, for example, it is difficult to identify what a level playing field even means, let alone to define operational policy and regulatory measures. In areas such as consumer rights and privacy, the app economy heightens already well-established concerns that originated in the shift online that began in the 1990s. Other traditional telecommunication-centric regulatory interventions such as interconnection requirements and quality of service do not have obvious or practically enforceable analogues on the world of online services.

Given this regulatory complexity and ambiguity, it is tempting to adopt a reactive and piecemeal approach to the rise of the app economy. This approach, however, runs the risk of being inadequate and potentially running into regulatory dead ends. This report suggests that a better approach is to

¹ The term ‘app economy’ refers hereinafter to the sum of economic activity, products and services, required to deliver app functionality to end users, in particular via mobile broadband connection.

develop an overarching conceptual and analytical framework for understanding the app economy that will enable the development of a more holistic approach to regulation.

An important part of such a framework is to identify who will benefit most from the app economy. It is necessary to understand how the rise of the app economy creates new and redistributes existing benefits and costs. The following table provides such an enumeration, providing a qualitative analysis of shifting app economy benefits and costs.

Benefits and costs created and redistributed in the app economy

Group	Benefits	Costs	Outcomes
Consumers	<ul style="list-style-type: none"> – Better, lower price services – Wider range of innovative, content and services offerings 	<ul style="list-style-type: none"> – More advertising – Loss of personal information (security and privacy) – Complaints 	<ul style="list-style-type: none"> – Positive for consumers
Non-communications businesses	<ul style="list-style-type: none"> – Better, lower price services – Increased competitiveness – New distribution and marketing channels increasing customer engagement 	<ul style="list-style-type: none"> – As telecommunication/ ICT services increases as a proportion of GDP, non-communications businesses may see demand for their services decrease – Possible industry disruption 	<ul style="list-style-type: none"> – Positive for business-except sectors disrupted
Online service providers	<ul style="list-style-type: none"> – More users, more revenues – Monetising personal info – Opportunity to initial public offering, capital raisings, etc. 	<ul style="list-style-type: none"> – Increased provisioning costs – May need to invest to address bottlenecks 	<ul style="list-style-type: none"> – Positive for over-the-top-services (OTTs)
Existing fixed and mobile network operators, ISP, and broadcasters	<ul style="list-style-type: none"> – Increased demand for and revenue from data services – Falling costs due to simplification and move to lower cost IP infrastructure 	<ul style="list-style-type: none"> – Reduction of revenue for legacy voice and SMS services – Loss of market power – Need for additional spectrum, investment to handle demand, congestion 	<ul style="list-style-type: none"> – Currently negative but increased data demand may make positive – Partnering may be positive
National governments	<ul style="list-style-type: none"> – Increased telecommunication/ICT efficiency – Increased penetration – Ability to provide government services online 	<ul style="list-style-type: none"> – Impact on taxation revenue and fees – Decreased capacity for regulatory intervention – Reduced ability to provide national security and policing – consumer protection 	<ul style="list-style-type: none"> – Negative except in developed/ tax haven markets where OTTs based
Country/ national level/ economy wide	<ul style="list-style-type: none"> – Increased telecommunication/ICT efficiency and consumer welfare – Platform for the establishment of new and innovative disruptive businesses 	<ul style="list-style-type: none"> – Increased imports, loss of tax – Reduced ability to pursue national objectives – Fragmentation of national markets and undermining of national culture/sport markets 	<ul style="list-style-type: none"> – Variable depending on the country and its policies – Active policy setting required

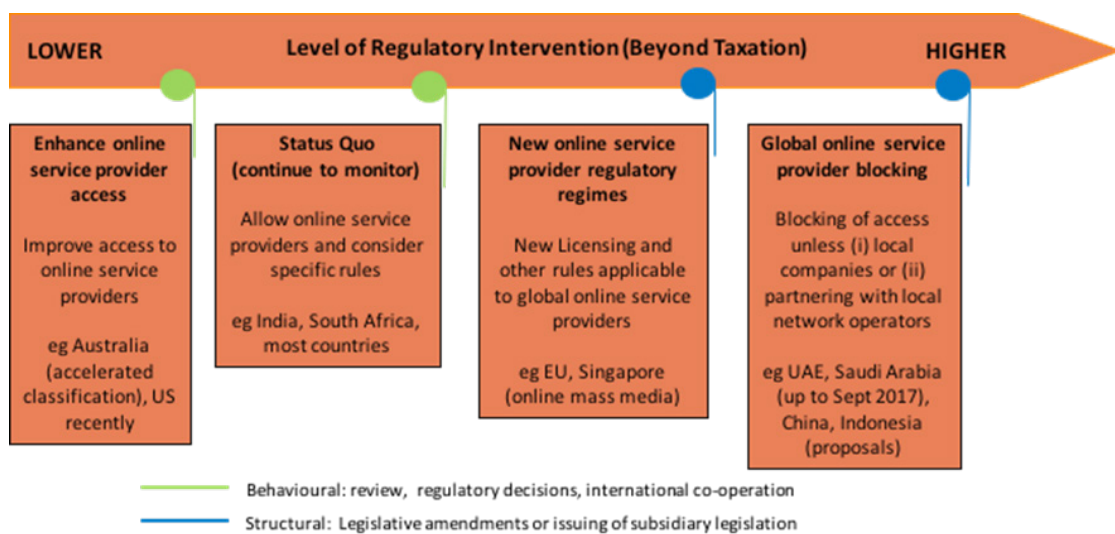
Source: Windsor Place Consulting, May 2017.

Importantly, other industry stakeholders, as well as consumers, can secure positive outcomes from the app economy especially if the policy and other settings are optimal. Existing network operators can also be winners given the growth in data demand as long as regulatory settings provide for *inter alia*, tariff flexibility, permitting operators to adopt the most cost effective and efficient technological innovations and key inputs like licences, and spectrum fees are priced fairly and reasonably. It is critical that the taxation regimes apply equally especially to those players that provide substitutable services.

Imposing an equitable and harmonised taxation regime and other rules on global online service providers is nonetheless a challenge, as the toolkit for dealing with large global companies is limited. In larger markets such as China, India, Indonesia, and the United States of America, as well as in the European Union, the government and industry regulators have greater bargaining power because online service providers cannot afford to ignore such markets. In smaller jurisdictions, however, governments and regulators have few options. Participating in and using international and regional fora to exchange and negotiate would seem to have considerable merit.

Notwithstanding such challenges, it does not mean that industry regulators cannot respond. Indeed, there is a continuum of possible regulatory responses/measures that in theory provides options, and the diagram below illustrates possible regulatory responses on online service issues. These extend from minimalistic interventions such as behavioural remedies including simple rules changes, facilitation measures to more substantial interventions such as those that are more structural requiring legislative amendments and/or issuing of subsidiary legislation (e.g., decrees, regulations, etc.).

Continuum of possible regulatory responses on online service issues



Source: Windsor Place Consulting, October 2017.

Governments and regulators need to be mindful that because the consumer benefits generated by online services are so significant, there is a political dimension to restricting the availability of services that are in high demand, and in respect of which, consumers have invested so as to use. Even where industry regulators decide on higher levels of regulatory intervention, history indicates that restrictions placed by governments on technological advances are difficult to maintain and cannot be sustained in the long run. It is also important to recognise that suppressing technological change such as that which is driving the app economy is also usually associated with a loss in competitiveness, which impacts negatively on economic growth and development.

In conclusion, an approach of continuing to monitor and/or putting in place legislative mechanisms so regulators have the ability to further regulate online service providers (even if they currently choose not to) is a prudent approach. Such measures could as a minimum facilitate the partnering between online service providers and network operators, and put in place fair and equitable taxation arrangements. The need for changes to the applicable taxation arrangements has become acute, meaning

that jurisdictions should consider legislating for online service providers that provide competing services to face similar taxation regimes both in respect to goods and service tax, value added taxes, and income tax regimes. Such measures could result in a more level playing field in the app economy including domestic entrepreneurs and network operators.

Ultimately, the optimal approach to the app economy does not mean more regulation but rather better regulation. Better regulation in the brave new world of the app economy is regulation which is:

- (i) harmonised regionally or globally;
- (ii) acknowledges the move to IP services;
- (iii) regulates for the new competitive paradigm;
- (iv) accepts the need for collaborative regulation between other sector regulators.

The new regulatory environment should embrace the new reality that online services (provided by online service providers) are no longer 'over-the-top'. Instead they are an integral and important part of the telecommunication/ICT sector future and the global move to the app economy.

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1 Moving from legacy to new ICT ecosystem regulation

Telecommunication carriers are faced with changing business models due to the appearance of over-the-top (OTT) communication services such as Skype, WhatsApp, Facebook, Instagram and Viber that compete directly with traditional voice and SMS services offered by carriers. Although seen as disruptive to previous business models and markets, OTT communication services have become an integral and important part of the global move to the app economy.

The app economy can be described as the sum of all economic activity, products and services, required to deliver app functionality to end-users via mobile broadband connection.

Telecommunication regulation has always had at its core the concept of the long-term interest of end users. The long-term interest of end users means that telecommunication/ICT regulators focus not only on consumer prices in the short term but the capacity of telecommunication/ICT companies to innovate and invest in the longer term.

The relationships between short-term and long-term consumer interests are complex. Low prices are good for consumers in the short term but probably mean lower margins for operators and reduced capacity to invest. Lower investment will likely mean that, in the longer term, quality of services will decline relative to best practice. The tendency of operators to innovate is related to both the capacity to generate margins but also, importantly, the level of competition spurring ongoing innovation. It is not uncommon, for example, for a business to innovate its way out of a period of low profitability thus re-establishing its commercial viability.

This regulatory focus on the long-term as well as a short-term is due to the fast pace of technological change in the telecommunication/ICT sector and the fact that it requires high levels of fixed investment. Once infrastructure has been deployed, variable costs and marginal costs are relatively low. Thus, the regulatory approach in telecommunications has always been inherently dynamic in nature – it emphasises change over time and the dynamics of technological change and service innovation.

This is in contrast to contemporary practice in competition regulation in many countries including antitrust regulation in the United States. In the mid to late twentieth century, the preferred economic theory underlying anti-trust regulation moved away from a 'structuralist' approach that emphasised the dynamics of market structure, towards a more short-term approach based on the pricing behaviour of companies.¹

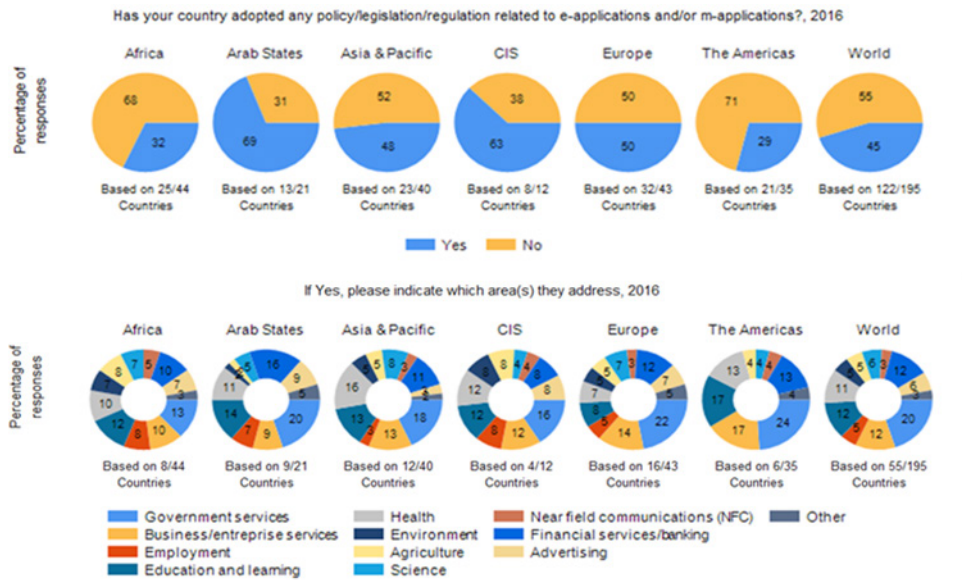
This perspective suggests that telecommunication/ICT regulators with their traditional focus on the long-term interest of consumers and the dynamic aspects of market structure could provide a useful counterpoint to competition regulators emphasis on consumer prices in the short term.

As some of the big technology companies in the app economy begin forays into operator roles, it will be necessary to give consideration to the interactions between their activities in the many markets they occupy and the implications of these in shaping their behaviour as telecommunication operators. A regulatory framework that combines dynamic and structural perspectives with the current approach to competition regulation creates fertile ground for collaborative regulation between telecommunication and competition authorities. This could result in well-informed, well-considered responses to the app economy and its interactions with other regulatory agencies across various industries. In this sense, based on the ITU telecommunication/ICT regulatory survey 2016, 55 countries (out of 122) reported the adoption of policies or regulations related to e-applications or m-applications, and interestingly only about half of those countries have legislation or regulation in place. What is more, 23 ICT regulators have acquired the mandate to regulate this booming market, and more regulators

¹ Lina M. Khan, *Amazon's Antitrust Paradox* Yale Law Journal, Volume 126, 2016-2017, Number 3, January 2017, 564-907.

may be acquiring this new responsibility. Figure 1 highlights regional trends in adopting such policies and regulations, and the areas covered.

Figure 1: Policies, legislation or regulations adopted by countries in relation with e-applications and m-applications, 2016



Source: ITU.

ITU data suggests that, in most countries, some kind of coordination mechanisms exist to ensure dialogue and interaction with the different levels of government involved in regulating ICTs. However, institutionalised mechanisms for the implementation of collaborative regulation to leverage telecommunications/ICTs in other sectors should be further encouraged.

Likewise, collaboration with other regulators, including data protection, competition and consumer protection agencies will grow in importance, as market dominance, anti-trust, mergers and acquisitions in the app economy bring in new players where data ownership and control is the focus.

Collaborative regulation

The evolution in the telecommunication/ICT sector has brought new players to the market and discussions as to new and existing business models, new technologies, and new opportunities. Regulators around the world have become more conscious of the changing ecosystem and are aware that they need to adapt to the changing environment. From a time when telecommunication/ICT regulators mainly focused on their creation as independent entities opening monopolistic markets, to one where they became active in promoting investment in infrastructure and services development and overseeing budding competitive markets, they now have many more issues at stake. Today, ICT regulators foster the development of ICTs for economic and social development. We stand at the edge of a new generation of regulation where collaboration within the ICT sector and across the sectors is a reality.

Such collaboration has led to the growth of the digital collaborative economy, allowing an even greater level of experimentation, innovation and growth than ever before. A strong digital economy is vital for innovation, growth, jobs and competitiveness. It offers opportunities but also challenges. The digital transformation is structurally changing the labour market and the nature of work. There are concerns that employment conditions, levels and income distribution will be affected by new digital applications and services, for instance increased use of artificial intelligence and robotics in manufacturing and service industries. Regulators increasingly require collaborative strategies with other agencies in other sectors to develop targeted responses to common challenges and opportunities. Experience shows that coordination with the respective competent authorities and other interested stakeholders is taking place to create awareness and foster an innovation and consumer-friendly environment.

Policy makers and regulators are being called on together to ensure people have access to technologies, have the digital skills to use them, and that there is trust in using e-government services. Collaborative efforts will lead to strategies to create an enabling environment, including appropriate legal and institutional frameworks, capacity-development for digital media literacy for citizens, and a seamless integration of online and offline features for public participation.

Source: See A Regulatory Perspective on Fifth Generation Collaborative Regulation (www.itu.int/en/ITU-D/Conferences/GSR/Documents/ITU_BuildingBlocksReg_GSR16.pdf) and OECD Recommendation of the Council on Digital Government Strategies (www.oecd.org/gov/digital-government/Recommendation-digital-government-strategies.pdf).

1.1 A regulatory taxonomy of the app economy

Applications can be loosely divided into two groups ‘pure OTT’ apps and ‘bits and atoms’ apps. Pure OTT apps exist entirely or primarily in the network such as messaging or telecommunication/ICT apps transmitting voice, messages, images, video or they may offer a package of services which, in the case of Facebook includes publishing, content and contact management, messaging, scheduling, etc. In contrast, bits and atoms apps groups together apps that use the network specifically to achieve some outcome in the world outside the network, such as Uber and Airbnb. This distinction was made in a recent ITU report² that also highlights:

- the competition and taxation implications of app economy companies;
- the role that intellectual property plays in their value creation;
- the ephemeral nature of intellectual property that provides these companies with a great deal of flexibility regarding the geographic location of the value creation centres, and therefore;
- significant discretion regarding payment of taxation (if any).

This is a concern to all governments as the app economy incorporates ever greater shares of economic activity. Table 1 sets out the corresponding market and regulatory issues, and policy and regulatory approaches.

² The APP economy in Africa: Economic benefits and regulatory directions: www.itu.int/pub/D-PREF-EF.APP_ECO_AFRICA

Table 1: App taxonomy and regulatory approaches

App type	Market and regulatory issues	Policy and regulatory approaches
Online service/OTT communications (WhatsApp, Viber, Skype)	<ul style="list-style-type: none"> – Falling margins and weakened market power for operators. – Rising market power of online service providers. – Congestion of existing infrastructure. – Reduced operator margins and capacity for investment. – Unequal regulatory treatment including taxation. 	<ul style="list-style-type: none"> – Collaboration between telecommunication regulators and other relevant government agencies such as those responsible for innovation. – Agencies for social inclusion and empowerment.
Online networking services (Facebook, LinkedIn, Google+)	<ul style="list-style-type: none"> – Consumer protection, privacy, use of consumer data, the right to be forgotten, harassment and/or bullying on social media. 	<ul style="list-style-type: none"> – Collaboration between consumer protection and telecommunication regulators.
Bits and atoms (Uber, Airbnb,)	<ul style="list-style-type: none"> – Maintenance of consumer protection standards in affected industries, e.g., accommodation, taxi services. – Complex issues of finding a level playing field for providers with significantly different business models. 	<ul style="list-style-type: none"> – Primarily responsibilities of regulators of affected industries but consultation with telecommunication regulators likely to enhance regulatory outcomes.
Cross-industry disrupters (Netflix, M-PESA)	<ul style="list-style-type: none"> – Financial stability, integrity of monetary policy. – Management of consumer funds. – Confirmation management protection of identity. – Prevention of illegal use, money laundering. – Government insurance of funds. – Status as quality banks, capacity to loan funds, Prudential management. – Encouraging production of local content and services over streaming channels. 	<ul style="list-style-type: none"> – Collaboration between financial and telecommunication regulators essential and also competition regulators.
Competition and macro level	<ul style="list-style-type: none"> – Industrial disruption causing increases in market power within particular industries. – Competition issues arising from global reach of disrupters. – Taxation issues arising within particular industries due to disruption. – Nation and global level taxation issues arising from opportunistic corporate structures by global firms. 	<ul style="list-style-type: none"> – Collaboration between competition authorities and taxation departments is critical. – Responses will include policy and legislative changes at the highest political level. – International collaboration and agreement between policy makers and at the political level will be critical.

Source: ITU, The app economy in Africa: Economic benefits and regulatory directions, 2017.

The app economy in Africa report focuses on services described as OTT communications and streaming services, one of the cross-industry disrupter categories. Two comments need to be made here: The first is that digital broadcasting whether delivered over cable, or terrestrially transmitted is similar to broadband and other online services. This is because:

- (a) Cable TV providers have been in the provision of Internet services for more than 20 years. The Data Over Cable Service Interface Specification (DOCSIS)³ 1.0 standard was released in March 1997 and before that there were a number of proprietary cable modem systems available. Cable Internet permits a range of broadband services up to 10 GB/s using DOCSIS 3.1.
- (b) Digital terrestrial television which is multiplexed is effectively a one way (unidirectional) IP data transmission system. Consequently, utilising DVB-T2 technology, an 8 MHz channel is an approximately 40 Mbit/s IP pipe which can support a number of content streams depending on their data usage (e.g., 4K vs HDTV, sports versus children's programming, etc.).

As a consequence, in a range of country markets (e.g., Europe, United States, etc.), cable TV providers and similar can be grouped together within the OTT communications category.

The second point reflects many of the arguments detailed in this report and concerns how app economy players no longer consider themselves as simply providing over-the-top services because they are now an integral part of the sector and offer a wide range of telecommunication apps and/or services.⁴

As online services and OTT communication capabilities get absorbed into most applications and websites as features, with WebRTC or other application programming interfaces (APIs),⁵ any such distinctions are arbitrary and arguably misleading. Similarly, the term 'Telco-OTT services'⁶ is unhelpful because each operator provides services that use the public Internet as a platform, rather than their own managed network infrastructure.

Furthermore, online service providers are significantly investing in Internet infrastructure (see Table 2), and therefore increasingly utilising their own infrastructure.

³ DOCSIS is an international telecommunication standard that permits the addition of high-bandwidth data transfer to an existing cable TV systems. DOCSIS is employed by many cable television operators to provide Internet access over their existing hybrid fibre-coaxial (HFC) infrastructure. The newest release is DOCSIS 3.1. It was first released in October 2013, and updated several times since, the DOCSIS 3.1 suite of specifications support capacities of at least 10 Gbit/s downstream and 1 Gbit/s upstream using 4096 QAM encoding.

⁴ See further discussion at <http://disruptivewireless.blogspot.com.au/2014/11/retiring-term-telco-ott-digital.html>

⁵ This is especially as fixed operators begin switching off their PSTNs (e.g.: include Telekom Malaysia, Australia with the nbco, etc.) and mobile operators move to VoLTE and similar services. As at August 2017, some 179 operators in 81 countries were investing in VoLTE deployment, studies or trials, including 121 operators that have commercially launched HD voice service using VoLTE in 60 countries. See www.gsacom.com

⁶ See <https://en.wikipedia.org/wiki/Telco-OTT>

Table 2: Selected examples of network and other infrastructure investments made by online service providers

OTT Provider(s)	Type of infrastructure	Details
Amazon	Data centres	<ul style="list-style-type: none"> • Amazon operates at least 30 data centres in its global network, with another 10 to 15 on the drawing board. • These data centres are used to support the Amazon on-demand cloud computer platform. • The company does not disclose the full scope of its infrastructure, but third parties estimate it at about 600 megawatts of IT capacity.
Facebook; Microsoft	Submarine cables	<ul style="list-style-type: none"> • In May 2016, Facebook and Microsoft announced that they would be building a new underwater cable across the Atlantic. • The 'Marea' cable will offer speeds of 160 terabytes per second.
Google; Facebook	Submarine cables	<ul style="list-style-type: none"> • Google and Facebook have joined forces to lay the first submarine cable that directly connects Los Angeles to Hong Kong, called the Pacific Light Cable Network. • The cable, which will be laid and operational by May 2018, will have 12 800km (7 953 miles) of fibre optics and have a huge capacity of 120 terabits per second. This will make it the highest-capacity trans-Pacific cable in existence.
Google	Submarine cables	<ul style="list-style-type: none"> • Google has invested in seven submarine cables across the world, hoping to better compete with other cloud providers and consumer Internet companies. • Most recently, Google has announced plans for a new 'Indigo cable', which will be completed in mid-2019. The cable will have two fibre pairs, as well as a capacity of 18 terabits per second and will run a length of around 5 600 miles from Singapore to the Eastern side of Australia.
Google	Fibre optic cables; wireless Internet infrastructure	<ul style="list-style-type: none"> • Google Fibre was launched in 2010 in Kansas City, providing gigabit broadband and TV services over the Google fibre optic cables. Over the past seven years, it has expanded to eight other United States metropolitan areas. • In 2016, Google began investing in wireless Internet infrastructure by acquiring 'Webpass', a company which provides wireless Internet in six metro areas in the United States.
Microsoft	Data centres	<ul style="list-style-type: none"> • Microsoft owns and leases datacentre capacity to support customers in regions throughout the world. • Microsoft global network of datacentres include more than one million services in more than 100 datacentres.

OTT Provider(s)	Type of infrastructure	Details
Microsoft	Submarine cables	<ul style="list-style-type: none"> Microsoft is investing in several submarine cables to connect data centres globally and in support of growing data network needs. The latest investments strengthen connections across both the Atlantic Ocean and Pacific Ocean, connecting several countries. Better connectivity helps Microsoft compete on cloud costs, as well as improves reliability, performance and resiliency worldwide.

Source: WPC, May 2017.

1.2 Communications and online services

1.2.1 Changing market structures

The economic significance of the app economy is visible everywhere but its size is difficult to quantify. App market statistics and analysis company, App Annie⁷, defines the app economy as “everybody who makes money and has a job thanks to mobile apps” and estimates “by 2020, the app economy could double in size to USD 101 billion”. This figure is based on app store revenues but in terms of total economic activity the app economy is actually much larger.

Table 3 shows the top 10 publicly traded companies in the world by market capitalisation. In the third quarter of 2016, for the first time ever, the top five positions were occupied by United States technology companies. All of these companies have large stakes in the app economy and together they were worth USD 2.6 trillion in first quarter 2017.

Table 3: The top 10 publicly traded companies in the world, market capitalisation, 2017

Rank	Third quarter, 2016		7 March 2017	
	Company	Market Cap (USD billion)	Company	Market Cap (USD billion)
1	Apple Inc	612.66	Apple Inc	730.06
2	Alphabet	541.70	Alphabet	580.77
3	Microsoft	448.22	Microsoft	497.11
4	Amazon.com	401.63	Berkshire Hathaway	432.51
5	Facebook	368.70	Amazon.com	402.42
6	Exxon Mobil	363.18	Facebook	397.75
7	Berkshire Hathaway	357.14	Exxon Mobil	343.62
8	Johnson & Johnson	325.37	Johnson & Johnson	336.70
9	General Electric	266.42	JPMorgan Chase	324.30
10	Tencent	260.90	General Electric	259.44

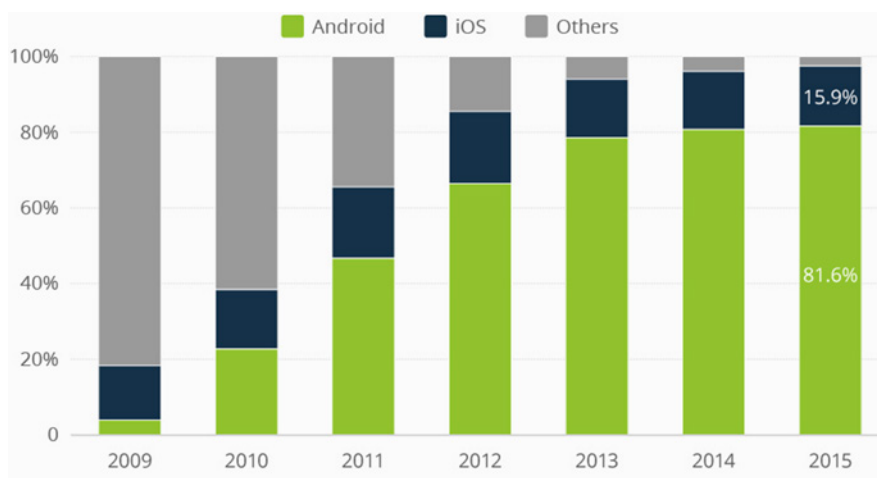
Source: Various including www.cnbc.com/2017/03/08/the-top-10-us-companies-by-market-capitalization.html

⁷ www.appannie.com/en/

Figure 2 illustrates the rapid and near absolute collapse of alternative mobile operating systems resulting in the Apple and Alphabet (Google) operating system duopoly.⁸ In early 2017, Gartner reported that this concerned 99.6 per cent of all of the smartphones shipped in 2016 (Android 81.7 per cent and iOS 17.9 per cent)⁹ despite the competitive efforts of significant companies such as Microsoft and Samsung to make inroads into the platform business. Both of these platforms offer a comprehensive suite of communications services that include voice calling, video calling and highly featured messaging services.

In the online app space, in addition to the major platform players, active WhatsApp users reached more than 1.2 billion worldwide as of January 2017, up from over 700 million in January 2015.¹⁰ Facebook is a platform in its own right¹¹ and its Messenger service had, by July 2016, reached 1 million active users¹². WeChat, the communications platform for Tencent in China, had 846 million users in 2016.¹³

Figure 2: Worldwide smart phone operating system market share (based on unit sales)



Source: <https://www.statista.com/chart/4431/smartphone-operating-system-market-share/>

Thus, in less than a decade, consumers have gone from a choice of three or four mobile operators in each geographic market to a situation where there are up to an additional half a dozen and more online service providers within easy reach. Even this understates the increased competition in telecommunication/ICT services. Postpaid customers of mobile operators (especially in developed country markets) were generally locked into two-year contracts associated with the purchase of handsets. This factor limited the level of churn of customers between mobile operators. With mobile data-based online service alternatives, consumers might typically use two or three providers in addition to their mobile operator in a single day depending on the context of the communications.

Thus, in two important app economy markets, the market for mobile operating systems and the market for telecommunication/ICT services, it is apparent that market structures are heading in opposite directions. At the same time as the mobile operating system duopoly, within the thousands of geographically defined markets for mobile telecommunication services across the globe, the number of services on offer has increased from three or four mobile operators to a plethora of app-based

⁸ Microsoft officially announced the end of its support of Windows Phone 8.1 on 11 July 2017. See <https://support.microsoft.com/en-us/help/4001737/products-reaching-end-of-support-for-2017>

⁹ www.gartner.com/newsroom/id/3609817

¹⁰ www.statista.com/statistics/260819/number-of-monthly-active-whatsapp-users/

¹¹ Some observers argue that Facebook is attempting to encroach on the operating system owners through the release of apps that deliver ever greater levels of functionality. See, for example, www.washingtonpost.com/news/the-switch/wp/2015/11/11/facebook-is-slowly-eating-your-phones-operating-system/?utm_term=.1b54306d6fb9

¹² www.statista.com/statistics/417295/facebook-messenger-monthly-active-users/

¹³ www.statista.com/statistics/255778/number-of-active-wechat-messenger-accounts/

telecommunication/ICT services. This experience demonstrates the importance of thinking carefully about market definitions, which is an indispensable first step in forming appropriate regulatory responses.

1.2.2 Online service provider revenue models

The following sections provide analysis of the impact of the app economy on the broad telecommunication/ICT sector and beyond. Online service providers base their strategy around reaching as many users as possible, offering them a compelling free service, locking them in where possible, and then trying to monetise its continued deployment via four main approaches:¹⁴

- (i) Advertising. Examples include *inter alia* Google, Facebook, Twitter, WeChat, Snapchat, ooVoo, Skype, and others (see Figure 3);
- (ii) Connectivity to PSTN (Skype make most of their money out of connectivity to PSTN and operator numbering schemes);
- (iii) Value added services, such as multipoint video calling, stickers, mobile money, etc; (examples include *inter alia* WeChat, LINE and ooVoo);
- (iv) Initial public offerings (e.g., Snapchat¹⁵);
- (v) Cashing out upon acquisition (e.g., Viber with its acquisition by Rakuten¹⁶).

Figure 3: Facebook average revenue per user (ARPU)



Source: Facebook, 2 February 2017.

Online service providers earn revenues by the extensive usage of their system,¹⁷ and for that, they prefer having users work within the boundaries of their service/ecosystem. As a consequence, they do not facilitate their interaction with competing offerings, nor is there any regulatory obligation to do so (e.g., any-to-any-calling in interconnection regulations). For example, it is currently not possible to call from Viber to Skype or send a message from WhatsApp to WeChat. Cross-platform interconnection, however, might be driving the next wave in competition in the app economy.

¹⁴ This excludes Apple which is a hardware company even though its services business is rapidly expanding. See www.businessinsider.com.au/apple-services-business-revenue-non-iphone-chart-2017-2

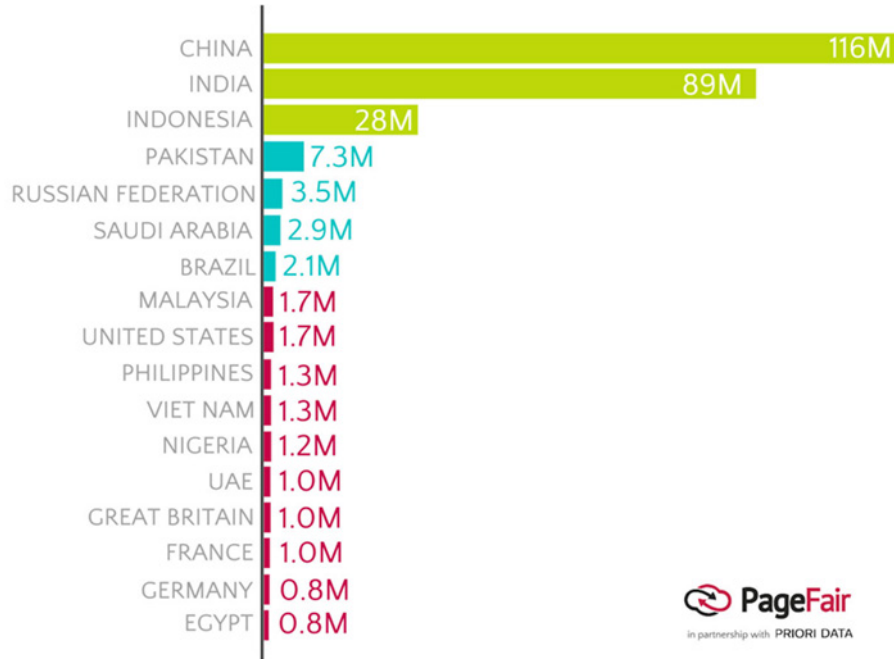
¹⁵ See www.forbes.com/sites/rogeraitken/2017/02/17/is-snapchat-parent-snaps-20bn-ipo-fair-value-or-overpriced/

¹⁶ See www.bloomberg.com/news/articles/2014-02-17/rakuten-falls-on-900-million-deal-to-acquire-viber-message-app

¹⁷ They increasingly also sell user data (i.e. for big data and other applications).

Such revenue models are however under threat, with a number of emerging markets especially in the Asia-Pacific region seeing the rise of ad blockers. In fact, global monthly active users of mobile adblocking browsers exceeded 275 million in early 2016 and 93 per cent of adblocking browsers are located in the Asia-Pacific region. Markets where there is a high degree of adblocker usage include China, India, and Indonesia.¹⁸ In India and in Indonesia adblockers are used on over 46 per cent of smartphones.

Figure 4: Monthly active adblocking browser users by country November 2016



Source: PageFair in partnership with PRIORI DATA.

In the early ad blocking period, digital publishers and broadcasters began to rely on indirect, passive methods to halt the problem. As the problem expanded, some content providers started to make a more direct, aggressive stance by blocking content, slowing video streams or decreasing stream quality to viewers who used ad blockers. In a highly controversial practice, some ad blocker companies have more recently offered to whitelist ads in exchange for a direct publisher fee. Ultimately, either the direct or indirect methods have served to substantially free blocked ad inventory for content providers on their terms.

Currently, with the potential revenue impact on the rapidly growing digital video ad market and the continued rise of ad blocking rates in various countries, the industry has now shifted its focus towards ad technology solutions to thwart ad blockers, creating the least disruptive consumer viewing experience to date.¹⁹ These include *inter alia* Facebook²⁰ and Indian news websites.²¹ The mobile adblocking landscape and key players is summarised in Figure 5.

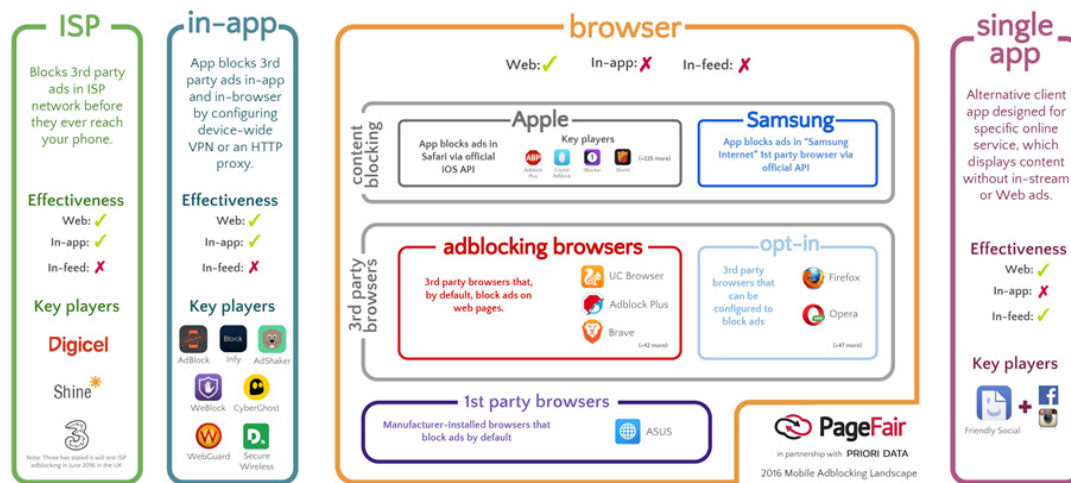
¹⁸ Page Fair, Adblocking goes Mobile, revised November 2016. Available at <https://pagefair.com/blog/2016/mobile-adblocking-report/> Alternative sources put the figures higher. A recent report noted that in 2015, while ad block usage grew 35 per cent in Europe in the past year (to 77 million monthly active users), during the same period it increased 48 per cent in the United States (to 45 million monthly active users, and 41 per cent globally (to 198 million monthly active users). See www.slideshare.net/informa0z/ooyala-antiadblocking-ott-summit

¹⁹ Ibid.

²⁰ See <https://newsroom.fb.com/news/2016/08/a-new-way-to-control-the-ads-you-see-on-facebook-and-an-update-on-ad-blocking/>

²¹ See <http://factordaily.com/adblocking/>

Figure 5: Mobile adblocking landscape and key players



Source: PageFair, in partnership with PRIORI DATA.

Even with technical and other means being used by advertisers to ‘fight back’ against adblockers, such moves are likely to necessitate a rethinking of the online service provider/OTT business model, where it is dependent on advertising (for instance where the two-sided markets are undermined) especially in the Asia-Pacific region. Part of that solution may be increased partnering between operators and online service providers.

1.2.3 App-based online services vs operator services – substitutes or complimentary?

Taking the above into account, the focus is on those online and broadcasting services that can be delivered over both fixed and mobile telecommunication networks.

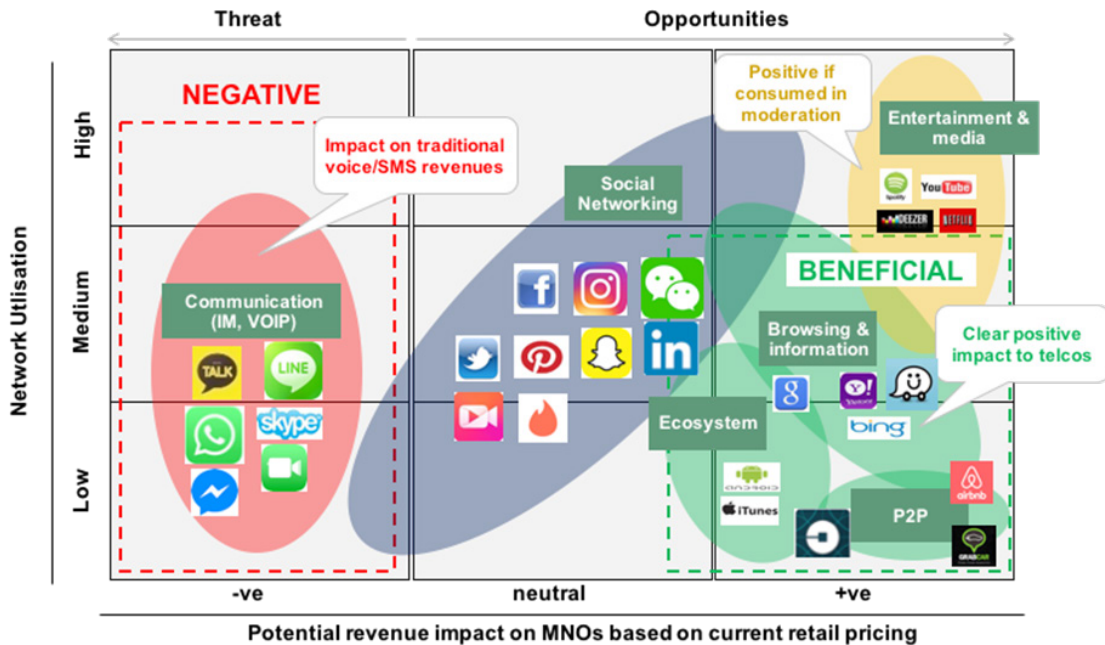
Table 4: Focus on online and broadcasting services

App type	Selected regulatory issues
Online services e.g.: Facebook, WhatsApp, Viber, Skype, Snapchat, Facetime, iMessage, Google Voice, LINE, Netflix, Hulu.	<ul style="list-style-type: none"> – Need for licences and application of licensing conditions. – Falling margins and reduced market power for telecommunication operators. – Rising market power of global Internet players. – Increased congestion of backbone and other infrastructure. – Reduced telecommunication operator margins and capacity for investment. – Classification of online content and regulation of online content. – Applicable of production of local content rules over streaming channels. – Global online service players do not necessarily pay taxes.

Source: WPC, May 2017.

It is also possible to assess the likely impact of online services on network operators by examining *inter alia* the utilisation of the network and the revenue implications from the use of such services. Examining a wide range of Internet services, based on current retail prices, online services can have positive, negative, or neutral impacts on operators, assuming that the current pricing of services is unchanged.

Figure 6: Possible assessment of operators from online services



Source: Industry sources with WPC amendments and additions, March 2017.

Having said that, the increased utility derived by consumers who utilise these online service providers (and the apps offered by them) results in consumers:

- (i) Purchasing/investing in a smartphone and other new devices. For example, Ericsson has recently forecast that smartphone subscriptions would rise to 6 billion by 2022 – a 10 per cent per annum increase from 2016 to 2022.²²
- (ii) Substantial increase in data utilisation per device. Again, Ericsson has estimated that all mobile data will increase by eight times between 2016 to 2022, which is a compounded annual growth rate (CAGR) of 40 per cent. Total fixed data traffic is also forecast to increase by 20 per cent per annum over the same period.²³

As a consequence, including the growth of subscriptions in relation to the Internet of Things (IoT) there are significant new growth opportunities for operators – both fixed and mobile – in supplying high speed broadband data services.²⁴ Without a range of new and innovative apps being made available including communications and digital content services, such growth opportunities would not exist and the sector would be dependent on the slow growth in legacy voice and SMS services.

For example, Facebook has exceeded 2 billion users in June 2017.²⁵ Accordingly to regulatory filings, Facebook has 845 monthly average users (MAUs), 2.7 billion daily likes (with Instagram having 600 million global MAUs and 400 million daily average users (DAUs) and comments while Snapchat has 158 DAUs and 2.5 billion daily snaps. Facebook is a third of Android web traffic and closer to half of iOS web traffic (Figure 7).

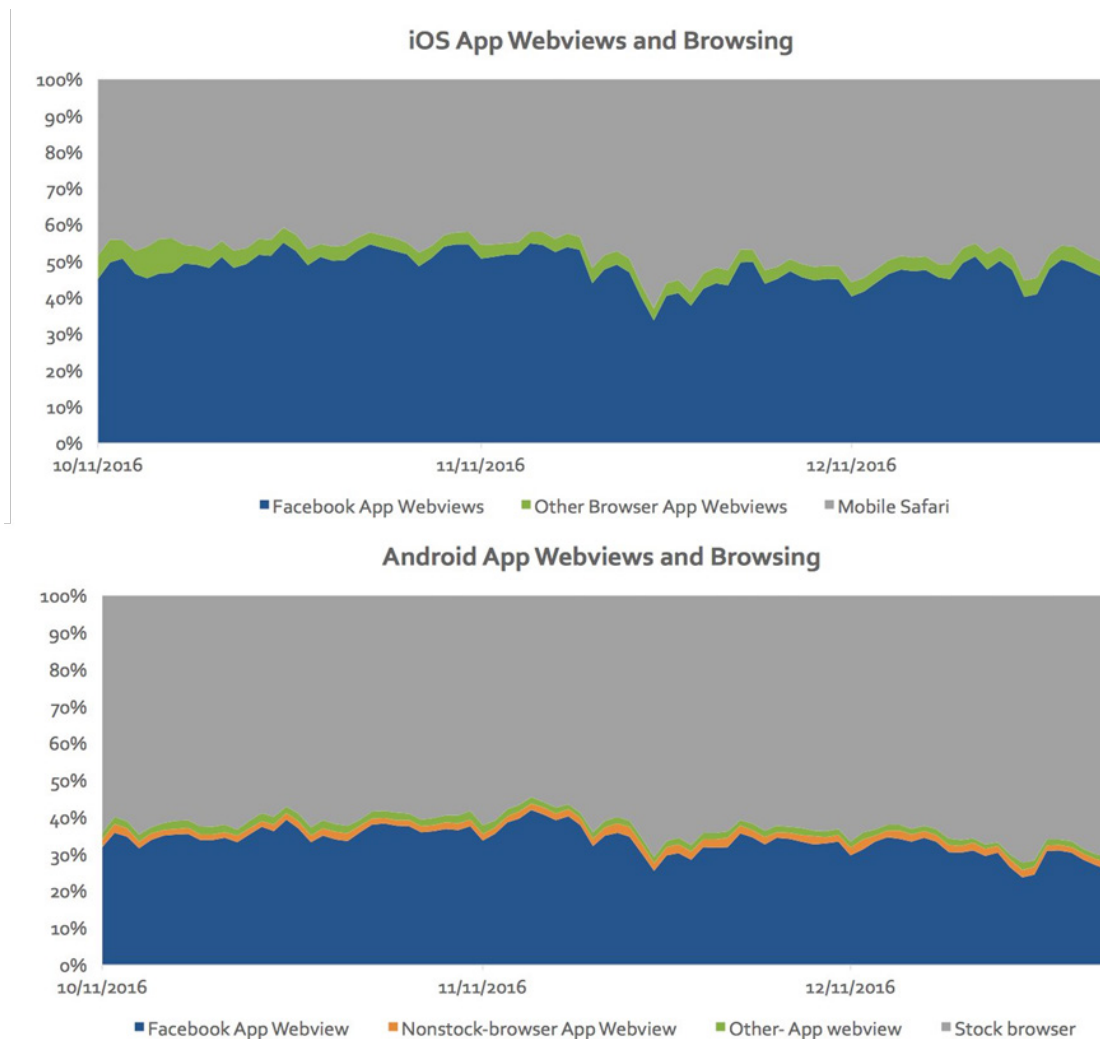
²² Ericsson, *Mobility Report on the Pulse of the Networked Society*, November 2016.

²³ Ibid.

²⁴ Further analysis does however need to be done on the implications of OTTs on smaller markets (e.g. in terms of population) such as small island developing states and least developed countries where investment attraction and return on investment is critical.

²⁵ Forbes, www.forbes.com/sites/kathleenchaykowski/2017/06/27/facebook-officially-hits-2-billion-users/#4b7623bb3708

Figure 7: Facebook as a proportion of total smartphone traffic



MOVR scientiamobile

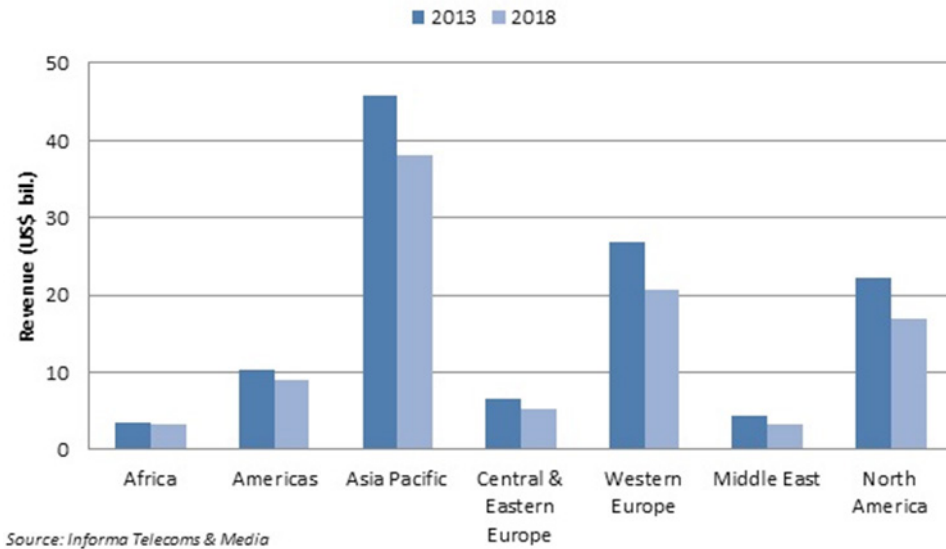
Source: ScientiaMobile.

But Juniper Research went on to state that there are a number of measures operators can introduce to stem the decline in core revenues and develop new sources of income. These include:

- (i) implementing big data and analytics packages for consumer and IoT devices;
- (ii) introducing operator billing payment options or mobile money services; and
- (iii) developing mobile identity services for consumers.

For instance, Juniper Research comments that WhatsApp alone now generates nearly three times as much daily traffic as SMS and this is also consistent with the other industry researchers such as Informa Telecoms & Media, which forecast falls in regional SMS revenues in 2018 (see Figure 8) even if more and more operators and service providers in the world are offering packages with voice/SMS and unlimited data.

Figure 8: Global SMS revenues by region, 2013 and 2018 (forecast)



Arguing however that SMS is analogous to a range of IP messaging services is misleading as a feature comparison of selected messaging services highlights the considerable innovation that has occurred, from traditional SMS services to new applications. IP messaging services have significant additional functionality, and consumer utility that result in such messaging services being preferred by consumers (Table 5). As a consequence, while a proportion of IP messaging is a substitute for SMS services, not all such messaging would have been SMS traffic. By having a useful and innovative product the number of messages sent has grown significantly.

Table 5: Feature comparison for selected messaging services

	SMS-MMS	WhatsApp	WeChat	Facebook Messenger	iMessage/Facetime	Kakao Talk	LINE	Viber
Text	✓	✓	✓	✓	✓	✓	✓	✓
Characters	160	None	None	None	None	None	None	None
Charges	Per SMS	Data only	Data only	Data only	Data only	Data only	Data only	Data only
Wifi connection	x	✓	✓	✓	✓	✓	✓	✓
PC/Mac integration	x	✓	✓	✓	✓	✓	✓	✓
Delivery report	✓	✓	✓	✓	✓	✓	✓	✓
Group Chat	✓	✓	✓	✓	✓	✓	✓	✓
Emoticons	✓	✓	✓	✓	✓	✓	✓	✓

	SMS-MMS	WhatsApp	WeChat	Facebook Messenger	iMessage/Facetime	Kakao Talk	LINE	Viber
Stickers	x	✓	✓	✓	✓	✓	✓	✓
Photos	✓	✓	✓	✓	✓	✓	✓	✓
Videos	x	✓	✓	✓	✓	✓	✓	✓
Audio	x	✓	✓	✓	✓	✓	✓	✓
Location	x	✓	✓	✓	✓	✓	✓	✓
Contact	Via text	✓	✓	✓	✓	✓	✓	✓
Walkie-talkie	x	✓	✓	✓	✓	✓	✓	✓
Voice and video calls	x	✓	✓	✓	✓	✓	✓	✓
Other		Various	Payments	Event messages	Hand written notes, animations	Polls, schedule	Line camera, games, points	

Source: WPC analysis, May 2017.

Such innovation is now extending to voice services, with IP messaging platforms now providing voice services if they were not already doing so. They are now trialling or incorporating multiple new telecommunication/ICT options, such as group voice, video chat and multiple video calling. This is likely to result in the continued erosion of traditional telecommunication traffic levels – and revenues- especially if operators do not innovate in terms of service offerings, packages, and bundling. In an IP world where VoIP (voice over IP) and VoLTE (voice over LTE) offerings are not only possible but indeed analogous to online IP services, innovation is an operator advantage in order to compete (except where precluded by regulation – which is discussed later).

Clearly, the market for telecommunication/ICT services has become more competitive. Operators have seen a decline in voice and SMS revenues but at the same time seen large increases in demand for mobile broadband data, which have been due, in part, to the rapidly increasing use of app-based online services. Operators have pointed to the regulatory constraints and obligations placed on traditional operators and emphasise the need to level the playing field. Some regulators appear to be sympathetic to the situation in which operators find themselves. However, more generally speaking, it is difficult to think of an industry that is not facing some challenge from technological change. Some challenges could be considered just a part of the dynamic context in which firms operate requiring innovative responses for them to remain commercially viable.

Among many observers there appears to be an untested assumption that operators cannot maintain a viable business providing purely data services. Certainly, this assumption is being strongly tested in India with the launch of Reliance Jio and the introduction of a fourth data-only mobile operator

in Singapore. Such considerations raise the question of how the market for telecommunication/ICT services should be defined.

When attempting to define the boundaries of a market, economists typically emphasise ‘close substitutes’. Two goods are close substitutes if, when the price of one increases slightly, consumers rapidly move to the alternative. A supplier product with close substitutes has little market power and therefore little ability to influence prices. More formally, goods are regarded as close substitutes if they have a high ‘cross elasticity of demand’. Within this framework, a market is defined in terms of the set of products which are close substitutes.

The extent to which app-based online services are close substitutes for traditional operator services depends on several factors. These include:

- the relative price of voice, SMS and data services;
- whether the consumer use a bundled service and is therefore less sensitive and/or less exposed to explicit data costs;
- whether consumers are postpay or prepay (this will influence attitudes to incurring data costs);
- how easy is it for a consumer to access Wi-Fi zones which enable access to app-based online services without using mobile broadband data services;
- how reliable and fast the consumer mobile broadband service is – for example, using FaceTime may not be viable over mobile broadband network but maybe strongly preferred over a relatively fast Wi-Fi network; and
- what type of telecommunication/ICT service specifically is being used – it would be reasonable to say that WhatsApp or WeChat text messaging is a very close substitute for SMS messaging even in the context of the consumer having access to only mobile broadband because these messaging services have relatively low broadband speed requirements.

All these considerations will factor into a consumer’s decision to use either operator based or app-based online services and highly informed consumers will move rapidly and fluidly between options depending on perceived utility, quality, and cost. When a consumer is on the move, for example, operator voice calling may be preferred but when the consumer is at home, FaceTime may be the preferred option.

Another important factor in the definition of markets is geography. Some national jurisdictions, for example, have officially blocked some services, such as Facebook in China or IP messaging in the UAE, and this has led to the emergence of alternative providers for banned services or an enhanced partnering between OTT providers and mobile network operators (MNOs). In other markets, cultural factors may influence consumer responses to various offerings and lead to some providers be more popular on the basis of consumer demand irrespective of any government intervention. An example is the popularity in Asia of the ‘LINE’ app.²⁶

Having noted these factors that may be a barrier to operator and app-based services being close substitutes, it is worth observing that the faster, more reliable and cheaper that wireless broadband networks become, the more likely consumers are, other factors remaining constant, to choose app-based alternatives. App-based messaging, for example is certainly much more feature rich than MNO based SMS messaging (see also section 1.1.1).

²⁶ Line however lost 3 million users from October to December 2016, with its total number of users falling from 220 million to 217 million. Line is dependent on its four main user bases in Indonesia, Japan, Taiwan, Thailand that now make up 77 per cent of its audience. Total revenue in 2016 was however, USD 1.2 billion, up 17 points from the year before. It had a full-year net profit of USD 66.6 million – in place of the similarly sized loss it made in 2015. See www.techinasia.com/line-losing-users-q4-2016

As noted above, almost every firm in the modern economy must contend with technology driven change and find innovative responses that maintain commercial viability. Telecommunication operators have the ability to deploy new cost saving technologies, create new innovations in their product offerings and move into new services altogether. For example, voice over LTE (VoLTE) will enable operators to offer much higher quality voice services and enable them to achieve operational cost savings. As very high speed (LTE-A Pro and 5G) services are deployed, operators will potentially be able to offer their customers new and attractive bundles including video streaming services.

Notwithstanding such opportunities, operators are likely to face increasing competition from much larger globe-spanning competitors and telecommunication regulators and competition regulators need to factor this consideration into the formation of future regulation.

1.2.4 The streaming revolution: Disrupting broadcasting and pay TV

The app economy challenges traditional broadcasting and television on several fronts. One of the earliest ways in which the app economy impacted the television industry was through simple distraction. As smartphone functionality expanded along with the range of apps available, the typical television watcher moved into multitasking mode, especially during commercials, checking emails, browsing the net, posting on Facebook and so on, as their interest in the television programme stream waned. Advertisers on commercial television became concerned about this growing inattention and this led to the initial falls in television advertising revenue as the shift to online advertising continued and the shift to mobile advertising began.

Now the app economy is colonising the television set itself. As Apple CEO, Tim Cook, declared, "The future of TV is apps."²⁷ The very identity of the physical television set has changed in less than a decade from a device that received broadcast signals to a device with multiple inputs including Ethernet cables and Wi-Fi signals. It is already tempting to think of the television set as a 'big mobile phone' or a 'fixed mobile media device'. Essentially, the television is becoming just another screen that along with smart phones, tablets, laptops and PCs enable consumers to interact with content and online services in a way that will eventually become seamless across devices. Smart TVs already enable PC like access to the Internet and manufacturers now provide Skype ready smart TVs with built-in cameras for wide-angle videoconferencing.

All of these alternative uses for the television mean that the advertising revenue base of free to air television is growing relatively slowly (or declining) and certainly slowly compared with online and mobile advertising growth rates.

In addition, the rapid growth of video streaming providers represents direct competition to the traditional television programming stream. Although there is a considerable partnering occurring.

²⁷ <http://blogs.wsj.com/personal-technology/2015/09/09/apples-tim-cook-we-believe-the-future-of-tv-is-apps/>

Launch of new YouTube TV service in the United States

On 28 February 2017, Google YouTube unveiled a web-TV service which offered a package of 40 broadcast and cable channels for USD 35 per month. YouTube TV includes all of the major United States broadcasters such as ABC, CBS, NBC, Fox as well as several dozen well-known cable channels including ESPN, FX, USA, MSNBC and Fox News. Focused on ‘cord cutters’ the offering is called a ‘skinny bundle’ in the United States. Competitors include Dish Network Sling TV, ATT DirecTV Now.

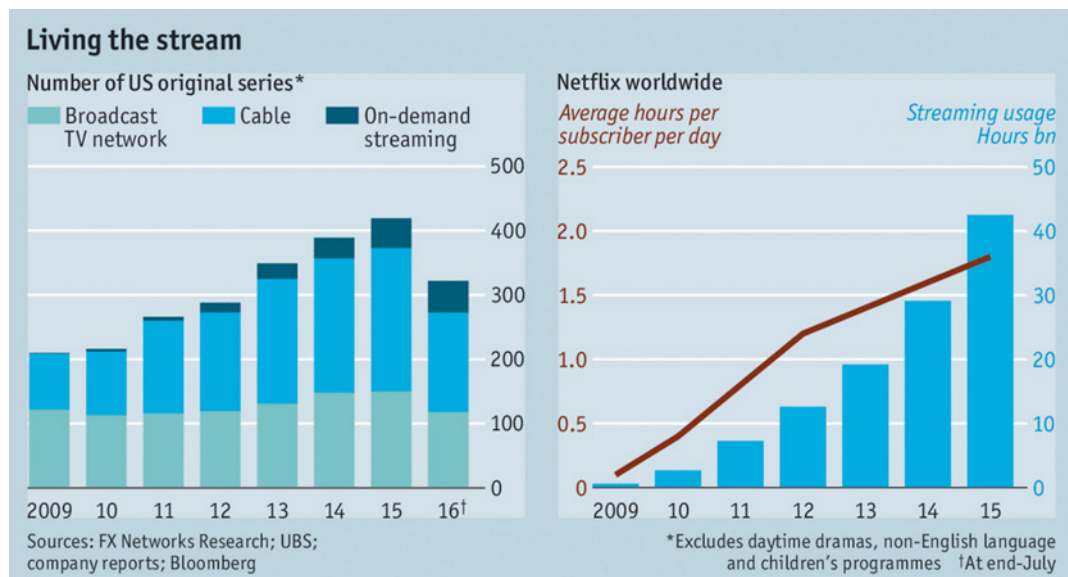
Amazon.com Inc is also considering its own bundle with media companies. It should be noted that YouTube users watch more than 1 billion hours of video per a day on the service, a 10-fold increase since 2012. While YouTube breaks even, Google is focused on breaking into the in-home and television advertising market (in the United States about USD 70 billion is spent on TV advertisements annually).¹

¹ www.wsj.com/articles/googles-youtube-to-launch-35-a-month-web-tv-service-1488317090

Figure 8 illustrates the very rapid growth of Netflix, the streaming industry leader. The major streaming companies are rapidly expanding their spending on original content: “Netflix will spend nearly USD 6 billion on content in 2017, second only to ESPN which spent USD 7.6 billion on content in 2016. The Amazon streaming service, which is likely to be Netflix closest competitor next year, spent an estimated USD 3.2 billion on content in 2016. Amazon stated that it is likely to double its spending on video content and triple its spending on originals in the second half of 2017.”²⁸

Thus, as video streamers attract more subscribers they can fund more and higher quality content that in turn attracts even more subscribers. This is another example of the race for scale that drives investment and growth in app economy companies (see Figure 9).

Figure 9: Growth in production of on-demand streaming content and viewing



Source: www.economist.com/news/business/21705353-can-netflix-stay-atop-new-broadband-based-television-ecosystem-it-helped-create-streaming

²⁸ www.forbes.com/sites/greatspeculations/2016/12/29/can-original-programming-be-netflixs-key-competitive-edge-in-2017/#171517525cc7

It has been suggested that these app economy challenges to traditional free-to-air television broadcasters have forced them to adapt their programming and emphasise reality TV, news and current affairs and sports. Nor does it help that some OTT services are being reported as facilitating a breach of intellectual property rights including exclusive sports rights.²⁹ This strategy, while paying medium-term dividends, does not address the fundamental drivers that are leading to the decline in broadcast entertainment.

Consumers are happy to abandon the ‘appointment viewing’ that is imposed by the broadcasting model and move into the customised viewing world of on-demand streaming. Across various country markets, consumers (especially younger viewers) prefer content on demand (i.e. non-linear services) delivered over telecommunication networks.

While this is an important driver of the shift to streaming, the deeper contest is between the capacity of mass medium broadcasting to deliver niche entertainment to discriminating consumers, compared with the superior capacity of broadband services provided by network operators to deliver one to one video programming over the Internet.

Set against this contest is the increasing demand for spectrum and mobile broadband that is being driven by the relentless rise of the app economy. In essence, this means that as broadband technologies improve, broadcasting becomes progressively less competitive as a mechanism for delivering video content.

As stated recently by the CEO of Telstra, Andy Penn “Really the only things that are getting watched live now are sport and news, everything else is streamed and downloaded... Therefore, the relationship between media and telecommunications has become more intimate as a consequence and it makes a lot of sense for us to look to bundle in the best content.”³⁰ He also stated that Netflix, and online content streaming services was growing considerably, and now represented the biggest driver of traffic on Telstra networks.

1.3 Partnering between network operators and online service providers

Telecommunication/ICT operators are developing partnerships with online service providers to increase revenue, mitigate churn, and attract subscribers (Table 6). In a growing number of countries, there has been regulatory support for such partnering.³¹

The first option being used by operators to increase data usage is to offer subscribers discounted access to high-bandwidth services, such as music, video, photo or file sharing services. Operators will select services that are likely to appeal to a large proportion of their customers and will most likely target prepaid subscribers, as high-bandwidth services could cause customers to go over their allowance and create a negative reaction to unexpected charges (bill shock). This technique can be seen in the United Kingdom partnership between Vodafone, Netflix and Spotify, as well as in the Philippines with Uber and Smart Communications.³²

The second technique used by operators is to give subscribers ‘free’ access to certain online or OTT services by zero-rating data, as seen in a majority of examples listed in Table 6. This technique consists

²⁹ See Mari Luz Peinado, *Un entramado de perfiles de Facebook emite fútbol pirata en directo*, 21 February 2017. Available http://verne.elpais.com/verne/2017/02/17/articulo/1487328698_181222.html and www.news.com.au/technology/online/piracy/facebook-live-stream-of-danny-green-vs-anthony-mundine-fight-to-be-pursued-by-foxtel/news-story/96bb934e57e8c4a09c4af9902292a5aa. This may change in the future as social networks pursue licensing deals. See www.theverge.com/2017/2/21/14693168/facebook-major-league-baseball-streaming-sports-deal

³⁰ See www.afr.com/technology/afr20techtelstravsoptusstreaming--20170217-guftjv

³¹ Mr Hoang Phuong Bui, MIC Vietnam, *Vietnam ICT Market and Regulatory View on OTT Services*, ITU-ASEAN Forum on Over-the-Top (OTT) Services, 8-9 December 2015, Cambodia. Available at www.itu.int/en/ITU-D/Regional-Presence/AsiaPacific/Pages/Events/2015/Dec-OTT/en.aspx

³² Analysys Mason, *White Paper Operator Partnerships with OTT providers: a review of operator motivations*, December 2014.

of the operator introducing data services to users at no charge, providing a taste of data-based services with the ultimate aim of persuading customers to pay for data for overall usage. In this model, the cost of the data is covered by the mobile operator. This technique can be observed particularly in sub-Saharan Africa, with Facebook providing its services free of charge across several operators, as well as planning to invest in a satellite to provide Internet access to remote parts of the region. Facebook has sold this agreement to mobile operators on the basis that customers will eventually buy data to access other services.³³

In addition, Wi-Fi connectivity has opened the way to some new, alternative ways of delivering ICT services of all kinds. The Wi-Fi First model is one example. The model is one where mobile devices and services use Wi-Fi as the primary network with cellular networks used to fill the gaps. This new business model offers lower-cost options for consumers. Free, the French mobile operator, launched a Wi-Fi First venture in 2012 and United Kingdom mobile operator EE has claimed the first launch of Wi-Fi calling in the United Kingdom in 2015. Republic Wireless, Scratch Wireless and Freedompop piloted the model successfully in the United States. One differentiator of the Wi-Fi First model is the absence of time-bound contracts (pure pay-as-you-go). Such ventures raise the bar for both MNOs and mobile virtual network operators (MVNOs) but also provide new opportunities to relieve overloaded mobile networks.³⁴

A key technique being used by operators to reduce churn through partnerships is to bundle online service content with subscriptions, as seen in the United States with T-Mobile ‘Simple Choice’ Plan. Another option used to increase revenue for the operator is the reselling of online services, where the operator takes a share of the revenue, as seen in the partnership between Netflix and Japan operator Softbank Inc. Notably, this option could be less effective in generating revenue in developed regions, as the operator is more likely to be competing against more advanced payment mechanisms, leading to difficulty in finding a strong market position.³⁵

Table 6: Global partnerships between MNOs and online service providers

Country/Region	Operator(s)	Online Service Player(s)	Details
Sub-Saharan Africa	Multiple operators across the region	Facebook	<ul style="list-style-type: none"> Facebook is offering a ‘free basics initiative’, in which mobile users are able to access Facebook free of charge, in over 20 countries in Africa As part of this initiative, Facebook is also investing in a satellite to provide Internet access to parts of the continent where optical fibre cables have not been laid down.
Australia	Optus	iHeartRadio, Spotify, Google Play Music, Pandora, Netflix, Presto	<ul style="list-style-type: none"> On selected plans, customers can stream selected OTT services without using the monthly data allowance.
Caribbean	Cable & Wireless (including Flow, BTC, and Lime)	WhatsApp	<ul style="list-style-type: none"> Allows customers to access the full range of WhatsApp features across the company networks.

³³ www.theguardian.com/world/2016/aug/01/facebook-free-basics-internet-africa-mark-zuckerberg

³⁴ ITU, Global ICT Regulatory Outlook 2017, itu.int/go/outlook.

³⁵ Analysys Mason, White Paper Operator Partnerships with OTT providers: a review of operator motivations, December 2014.

Country/Region	Operator(s)	Online Service Player(s)	Details
Japan	SoftBank Inc	Netflix	<ul style="list-style-type: none"> Customers are able to opt in for Netflix at SoftBanker Shops, major retails and via the website without additional registration. In addition, Softbank has begun pre-installing the Netflix app on its smartphones.
Malaysia	Digi	WhatsApp	<ul style="list-style-type: none"> Offers unlimited access to customers for WhatsApp for a flat fee. Similar agreement was followed by 3 Hong Kong and India RCom
Nigeria	Airtel Nigeria	WhatsApp	<ul style="list-style-type: none"> Offers an exclusive WhatsApp-branded mobile data plan Partnership has been extended regionally to other Airtel markets (e.g., India) and to include other online service platforms such as Twitter and Facebook.
Philippines	Globe Telecom	Google Maps, GrabTaxi, Viber, Whatsapp, Instagram, Amazon, etc.	<ul style="list-style-type: none"> A range of cheap data bundles are offered to customers with varying online service services, including a navigation bundle (e.g., Google Maps, GrabTaxi), a chat bundle (e.g., Viber, WhatsApp), a shopping bundle (e.g., Amazon) and photo bundle (e.g., Instagram).
Philippines	Smart Communications	Uber	<ul style="list-style-type: none"> Offers free high-speed WiFi to customers during their ride with Uber In addition, the Uber app comes pre-installed on new Smart Android Phones Also exclusive Uber rider promotions and discounts are offered to Smart subscribers
Qatar	Vodafone Qatar	Go by OSN	<ul style="list-style-type: none"> Partnership gives customers exclusive access to a large selection of movies and series on the online service platform
Singapore	Starhub	LINE	<ul style="list-style-type: none"> Offers its prepared customers unlimited access to the calling and messaging app, with prepaid daily or monthly 'LINE Data Plans'
South Africa	MTN	MTN Play	<ul style="list-style-type: none"> MTN has created the content platform MTN Play to reduce usage of global online service provider content and increase brand perception. Subscribers get mobile access to content such as games, news, wallpapers, ringtones, music and videos.

Country/ Region	Operator(s)	Online Service Player(s)	Details
South Africa	Vodacom	Teta	<ul style="list-style-type: none"> App allows consumers to send messages, photos and videos with a zero data or air-time balance, provided that they are on the Vodacom network. Vodacom acts as a service provider to the OTT, billing the company on a wholesale basis. Once Teta has secured a meaningful user base, it will pay for the cost of access to the Vodacom platform through in-app advertising
United Kingdom	Vodafone	Spotify, Sky Sports Mobile TV, Netflix, Now TV Entertainment, Now TV Sky Movies	<ul style="list-style-type: none"> All online services are available for a free period, with subscribers allowed to use as much data as they want. At the end of the free period, subscribers are automatically signed up to a month-to-month contract to the TV or music streaming service. It is likely that Vodaphone takes a revenue share for each subscriber when they sign up at the end of the trial period
United States of America	T-Mobile	Facebook, Netflix, YouTube	<ul style="list-style-type: none"> The service called 'Binge On' allows customers to watch mobile video from partnering online service providers without tapping into their data plan.
United States of America	T-Mobile	Including Apple Music, Spotify, iHeartRadio, SoundCloud, Pandora, Napster.	<ul style="list-style-type: none"> Allows customers on a 'Simple Choice' plan to stream music from a selected range of music streaming services using zero-rated data.
Viet Nam	Vietnamobile, Viettel	Google Play	<ul style="list-style-type: none"> Through, mobile payments company Fortumo carrier billing is offered to its subscribers for purchases on the Google Play app store.

Source: WPC research, May 2017.

1.4 Costs and benefits of the increasing use of online services

Given the above discussion, it is critical to assess all the costs and benefits of the increasing use of OTT and digital content services from the perspective of each of the key stakeholders:

- (i) telecommunication/ICT consumers,
- (ii) non-communications businesses,
- (iii) online service providers,
- (iv) existing fixed and mobile network operators and broadcasters,
- (v) national governments, and
- (vi) the national or country level.

The analysis in Table 7 highlights the challenges ahead of moving from legacy regulation to a brave new world of regulation.

Table 7: Costs and benefits of increasing use of online/OTT services

Group	Benefits	Costs
Telecommunication/ICT consumers	<ul style="list-style-type: none"> - Better services - Lower cost - Increased consumer surplus - Increased spending on non-telecommunication/ICT goods and services - Wider range of content and services offerings - Advertising targeted to personal interests 	<ul style="list-style-type: none"> - More advertising - Loss of personal information - Reduced ability to locate consumer in times of disaster/emergency, etc.
Non-telecommunication/ICT businesses	<ul style="list-style-type: none"> - Better services - Lower cost - Increase competitiveness - Increased demand for outputs because of reduced telecommunication/ICT expenditure by consumers - New distribution and marketing channels which promote customer engagement 	<ul style="list-style-type: none"> - Possibly reduced demand for outputs if telecommunication/ICT expenditure by consumers increases as a proportion of GDP - Possible industry disruption arising from business model disruption
Online service providers	<ul style="list-style-type: none"> - More users - Increased revenue (direct – subscriptions) - Increase advertising revenue - Monetising personal information of users - Increased economies of scale - Opportunity to IPO, capital raisings with global players better able to compete with domestic online service competitors 	<ul style="list-style-type: none"> - Increased provisioning costs - May find it necessary to invest to address bottlenecks (e.g., international submarine cables) and offer significant exclusive content for differentiation (e.g., Netflix, Amazon)
Existing fixed and mobile network operators and broadcasters	<ul style="list-style-type: none"> - Increased demand for and revenue from data services - Falling costs due to simplification of offerings and move to lower cost IP network infrastructure 	<ul style="list-style-type: none"> - Reduction of revenue for legacy voice and SMS services - Possible loss of market power - Possible loss of branding value - Diminution of customer relationships

Group	Benefits	Costs
Existing fixed and mobile network operators and broadcasters	<ul style="list-style-type: none"> - Increased market power 	<ul style="list-style-type: none"> - Need for additional capital investment to handle increased broadband demand - Increasing network congestion - High cost of capital due to higher perceived risk/market volatility (e.g., higher weighted average cost of capital (WACC)) - Need to acquire additional International Mobile Telecommunication (IMT) spectrum to support wireless demand growth - If tariff rebalancing/bundling not permitted then reduced margins - Increased competition (i.e. telecommunication operators and online service providers offer online content, cable broadcasters offer broadband services)
National governments	<ul style="list-style-type: none"> - Increased telecommunication/ ICT efficiency - Ability to provide more efficient government services online (especially to rural and remote areas) - Increased demand and hence revenues (if market pricing in place) for allocation of IMT spectrum 	<ul style="list-style-type: none"> - Reduced taxation revenue - Reduced licence fees - Decreased capacity for regulatory intervention - Reduced ability to provide national security and policing function (e.g., reduced interception capability) - Need to devote additional resources to develop new regulatory models/mechanisms
Country/national level/ economy wide	<ul style="list-style-type: none"> - Increased telecommunication/ ICT efficiency - Increased welfare of consumers - Increased efficiency and competitiveness - Platform for the establishment of new and innovative disruptive industries/businesses - Platform for new arts/culture/ niche sports (e.g., including women) as markets can be accessed at lower cost 	<ul style="list-style-type: none"> - Increased imports - Loss of tax revenue - Loss of discretion to pursue national telecommunication/ICT objectives - Fragmentation of national markets (e.g., free to air TV, etc.) - Possible undermining of national culture/sport markets as national free to air broadcasters lose revenue, unable to pay for sporting rights, etc. versus global sport – EPL, Bundesliga, etc.

Source: Windsor Place Consulting, May 2017.

2 Key regulatory issues to be addressed

In the telecommunication/ICT sector the move from legacy environments (e.g., including but not limited to circuit switched telephony, analogue TV broadcasting) demands a re-appraisal of existing regulatory regimes including laws and regulations. Since the 1980's and 1990's sector regulation has been based on the existence of stand-alone networks delivering specific services and the business models that supported those networks (e.g., per minute charging, linear televisions, etc.). Such regulatory approaches therefore pre-dates ubiquitous Internet/broadband connectivity, changes in industry structure, online service players, the advent of social media, advances in IP technology and changes in consumer expectations. These changes pose significant challenges for the regulatory regime and regulators in all global markets.

Put simply, the existing telecommunication/ICT regulatory regime in most, if not all countries, has not kept pace with technological, behavioural and competitive changes.

ITU, in the framework of the ITU-D Study Groups, is working on specific regulatory issues to support national regulatory authorities in the transition to this new digital environment, for example, ITU-D Study Group 1 – Question 1/1 on *Policy, regulatory and technical aspects of the migration from existing networks to broadband networks in developing countries, including next-generation networks, m-services, online services and the implementation of IPv6* has just launched a report that includes best-practice guidelines, case studies and recommendations on the way to stimulate investment in broadband that allows the delivery of services for development in an affordable manner, and the identification of policy tools to facilitate the availability to consumers at local and national levels of competitive IP-based services and applications. It also illustrates a range of alternative successful business arrangements that have been used to meet growing demand and other changes in the market³⁶. In addition, ITU-T Study Group 3 is working on the economic and regulatory impact of the Internet, convergence (services or infrastructure) and new services, such as OTT services, and international telecommunication services and networks³⁷.

With the recent take-up of applications such as Spotify and Netflix, it is suggested that subjecting traditional broadcasters to regulatory treatment on the basis of the broadcast technologies they employ is inconsistent and difficult to justify, and that similarly, traditional voice and mobile phone services are subject to different licensing and quality-of-service requirements to similar services being delivered by providers like Skype, Viber and WhatsApp (See Appendix A). Reviews have taken place in a number of markets including India.

OTT regulation developments in India

In May 2015, the Telecom Regulatory Authority of India (TRAI) began a process to prepare a regulatory framework for OTT services in India by releasing a consultation paper. The objectives of the consultation paper were to analyse the implications of the growth of OTTs and consider whether or not changes were required in the current regulatory framework. The paper was motivated by the observation that OTTs riding on operators networks are not subject to any regulatory framework in India and that it is likely that, in the future, the provision of services by OTT players will impact revenues of network operators insofar as their current business models are concerned.

³⁶ www.itu.int/net4/ITU-D/CDS/sg/rgqlist.asp?lg=1&sp=2014&rgq=D14-SG01-RGQ01.1&stg=1

³⁷ See www.itu.int/en/ITU-T/studygroups/2017-2020/03/Pages/default.aspx

The paper identifies key questions, such as whether there is an even need for regulation of OTT services, security concerns, issues arising because of net neutrality and network discrimination and traffic management practices. The consultation paper concludes that national policy issues arising from the rapid growth of OTT services need to be addressed, including the various regulatory imbalances at different levels and by different agencies of Government, the security issues (including law and order dimensions) that have surfaced because of the growing popularity of the OTT services, and the growth of OTT impacting the economy (positively or negatively) in the short-term and long-term.*

Alongside the TRAI consultation paper, the Department of Telecommunications (DoT) has also released a report in July 2015, recommending the regulation of OTT services to ensure a level playing field in the sector. In its report, the panel recommended that OTT services offering local voice calls should be regulated through the exercise of licensing powers, available under section 4 of the *Indian Telegraph Act*. The committee also recommended the incorporation of a clause in the licence conditions of telecom and Internet service providers which will make them adhere to the guidelines prescribed by the government on the issue of net neutrality, firmly standing against the zero rating plans of telecommunication operators and any sort of prioritization of Internet traffic.**

Although much public consultation has come out of these two reports, no final decision has been made in India on the regulation of OTT services due to the TRAI not yet issuing a set of recommendations, based on which the DOT could make a final decision.***

* www.trai.gov.in/sites/default/files/OTT-CP-27032015.pdf

** www.business-standard.com/article/economy-policy/dot-panel-recommends-regulation-of-ott-services-115062901025_1.html

*** <https://thewire.in/46706/what-happened-to-the-consultation-on-licensing-of-whatsapp-like-applications/>

In this section, a number of key regulatory issues relating to online and digital content services that need to be addressed in order to move to a new forward looking regulatory regime are assessed:

- (i) competition issues;
- (ii) licensing of online service providers;
- (iii) interconnection frameworks;
- (iv) universal service;
- (v) net neutrality and zero rating of content;
- (vi) consumer privacy;
- (vii) consumer rights;
- (viii) quality of service;
- (ix) numbering issues;
- (x) content regulation;
- (xi) cyber security;
- (xii) approaches to International Mobile Telecommunication (IMT) spectrum availability; and
- (xiii) taxation arrangements.

2.1 Competition issues

While some of the key relevant competition issues have already been discussed earlier in this report, further discussion of competition issues related to the app economy is necessary. Firstly, it is important to emphasise that the telecommunication/ICT sector is generally subject to a specific system of sector regulation (*ex-ante* and dominant operator regulation, particularly on access and interconnection), as well as competition law. Because services offered by online service providers do not fall within the traditional definitions in such regulation, global online service providers are outside the scope of sector specific regulation and can sometimes escape competition law scrutiny altogether, due to the characteristics of their business model.³⁸

In countries where a generally applicable system of competition law applies, all market participants including online service providers are however subject to competition law.

Where the competitive circumstances allow, in fast moving markets, a case-by-case assessment under the competition rules is more likely to lead to more effective competition and better outcomes for consumers than *ex ante* regulatory intervention under the significant market power (SMP) rules. This is because any direct regulatory intervention in the market, not supported by clear data, can distort the incentive structure of firms (for example, by distorting the incentives to invest, or engendering a different pricing behaviour) and harm consumers and typically results in welfare loss.

At the same time, generally applicable competition rules, when available, should be applicable to all service providers – operators and others. A proper assessment of the competitive position in the market can show that developers, owners of operating systems (through patents) and smartphone makers (especially if vertically integrated – players such as Apple owning handsets, operating systems and software) have market power. A company with intellectual property at each stage of the value chain may be able to leverage market power from upstream to downstream due to their position of ownership, highlighting the importance of intellectual property in the digital age. The application of the competition rules is therefore more likely to lead to a level playing field between operators, ensuring that the same services are subject to the same rules.³⁹

While there is a general agreement around this principle, there might be stumbling blocks along the way. Existing rules, procedures, enforcement mechanisms as well as the skills at the regulatory authorities might need to be revised and upgraded. The focus should move from the core ICT sector towards a cross-sector view that would allow to capture significant market power across platforms and layers and measure its scale. Regulators would need to carry complex analysis holistically and ‘add up’ market power in the various segments into a global equation. The structure and dynamics of market power in the app economy are fundamentally different from the analogue era and the regulatory interface need to be able to account for the new market realities.

There has been debate about the potential market power of app platforms. It is clear that the market is evolving so rapidly that an analysis based solely on traditional measures of concentration risks invoking regulation before the markets have had time to settle and potential market power has solidified. But any interpretation of concentration measures must be done with caution since the market is still developing and market shares have risen and fallen dramatically over a short period of time. It will become more and more difficult to establish specific rules for behaviour that should be applied in the regulatory environment, as well as for the choice of remedies or restrictions that should be imposed. Commercial strategies in the app economy are more complex, and maybe a case-by-case assessment will have to play a greater role. This may mean a greater reliance on general competition policy or a change in the nature of regulatory obligations, making them more competition-policy like. Even

³⁸ www.gsma.com/publicpolicy/wp-content/uploads/2015/10/Competition-Policy-Handbook.pdf

³⁹ *Ibid.*

where general competition law gains in importance, the sectoral expertise of regulatory authorities will continue to be extremely valuable.⁴⁰

2.2 Licensing of online service providers

Licensing structures in the telecommunication/ICT sector have been relatively static for some time, even though various attempts have been made to reform them, including by ITU⁴¹. While perhaps licensing structures have been underpinned by national WTO telecommunication sector commitments, in general licensing in the sector is focused on regulating infrastructure and services typically with a number of sub-categories. Telecommunication licensing regimes are arguably less focused on market entry and more concerned about the rights and obligations of market participants. The rapid growth of the app economy and global online service providers raises significant questions on whether such structures ought to be amended.

Converged licensing frameworks – featuring unified licenses and simplified administrative procedures – are playing an important role in the app economy, rendering the market attractive, enhancing ease of doing business, and helping unlock market potential. Such reforms are most effective if technology neutrality and flexibility are applied to the rights and obligations of ICT operators, and to elements such as interconnection, numbering, universal service, and spectrum use.

With the advent of global app economy players, licensing matters have become more complex. One argument has it that offering substitutable services should be subject to the same licence fees obligations as MNOs, subject to modification of the definition of relevant revenues for the purposes of calculating licence fees.

Going forward, alternative approaches to licensing may have broader merit in telecommunication and broadcasting sectors depending on the market and services concerned. They include:

- **Temporary licensing:** Apply temporary rules/grant licences for a limited period, say of two years, in order to permit greater study or to bring online service providers within the scope of domestic regulation.
- **Transition arrangements:** Put in place transition schemes to compensate existing stakeholders or reduce the costs face by existing market participants; or
- **Deemed class licensing:** Another alternative approach is to use deemed class licensing for say web content such that services while not being located in the jurisdiction may be subject to a country classification regime (e.g., with respect to nudity, violence, etc.). Such an approach has been used in Singapore and has been debated in Malaysia and Indonesia.

While such measures have not generally been adopted by telecommunication/ICT regulators except by the issuance of ‘no objection certificates’ to a telecommunication operator asset transfer ahead of later formal licensing,⁴² there would be merit for example, in having the ability to temporarily licence innovative services pending more detailed analysis or bring certain services within the penumbra of domestic regulation. New telecommunication legislation in selected jurisdictions would certainly permit this.⁴³ Putting in place transition from existing licensing and other sector regulatory regimes may also be required going forward.

⁴⁰ ITU Report on completion and regulation in a converged broadband world, https://www.itu.int/dms_pub/itu-d/opb/pref/D-PREF-EF.COMPREG-2013-PDF-E.pdf

⁴¹ For example, see ITU, *Trends in Telecommunication Reform, 2004/05. Licensing in the Era of Convergence*.

⁴² For example, the no objection certificate issued by the Bangladesh Telecommunications Regulatory Commission (BTRC) in relation to the tower company spinoff (i.e. passive infrastructure transfer) to edotco Bangladesh from Robia Axiata Limited dated 15 January 2013.

⁴³ For example, the Cambodian *Law on Telecommunications 2015* promulgated 17 December 2015 provides in Article 17, for the licensing of operations (other than infrastructure and services) to be determined by Prakas of Ministry of Posts and Telecommunications Cambodia.

Another approach that has considerable merit is industry regulation, which includes the formulation of industry codes of conduct, or self-regulation. Often codes of conduct are industry specific and will be decided by all operators or retailers within a given market amongst themselves. Examples of markets with a self-imposed code of conduct include the United Kingdom ISP Code of Practice, which is uniform and obligatory on all members.⁴⁴

The chief appeal of such regulation to providers is that, where sufficient self-regulation is accepted by market participants, telecommunication/ICT regulators will not seek to impose more stringent rules. They help determine market conduct and can provide improved visibility to government on how and when they can achieve policy objectives.

Regulators may also favour such mechanisms as they are flexible, can be implemented perhaps quicker than formal regulation and move the cost of regulatory compliance to market players. Importantly, the licensing regime has moved from a tool that was mainly focused on restricting and regulating market entry to a tool that formulates the rights and obligations of new entrants. In that context, industry self-regulation is an alternative since if industry signs up to an appropriate code of conduct this could determine the conduct in the market and provide more transparency toward government on how and when they can achieve national policy objectives, such as, coverage of unserved and underserved areas.

It should also be noted that high operational licensing fees (based on a percentage of revenue or similar) imposed on telecommunication licensees may need to be reduced going forward if comparable online service providers are not subject to similar licensing cost imposts.

2.3 Interconnection frameworks

There are two main dimensions to the issue of app economy players and interconnection challenges. Firstly, by generating demand for bandwidth, which can lead to congestion and quality issues for network operators, online service providers are perceived as generating additional expenses in next generation infrastructure investment, without making a contribution to these expenses through the 'access and interconnection' arrangements they make with telecom operators.⁴⁵

In response, some network operators are advocating some sort of peering agreements to be in place between themselves and the application vendors that would share the profits. This is similar to how networks currently share arrangements for call and SMS traffic with their counterparts overseas. In this arrangement, traffic is generally allowed freely without restriction but over a certain volume both parties pay each other for termination rights. Given that their networks are impacted by online service providers, it may be reasonable for operators to apply these same terms to the data/Internet services being provided.⁴⁶

Secondly, the regulatory treatment of traditional voice services using national numbering plans so as to ensure interconnection and interoperability differs considerably from that of online service providers. Based on ITU data⁴⁷, the termination of voice calls to fixed or mobile networks is highly regulated in the majority of countries as a result of market power of the terminating network operator (see Figure 10). There are, however, no obligations for communication applications running on the Internet such as VoIP and messaging application to be interoperable, and in practice most online-only applications are not.

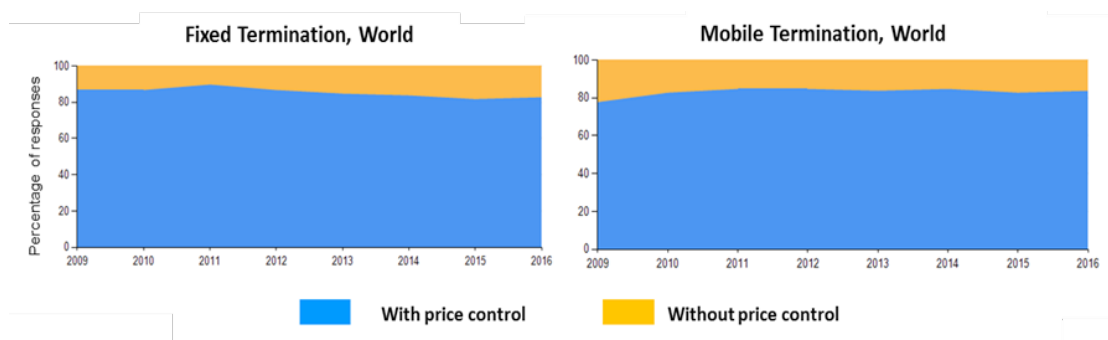
⁴⁴ See www.ispa.org.uk/about-us/ispa-code-of-practice/

⁴⁵ [www.europarl.europa.eu/RegData/etudes/STUD/2015/569979/IPOL_STU\(2015\)569979_EN.pdf](http://www.europarl.europa.eu/RegData/etudes/STUD/2015/569979/IPOL_STU(2015)569979_EN.pdf)

⁴⁶ <http://bigthinkingapplied.com/telecoms-selectively-blocking-voip-applications/>

⁴⁷ ITU ICTEye : www.itu.int/itu-d/icteye/Default.aspx

Figure 10: Mobile and fixed termination regulation (price control) – Global evolution 2009 to 2016



Source: ITU Tariff Policies Survey, ICT Eye, www.itu.int/icteye.

Notably, however, this does not necessarily raise problems for consumers, due to the ease by which customers can subscribe to multiple online applications simultaneously (known as multi-homing), rather than having a single subscription as is common or managed fixed or mobile telephone services. The fact that the majority of customers also have a fixed or mobile managed service further mitigates concerns over interoperability; however, this lack of interoperability may create challenges for entrants in the online communications space if they are too small to benefit from network effects. If online services were to substantially replace conventional voice calls over time, this might either increase or decrease interoperability concerns.⁴⁸

Even if a lack of interoperability becomes a concern, it is worth recalling that legislation and regulatory obligations are only one route to interoperability. Voluntary standards could also provide solutions. The Internet is by design an interoperable system, and associated services such as email are also interoperable; however, this interoperability is not legislated. Interoperability came about through voluntary adherence to standards (including Internet Protocol and the related protocol suite). Whether technical standardisation alone would suffice is not altogether clear today. Economic theory suggests that incentives to interconnect are similar to those for standards compliance, and pose potential challenges. Small firms will be motivated to interconnect and to interoperate, but a firm that is sufficiently large (both in absolute terms, and in comparison to its next largest competitor) will tend not to be motivated to interconnect or to interoperate.⁴⁹

In India, the TRAI has released a consultation paper on the issue of interconnection asking whether the country needs to change the current approach, where users are not charged for incoming calls and only the calling party pays. It asks this in the context of WhatsApp and Skype calls, where both the users receiving and making the call pay for data usage. TRAI points out that on IP-based networks, there has been no custom globally of levying termination charges for the traffic arriving in a particular network, and that users simply pay for data. This can be related to the existing bill-and-keep (BAK) method wherein a telecommunication operator does not pay any termination charge to its interconnecting operator.⁵⁰

Overall, creating a converged reference framework for competition, interconnection and interoperability can effectively facilitate the relationships among the various providers of infrastructure and services, as well as among them and apps and content providers.⁵¹

⁴⁸ [www.europarl.europa.eu/RegData/etudes/STUD/2015/569979/IPOL_STU\(2015\)569979_EN.pdf](http://www.europarl.europa.eu/RegData/etudes/STUD/2015/569979/IPOL_STU(2015)569979_EN.pdf)

⁴⁹ Idem.

⁵⁰ www.medianama.com/2016/08/223-trai-iuc-voip-paper/

⁵¹ ITU, GSR15 Best Practice Guidelines to facilitate the widespread adoption and use of mobile applications and services through targeted regulation, www.itu.int/bestpractices

2.4 Universal service

It is generally accepted that the underlying concept of universal service is to ensure that telecommunication services are accessible to the widest number of people (and communities) at affordable prices.⁵² Universal access and service (UAS) is generally achieved through a combination of liberalization measures and regulatory reform as well as dedicated financing instruments and additional measures that have an impact on affordability, availability and accessibility and stimulate expansion beyond 'normal' market forces into rural and remote areas and including marginalized population groups. Mechanisms that have been applied by countries over the years to achieve universal access and service have often included:

- market based reforms such as authorization and licensing, spectrum management, access and interconnection, competition regulation, numbering;
- mandatory universal service obligations;
- cross subsidies and access deficit charges;
- private public partnerships (PPPs);
- universal service financing, including funds.

The fact that 75 per cent of ITU Member States have some kind of universal access and service policy and regulation in place illustrates the need to adapt current legal instruments and to ensure their implementation. Problems of ownership and governance are common, although largely undisclosed. This constitutes a kind of double 'cul de sac' often surrendering universal access and service, and universal service funds in particular, to persistent issues while preventing opportunities for discussion and problem solving.

A 2011 ITU GSR discussion paper⁵³ suggests that over the past two decades the scope of universal service and universal access, which describe the level of ICT inclusion, has widened. Historically inclusion related to basic voice, including access to emergency services and access for people with disabilities. Today, however, universal service and universal access is increasingly being re-conceptualized to include Internet – and even broadband – and to address issues around digital inclusion.

In addition to issues concerning the use of universal service funds⁵⁴ and the large balances of many universal service obligation (USO) funds,⁵⁵ another outdated requirement of USF globally is the discrimination seen in levying only infrastructure-based communication providers for universal service and not their online service provider competitors.

Many operators argue that consideration should be given to extending levy liability to online service providers of telecommunication services as they offer substitutable services, benefit from the availability of their network infrastructure that was built primarily to deliver the USO, and do not currently purchase wholesale inputs from the carriers to provision their services. This argument is based on the idea that a user-pays levy base should ideally capture all those who benefit from the services that it funds. To minimise distortions, the base should include all providers in the levy that

⁵² www.itu.int/en/ITU-D/Conferences/GSR/Documents/ITU%20USF%20Final%20Report.pdf

⁵³ www.itu.int/ITU-D/treg/Events/Seminars/GSR/GSR11/documents/06-Universal-broadband-access-E.pdf

⁵⁴ Notably, an ITU study entitled *Universal Service and Digital Inclusion for all in 2013* recommended a number of reforms. See www.itu.int/en/ITU-D/Regulatory-Market/Documents/USF_final-en.pdf. A GSMA study also found numerous "challenges, pitfalls and deficiencies" in USO arrangements across the globe, including the fact that many underlying USO rules do not support or permit use of the funds for services arguably required in today's society, such as wireless and broadband www.gsma.com/publicpolicy/wp-content/uploads/2016/09/GSMA2013_Report_SurveyOfUniversalServiceFunds_KeyFindings.pdf

⁵⁵ Certainly, the universal service obligations are frequently defined narrowly, in ways that do not favour new technologies. For example, wireless technology is now the preferred means for voice communications and the number of users on the fixed network is in decline, yet some USO arrangements are voice-only and support the provision of payphones, with no guarantees for mobile or Internet services www.gsma.com/publicpolicy/wp-content/uploads/2016/09/GSMA2016_Report_NewRegulatoryFrameworkForTheDigitalEcosystem_English.pdf

supply services that are close substitutes, particularly where there is evidence of convergence in telecommunication services.⁵⁶

However, it was argued in 2016 by the Australian Productivity Commission in the *Telecommunications Universal Service Obligation Draft Report* that developing equivalent regulation for online service providers, let alone including them in an industry levy base, presents several practical challenges.

Primarily, although these new services can disrupt the market, they also benefit consumers and apply competitive pressure on existing market players. There is a risk that extending existing regulatory arrangements to online service providers may discourage efficiency among incumbent as well as new market players. Simply extending regulation without an assessment of its consequences and differences in risk between traditional and new business models could quash innovative new approaches, reduce choice, and result in consumers paying higher prices than they otherwise would.

Secondly, there are practical challenges to whether existing regimes can be feasibly extended to these new entrants, or whether this would be too administratively difficult and may even be bypassed. Certainly, the different and often global nature of online service providers makes it difficult in practice to subject them to the same rules as those imposed on traditional telecommunication operators. From these conclusions, the Productivity Commission in Australia argued that rather than extending existing regulations, governments should use such disruption as an opportunity to reassess risk and adjust regulation accordingly.⁵⁷

Ultimately, reforms to USO which focus on USO funds, reduce overall contributions and/or such costs go on-budget should mean this issue of any online service provider contributions will fall.

2.5 Net neutrality and zero rating of content

Net neutrality is the principle that Internet service providers including network operators should enable consumer access to all Internet content and applications regardless of the source, and without favouring or blocking particular products or websites.

Globally, there has been considerable debate about net neutrality that has centred around three basic approaches⁵⁸ by countries globally namely:

- **Cautious observation:** where countries have taken note of net neutrality issues however have not currently chosen to take any specific measures to address these issues;
- **Tentative refinement:** where countries adopt a light-handed approach, with some refinements to the existing regulatory regime governing communications services, but not going so far as to prohibit certain behaviours; and
- **Active reform:** with countries have gone further and sought to prohibit specific behaviours by ISPs, often subject to reasonable network management practices (for example the United States⁵⁹ and European Union⁶⁰).

⁵⁶ www.pc.gov.au/__data/assets/pdf_file/0017/202373/sub030-telecommunications.pdf

⁵⁷ Ibid.

⁵⁸ See ITU GSR 2012 discussion paper, Net Neutrality: A Regulatory Perspective: www.itu.int/ITU-D/treg/Events/Seminars/GSR/GSR12/documents/GSR12_Webb_NetNeutrality_1.pdf

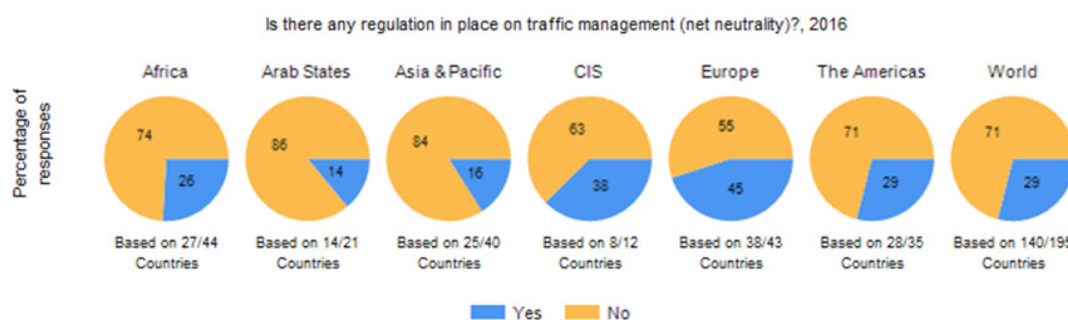
⁵⁹ See https://apps.fcc.gov/edocs_public/attachmatch/FCC-15-24A1.pdf. However, Ajit Pai, Chairman of the United States Federal Communications Commission (FCC) on 28 February 2017 at a presentation at the GSMA Mobile World Congress in Barcelona, stated that the net neutrality rules were a "mistake" and that "our new approach injected tremendous uncertainty into the broadband market. And uncertainty is the enemy of growth." He went on to argue that the broadband market would benefit more from "light-touch Internet regulation."

⁶⁰ See EU Regulation 2015/2120 of 25 November 2015 (<http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32015R2120&from=EN>) and subsequent BEREC Guidelines on the Implementation by National Regulators of European Net Neutrality Rules, BoR (16) 127 (<http://berec.europa.eu/eng/netneutrality/>)

While in some geographies there is a move away from net neutrality principles including permitting zero rating⁶¹ as discussed earlier, there is a growing imbalance in the market power of domestic network operators and global online service providers with it shifting significantly in favour of the largest online service providers and app economy players. Arguably, a particular ISP could not threaten to withdraw or charge a service provided by global OTT providers such as Google or Amazon, as the loss of this service would have a substantial impact on the ISP and it would face a material risk of client loss to other ISPs that did have access to these services.⁶² How this competitive dynamic plays out in future dealings between carriers and app economy companies is difficult to predict but it is reasonable for regulators to consider what powers they might require to address potential misuse of new market power.

Looking to address the growing number of issues around net neutrality, a growing number of ICT regulators from all regions have tried to ensure competitive neutrality across service providers and delivery platforms. Based on the results from the ITU Regulatory Survey 2016, 41 out of 140 countries reported to regulate, in some way, traffic management related with net neutrality with the application of legal instruments (see Figure 11). It is interesting to note, that several countries highlighted the application of guidelines and best practices. In the European Union (EU), a new regulation contains a set of rules on traffic management and measures concerning open Internet access that countries should apply.

Figure 11: Regulation in place on traffic management (net neutrality by region)



Source: ITU Regulatory Survey 2016, ICT Eye, www.itu.int/icteye

Regulatory approaches to net neutrality need to take into account local conditions, particularly the level of retail competition to access the market. In competitive markets, mandating net neutrality may be excessive: barriers to users switching between ISPs will be low, and ISPs will be less likely to discriminate against unaffiliated OTT content. However, in less competitive markets, regulatory intervention may be required. Such intervention can range from lighter-touch options – such as requirements for transparency or minimum quality of service – to more direct approaches, such as no-blocking or non-discrimination rules that apply to Internet traffic.⁶³

As a minimum, it is suggested that net neutrality provisions, as agreed during major regional trade negotiations, should be endorsed as a way of ensuring a better level playing field. For example, in the Trans Pacific Partnership (TPP) Agreement, it had been agreed “subject to applicable policies, laws and regulations, the Parties recognise the benefits of consumers in their territories having the ability to the access and use of services and applications of a consumer's choice subject to reasonable network

⁶¹ See <http://fortune.com/2017/02/03/trump-fcc-zero-rating-att-verizon/>

⁶² ITU GSR 2012 discussion paper, *Net Neutrality: A Regulatory Perspective*.

⁶³ ITU, Interactive multimedia services for Asia-Pacific: trends and insights, 2015.

management, the connection of end-user devices of the consumer's choice, and the availability of information on network management practices.”⁶⁴

2.6 Consumer privacy

The rise in the use of Internet for e-commerce, online streaming, and social networking has made large-scale data gathering and analysis a valuable strategic asset for market players in the digital ecosystem. In this fast-developing environment, online service providers have adopted a wide variety of business models that facilitate data collection, including pay-per-use, subscription services with no usage charges, and services that are free to access and funded by advertising income.⁶⁵ Commercial practices such as the collection of personal information, and its use and monetization by service providers have become a growing area of concern and a compelling candidate for the imposition of more stringent rules – and an enforcement priority.⁶⁶

While regulators strictly monitor data protection and privacy requirements for users by operators, the regulation of online service providers is often practiced on a rather limited and generally voluntary basis, with there being minimal regulatory constraints.⁶⁷ In light of this, the dissemination of data in the digital ecosystem could be described as a ‘hidden cost’ to consumers, with concerns that information in the possession of online service providers may not be adequately protected and used inappropriately. For example, some online services may collect users’ private information for commercial gains without making the customer fully aware of the exact details of the use and storage of that information.⁶⁸

Critically, differences in regulatory treatment of data protection and privacy concerns causes a void of protection for citizens and an uneven playing field in the market. Consumers should be able to form consistent expectations about how their information is collected and used. It is therefore arguable that online service providers offering substitutable services should be subject to the same data protection and privacy obligations as MNOs, so as to provide a stable and level regulatory environment where competition and consumer choice and protection is promoted.⁶⁹ This is an issue that could be solved by improved collaboration among the different regulators involved (consumer protection, data protection, competition and ICT).

Regulators, globally, have recommended that OTTs adopt more transparency around data processing, obtaining the consent of their customers through opt-in before sharing their data, and allowing users to select the status of their communications (private or public). Users should be able to make informed decisions about how much of their data can be accessed by others and the usage that third parties make of it.⁷⁰

Nonetheless, it will be critical that new regulation does not act as a barrier to entry into the market for online service providers, providing clear guidance for market players and consumers on the scope and content of the new rules. When regulators fail to provide clear guidance, or force online service providers to seek advisory opinions to determine what types of activities are permitted, regulatory risk increases and innovation slows. At the same time, the absence of consistent standards harms consumers by causing uncertainty and confusion about which rules apply to which services or providers.⁷¹ In

⁶⁴ See Article 14.10 in Electronic Commerce Chapter of the Trans Pacific Partnership (TPP) Agreement. Available at www.mfat.govt.nz/Treaties-and-International-Law/01-Treaties-for-which-NZ-is-Depositary/0-Trans-Pacific-Partnership-Text.php

⁶⁵ www.gsma.com/publicpolicy/wp-content/uploads/2016/10/GSMA_Resetting-Competition_Report_Oct-2016_60pp_WEBv2.pdf

⁶⁶ ITU, Global ICT Regulatory Outlook 2017, www.itu.int/go/outlook.

⁶⁷ Commonwealth Telecommunications Organisation, ‘*Understanding the Dynamics of OTT Services*’, October 2016.

⁶⁸ www.gsma.com/publicpolicy/wp-content/uploads/2016/09/GSMA2016ReportNewRegulatoryFrameworkForTheDigitalEcosystemEnglish.pdf

⁶⁹ Ibid.

⁷⁰ ITU, GSR14 Best practice guidelines on consumer protection in a digital world, www.itu.int/bestpractices

⁷¹ www.ovum.com/indonesia-levels-up-telecoms-regulatory-environment-to-include-ott-providers/

certain countries and regions, regulators have put privacy and data protection rules in place covering online service providers, the most notable being the European Commission (EC) proposed Privacy and Electronic Communications Regulation, as detailed below.⁷² The ePrivacy Directive and the General Data Protection Regulation provide the legal framework to ensure digital privacy for EU citizens. The EC has reviewed the Directive to align it with the new data protection rules.

ITU has observed⁷³ that there is at least the beginning of some global convergence in terms of the content and approaches in data protection laws, with a trend towards adoption of laws along the 'European' lines. Consequently, these new proposals by the EC, if successful, could become a 'global reference' for data protection in the digital age. The trend is towards laws mirroring the model of the EU Data Protection Directive and the establishment of special, independent and adequately resourced privacy or data commissioners with strong investigative and enforcement powers. 'Model Laws' have been drafted with support of ITU and the EU for the Caribbean, and central Africa, and sub-Saharan Africa.

There is strong global support too for closer and more effective cross-border cooperation. Part of this concerns the development of rules and tools to allow international data transfers – either because they occur between countries that effectively have the same levels of protection – or because 'appropriate safeguards' are provided by various means and mechanisms such as data transfer contracts, binding corporate rules, sectoral codes of conduct or privacy seals.⁷⁴

Notably, in opposition to the EC proposal, Facebook, which uses full-scale encryption on WhatsApp, argued that extending the rules to online messaging services would mean they could in effect 'no longer be able to guarantee the security and confidentiality of the communications through encryption' because governments would have the option of restricting the confidentiality right for national security purposes.⁷⁵ Other major players of the app economy have also voiced their concerns regarding the implementation of the proposal. However, despite the arguments, more than three quarters of citizens and civil society organisations who responded to the public consultation on the EU privacy rules believed the law should be extended to cover online service providers.⁷⁶

The European Commission newly proposed Privacy and Electronic Communications Regulation

The EC e-Privacy regulation extends to all electronic communication providers, to keep pace with technological developments and 'fill the void of protection of communications conveyed through new services.' The proposed rules from the EC, announced in January 2017, will extend the scope of current rules to all electronic communications providers, for the first time including OTT services such as WhatsApp Messenger, Skype and Viber within their scope.¹ It is clear from the proposals that the Commission wants these new regulations to closely align with the General Data Protection Regulation (GDPR), with the new rules set to be adopted by 25 May 2018, the day the GDPR comes into force.

¹ <http://eurocomms.com/industry-news/12043-european-commission-extends-privacy-regulation-to-ott-providers>

⁷² www.gsma.com/publicpolicy/wp-content/uploads/2016/09/GSMA2016ReportNewRegulatoryFrameworkForTheDigitalEcosystemEnglish.pdf

⁷³ <http://www.itu.int/en/ITU-D/Conferences/GSR/Pages/GSR2016/Papers.aspx>

⁷⁴ ITU, GSR-16 discussion paper, Maintaining trust in a digital connected society, www.itu.int/gsr16

⁷⁵ www.itnews.com.au/news/ott-players-face-telco-like-regulation-in-eu-433879

⁷⁶ <https://arstechnica.co.uk/tech-policy/2016/08/eprivacy-cookie-law-consultation-results/>

The rules cover the privacy of Internet users, requiring:

- Content and metadata in electronic communications to be anonymised or deleted if users have not given their consent, unless it is being used for billing purposes.
- Unsolicited electronic communication to be banned if users have not consented.
- Marketing callers to display a phone number or use a special prefix to indicate that the call is for marketing purposes.
- Users to be able to accept or refuse the tracking of cookies.
- Services to alert end-users in case of a particular risk that may compromise the security of networks and services.

Users of electronic communications services would also obtain a right to object to the processing of their electronic communications data, and could potentially win compensation from communications providers if they have 'suffered material or non-material damage as a result of an infringement' of the new rules by those companies.¹

Enforcement of the rules will be carried out by national data protection authorities. If implemented, the new Regulation would also require regulators to cooperate on enforcement action where breaches have a cross-border. The maximum penalty that could be imposed, which only applies to certain breaches, would be a fine of up to 20 million euros (USD 21.45 million), or 4 per cent of their annual global turnover, whichever is the highest.²

¹ <https://ec.europa.eu/digital-single-market/en/news/proposal-regulation-privacy-and-electronic-communications>

² www.out-law.com/en/articles/2017/january/plans-for-new-e-privacy-regulation-published-by-european-commission/

2.7 Consumer rights

In general, consumer rights, established under the laws of many countries, include:

- fair value, good quality and safety;
- fair and honest dealing;
- fair and reasonable marketing;
- supplier accountability;
- just and reasonable terms;
- disclosure of information;
- redress mechanisms that are easy to access and quick to resolve issues.

Underpinning these laws is an economic perspective that typical suppliers have significantly greater power than typical consumers and that (at least some) suppliers are prepared to adopt business models that exploit consumers under which there may be limited options for direct redress. These provisions also aim to prevent retailers from gaining an unfair competitive advantage over other retailers and so aim to prevent the wider competitive process at the expense of consumers. The objectives underpinning these laws make it critical that such consumer protection mechanisms apply even-handedly to online service providers and their competitors.

Certainly, transactions that take place over the Internet and through application-based platforms raise a number of consumer issues that do not arise in face-to-face transactions, such as the inability

to examine a physical product before purchasing. However, despite the changed business model of online service players, most jurisdictions have continued to use existing general and specific consumer protection mechanisms supplemented by codes and guidelines to provide consumer protection and redress for online activities.⁷⁷

Yet the differing nature of digital products and the changing business models within the digital and sharing economies raise a number of emerging issues for regulators. For example, regulators have struggled with the legal characterisation of digital content and services, leaving it uncertain as to whether such content and services are caught by existing consumer protection mechanisms. In addition, the often global operation of online service providers raises jurisdictional issues for enforcement. Businesses operating in low regulatory jurisdictions, but supplying goods or services within high regulatory jurisdictions will attempt to exclude the operation of warranties or guarantees by choosing the law of another country as the applicable law. Notably, jurisdictions have attempted to counter this behaviour by prohibiting contracting out, broadening extra territorial application of law and ensuring harmonisation of laws at least nationally and in some cases within regions.⁷⁸

Although it is advised that these emerging issues need to be addressed as consumer protection rights should apply even-handedly across the market, it should also be noted that innovation could be hampered by regulations tailored to a specific (arguably legacy) business model. Capturing the benefits of innovative business models will require regulations that allow for growth and changes in the industry without sacrificing consumer protections developed over many years.⁷⁹

2.8 Quality of service

Most operators have to comply with stringent rules set by national regulators regarding complying with quality of service (QoS) obligations for their service offerings including in many cases broadband and wireless broadband services. In some jurisdictions, it is mandatory for operators to also provide customer care services and put mechanisms in place to address customer complaints, where minimum QoS requirements are often written into an operator licence.

In contrast, online service providers do not have to provide any QoS guarantees, instead QoS issues with online services are often blamed on network providers.⁸⁰ However, it should be highlighted that online service providers make efforts to improve user experience such as questionnaires at the end of VoIP calls that ask about the quality of user experience, as well as their investments in data compression and quality of service.⁸¹ Although it is unclear how such information is used and it is never published.

The different obligations of service providers are rarely apparent from a user point of view. However, behind the screens, the differences and risks for consumers may be significant – especially in terms of the confidence that the public may reasonably place in them. Online service providers may be able to provide much lower service quality, either because they focus on services where QoS may be of limited relevance, or on users who are less demanding and willing to accept best effort services, especially when they are free of charge. However, as the user base for online services grows, the QoS offered by these apps may deteriorate as congestion increases.⁸²

It is arguable that, because these are comparable services, QoS obligations that are applied to network operators should also apply to online service providers. However, for VoIP calling in particular, these

⁷⁷ See ITU, *Trends in Telecommunication Reform 2015*, Chapter 5 on consumer protection in the online world and http://consumerlaw.gov.au/files/2016/05/ACL_Comparative-analysis-overseas-consumer-policy-frameworks_Part4-1.pdf

⁷⁸ Ibid.

⁷⁹ www.itu.int/en/ITU-D/Conferences/GSR/Documents/ITU_AppEconomy_GSR16.pdf

⁸⁰ www.orange.com/fr/content/download/28314/619959/version/2/file/Regulation_of_digital_services_2_December_2014.pdf

⁸¹ www.cto.int/media/CTOOTTStudyPaperFinal_ReviewedDraft04Oct2016.pdf

⁸² Ibid.

promises may be more arduous for online service providers to keep, particularly because the service that they provide is so latency-sensitive.⁸³

QoS and quality of experience measuring is becoming more and more complex. Quality can be impacted by many factors at the network level and along the value chain – including the device, hardware, infrastructure, service and apps. In addition, differences may arise between perceived and assessed QoS. Traffic management techniques may be put in place when congestion is being experienced. However, these should be utilised to maximize network utilisation while minimizing the effect on most users. To enable consumers to test their broadband connection and monitor the broadband QoS, national regulatory authorities (NRAs) are increasingly providing broadband speed test tools free to all via their websites. Furthermore, as they define appropriate QoS standards, it is important to maintain an environment where consumers have the ability to choose services according to their needs.⁸⁴

NRAs ought to assess QoS obligations and their application so as to both legacy and new telecommunication/ICT and digital content services. This seems to be happening in a number of markets including Egypt, Malaysia, Thailand, and the United Kingdom, where there has been regulatory action.

Going forward, regulation is pressing for greater accountability and measurement in the QoS area. Such regulation will build on and replace monitoring schemes that have been in place for some years, targeting dominant operators or groups of players for a narrow set of requirements, in an attempt to level the playing field and deter abuse of market power. Now the app economy with its new market dynamics and increased consumer demand contribute to the pressure for change as more countries move towards a regulatory framework with fully integrated monitoring of performance and QoS.⁸⁵

2.9 Numbering issues

When considering the impact on numbering, numbering plans, and related issues from online services, there would seem to be two major issues that need to be addressed.

The first is whether VoIP providers are able to allocate numbers consistent with the national number plans. In Australia variations were made by the Australian Communications and Multimedia Authority (ACMA) in 2011 to the Australian Numbering Plan. Among other changes, this allowed VoIP providers to use geographic and location-independent communication services for carriage services only offering outgoing calls.⁸⁶

In the United Kingdom, in an attempt to encourage online service providers to provide legal intercept and emergency call access they are offered geographic numbers if they agree to provide these services – otherwise they are assigned numbers from a VoIP specific range which is clearly identifiable. In Europe, the former European Regulator Group – now BEREC- common position on VoIP recommends that geographical numbers for traditional telephony services and geographical numbers for VoIP services should share the same number range, i.e. come from a common number pool (ERG, 2007).

The second is the ability of non-mobile network operators to secure mobile network codes (MNCs). Following an advocacy campaign by CEPT-ECC⁸⁷ which included an analysis of the emerging demand for MNC resources for *inter alia* MNOs, MVNOs, MVNEs and resellers, a decision was taken by ITU in 2016 to allow a range of non-mobile network operators to secure MNCs. This resulted in a change

⁸³ www.bna.com/fcc-struggles-regulate-n17179877146/

⁸⁴ For an in-depth discussion on QoS regulation, please see: Quality of Service Regulation Manual, ITU, 2017: https://www.itu.int/dms_pub/itu-d/opb/pref/D-PREF-BB.QOS_REG01-2017-PDF-E.pdf

⁸⁵ ITU, Global ICT Regulatory Outlook 2017, www.itu.int/go/outlook

⁸⁶ The Australian Telecommunications Numbering Plan Variation 2011 (No. 1) allowed VoIP providers to use geographic and location-independent communication services numbers for carriage services that are only capable of making outgoing calls. It also provided a framework for geographic numbers to be used for carriage services outside their normal area.

⁸⁷ See ECC Report 212, *Evolution in the Use of E.212 Mobile Network Codes*, 9 April 2014. Available at www.erodocdb.dk/Docs/doc98/official/pdf/ECCREP212.PDF

to E.212 *The international identification plan for public networks and subscriptions*.⁸⁸ ITU-T Study Group 2 is home to this Recommendation, which describes a system to identify mobile devices as they move from network to network. International mobile subscriber identity (IMSI) is a critical part of the modern mobile telecommunication system, allowing the identification of a roaming mobile terminal in a foreign network and subsequently the querying of the home network for subscription and billing information⁸⁹.

These changes need to be reflected in national numbering plans.

2.10 Content regulation

The main focus of content regulation is on the restriction of access to certain content to protect vulnerable members of the community and to ensure that community standards are reflected in content that is easily accessible by all members of the public. Access to content can be restricted in three ways, namely:

1. **Classification and levelling systems** that provide information to parents and responsible adults on suitable content for children and dependents.
2. **Content codes** that contain rules and guidelines for content providers and distributors that limit certain content or place on restrictions on how certain content can be presented.
3. **Industry self-regulation** generally through the development of industry codes that are ultimately self-enforced.

Up until now, the regulation of content has been focused on traditional media platforms – television, radio, film and print – in regional settings, with standards enforced by regulators and industry. However, the emergence of global digital streaming services such as Netflix has led to a reevaluation of key concepts used in the regulation of content, although a common, unified approach is yet to emerge.⁹⁰

Classification systems are usually enforced by a national telecommunication/ICT authority, or a separate classification board. Content distributors are generally obligated to comply with the classification standards and content codes by either not publishing the content or by denying access to those audiences that do not meet the age requirement for particular content.

The contravention and consequent enforcement of digital content standards is generally taken by the regulator, which is then followed by prosecutorial action in court.

As a digital streaming service, it is understandably difficult to have a global product when there are widely differing regional classification systems and content standards. Different countries have different cultures, imperatives, and legal and constitutional frameworks. Some countries will place stricter limitations on certain content, based on prevailing cultural and moral standards. For example, regulators in Indonesia and Malaysia prohibit all forms of advertising for alcohol and tobacco products, and Indonesia has also introduced legislation prohibiting all forms of pornography.

In light of these occurrences and the global nature of digital streaming services, it is recommended that a unified content rating system is attempted either regionally or globally, as seen with the Pan-European Game Information (PEGI) age rating system, which has replaced a number of national age rating systems with a single system now used in 30 countries across Europe⁹¹ or the International Age

⁸⁸ www.itu.int/rec/T-REC-E.212/en

⁸⁹ www.itu.int/en/ITU-T/studygroups/2017-2020/02/Pages/default.aspx

⁹⁰ For a more detailed discussion see ITU Paper “*The Challenge of Managing Digital Content*” for the ‘ITU-TRAI Regulatory Roundtable’, 21-22 August 2017, New Delhi, India. Available at www.itu.int/en/ITU-D/Regional-Presence/AsiaPacific/Documents/Events/2017/August-RR-ITP-2017/ITU%20Report%20Regulatng%20Digital%20Content%202017%20Final.pdf

⁹¹ www.pegi.info/en/index/id/28/

Ratings Coalition (IARC), which is a globally unified age ratings classification system.⁹² This will make content regulation more coherent for consumers and digital streaming services.

In addition, it is recommended that a self-regulatory classification approach is considered, such as the one currently being piloted in Australia. In taking such an approach, it is hoped that digital streaming services will not be blocked for failing to submit content for censorship approval to the national regulator, and that the classification process will be quicker and more efficient.

Some approaches to classifying Netflix content

The streaming giant Netflix was blocked by Telekomunikasi Indonesia (Telkom), the largest telecommunication operator in Indonesia, having been accused of not submitting content for censorship approval and displaying violence and adult content.

In addition, the Kenya Film Classification Board has considered a block of its own, stating that the platform posed a threat to moral values and national security because it had not submitted its shows for local rating. This not only caused consumers in these countries to miss out on accessing this digital streaming service, but has also resulted in Netflix losing millions in potential revenue.

In December 2016, the Australian Federal Government announced a 12-month pilot of a classification tool to streamline the process of classifying Netflix content for audiences in Australia. This trial was created in response to what Netflix claimed as significant obstacles associated with classifying large volumes of content in Australia, leading to processing delays that had the potential to result in content being premiered later in Australia than in other Netflix markets.¹ The pilot will see Netflix itself applying the classification tool, which is expected to lead to quicker and more efficient classification of content for Australia. A broad range of classification decisions will then be reviewed by the Classification Board to assess the integrity of the tool. The Board has the power to revoke classifications made by the Netflix tool and replace them with its own decisions.²

¹ www.news.com.au/technology/home-entertainment/tv/netflix-content-in-australia-could-face-delays-company-warns/news-story/a60e2d6753067e71b09fcdd989cd1271

² www.gizmodo.com.au/2016/12/the-australian-government-is-letting-netflix-classify-its-own-shows/

2.11 Cyber security

Currently, depending on country legislation, online service providers do not have to comply with public authority requirements in terms of security, integrity, and lawful intercept. Notably, with the spread of Internet encryption and browser proxies, network operators might no longer be able to fulfil their own obligations. For example, online encryption might prevent network operators from identifying and blocking websites in the fight against sexual abuse and the sexual exploitation of children, and might also affect the ability of network operators to track malware and other technical intrusions.⁹³ These potential risks strengthen the argument for the same security obligations that apply to network operators to apply to online service providers.

⁹² www.globalratings.com

⁹³ www.orange.com/fr/content/download/28314/619959/version/2/file/Regulation_of_digital_services_2_December_2014.pdf

To address these issues, Europe has taken significant steps to address cybersecurity issues. Individual jurisdictions such as the United Kingdom have also imposed legislative requirements.⁹⁴

European approach to cybersecurity in the NIS Directive

The Directive on Security of Network and Information Systems (the NIS Directive), the EU-wide legislation on cyber security that aims to create a more secure and trusted online environment in Europe. The new rules will concern first and foremost providers of critical infrastructures in the following sectors: energy, transport, banking, financial market infrastructures, health sector, drinking water supply and distribution and digital infrastructures. It also concerns providers of digital services, namely online marketplaces, online search engines and cloud computing services.

By September 2017, the Commission will review the EU Cybersecurity Strategy and the mandate of the European Union Agency for Network and Information Security (ENISA), to align it to the new EU-wide framework on cybersecurity.¹

Online service providers will have obligations under the directive as far as the services they provide fall under the scope of the directive. This means that if an OTT provider offers services such as an online marketplace, an online search engine or a cloud computing service, it falls under the directive and has to fulfil the obligations the directive imposes.

To avoid imposing a disproportionate financial and administrative burden on operators of essential services and digital service providers, the requirements the directive imposes do not apply to micro- and small enterprises.

Going forward, the stated EU objective is to embed cybersecurity in the future EU policy initiatives from the start, in particular with regard to new technologies and emerging sectors such as connected cars, smart grids and the Internet of Things (IoT).

¹ See <https://ec.europa.eu/digital-single-market/en/cybersecurity>

The cybersecurity discussion also illustrates the interdependence of regulatory issues. For example, the lack of global cybersecurity frameworks hampers the development of a framework for global privacy and data protection. The development of such frameworks is further undermined by the adoption of international trade agreements, unless they stipulate that restrictions on transborder data flows (imposed to protect personal data) are not seen as non-tariff barriers to trade.⁹⁵

2.12 Approaches to IMT spectrum availability

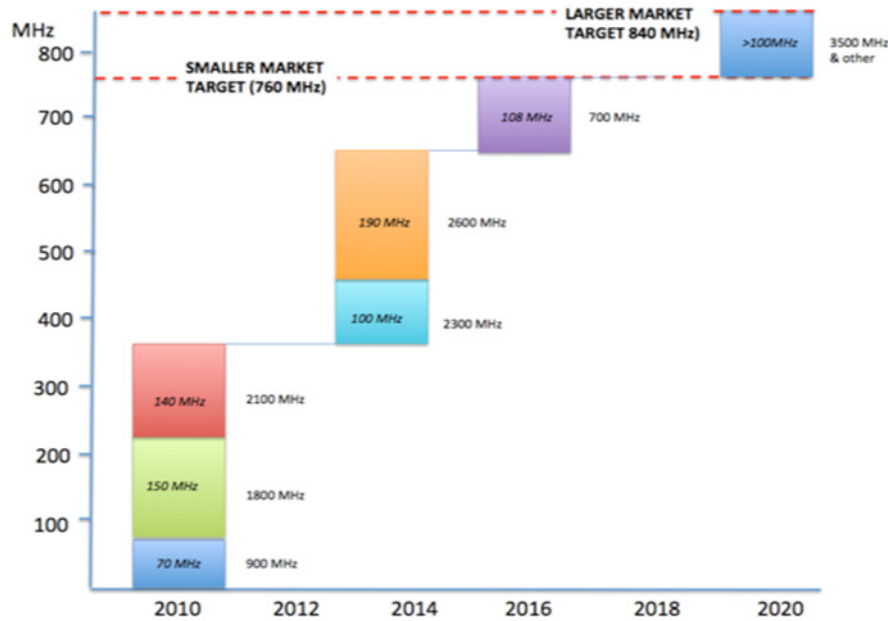
Digital transformation, with more intensive use of online services, including video streaming services, will require additional International Mobile Telecommunication (IMT) spectrum allocation at national levels to support the high speed connectivity of smartphones, devices and IoT. ITU studies have modelled the amount of spectrum that will be needed nationally by 2020. Estimates suggest that current national spectrum allocations for IMT which, in general, provide for an amount of 440 MHz to 540 MHz, should be increased substantially by 2020.

⁹⁴ For example, the *UK Investigatory Powers Act 2016* provides that businesses in the online communications sector (whether traditional ISPs, or providers of over-the-top services) are likely to be classified as communications service providers, and are therefore likely to face retention obligations in relation to customer data under the Act. There are however, queries concerning this law given the judgment issued by the European Court of Justice on 21 December 2016. See <https://www.documentcloud.org/documents/3245181-C-203-15-amp-C-698-15-Arre-T-En.html>

⁹⁵ ITU, *Global ICT Regulatory Outlook 2017*, itu.int/go/outlook

This issue was addressed in the preparation of the ITU World Radiocommunication Conference (WRC-15), through Report ITU-R M.2290-0, which defined the future spectrum requirements estimate for cellular mobile services below 6 GHz as 1 340 MHz for lower user density settings and 1960 MHz for higher user density settings. Additional spectrum requirements depends on the amount of spectrum already identified in each country and on the particular situation of the country. Figure 12 provides an example of a country in the Asia-Pacific region, where a total of 840 MHz is planned to be made available to IMT by 2020.

Figure 12: Example of IMT allocation targets for wireless spectrum until 2020



Note: The figures next to the colour boxes indicate the relevant frequency bands from which more spectrum can be allocated for IMT.

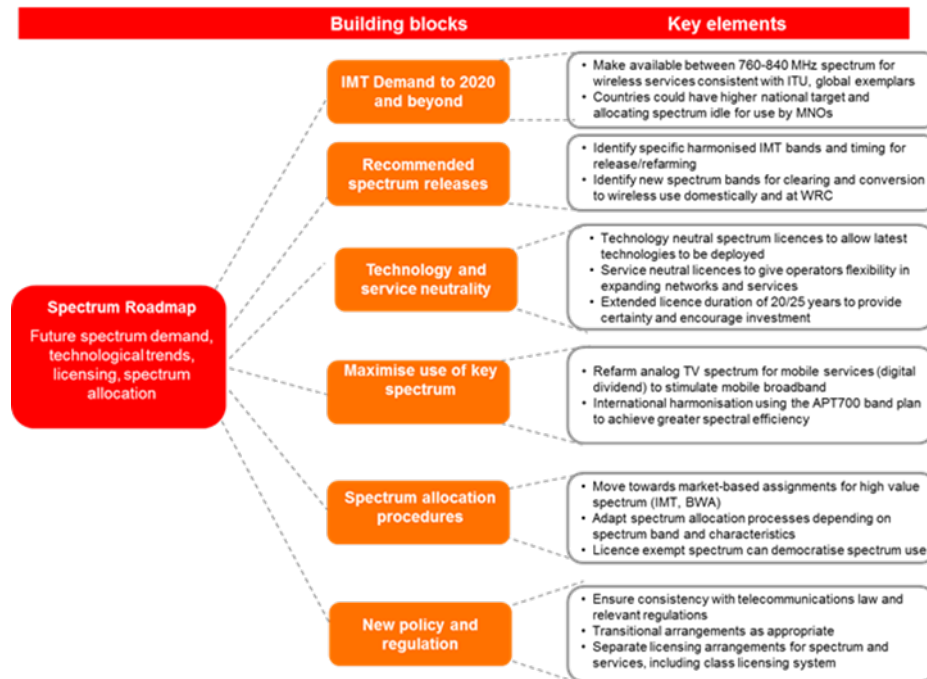
Source: ITU, Guidelines for the preparation of national wireless broadband masterplans for Asia Pacific region, 2012.

While countries can certainly seek to set IMT spectrum targets of 1000 MHz or more, as a minimum, administrations should consider:

- i) Undertaking the refarming of 2G bands for LTE and LTE-A services (and plan for the switch-off of 2G networks similar to Australia, Japan, Singapore, Republic of Korea, United States, and other developed countries)⁹⁶. To do so, various regulatory restrictions that do not permit technology neutral spectrum use should be eased so that operators are able to use the most efficient and affordable technologies.
- ii) Allocating and making available at least 760 MHz by 2020 and preferably 840 MHz in IMT spectrum by 2020. Going forward with the availability of the spectrum identified by WRC-15, governments and regulators should plan for additional IMT spectrum allocations. In order to do so, it is recommended that respective country spectrum managers develop an IMT spectrum roadmap. An example of an IMT spectrum roadmap is summarized in Figure 13.
- iii) Beginning the process of refarming legacy broadcasting bands where appropriate.

⁹⁶ Note in New Zealand, 2degrees has announced it will shut off its 2G network in March 2018.

Figure 13: Example of elements to consider in an IMT spectrum roadmap



Source: Adapted from Windsor Place Consulting, 2014.

IMT systems, technologies, and architectures supporting mobile broadband continue to evolve to improve on spectrum efficiency and utilization. In a few years, ITU expects to produce IMT-2020 specifications to be implemented in view of 5G technologies. Studies are currently underway within the ITU-R to determine the amount of additional spectrum required, the frequency bands that may be considered, and the potential impact on other existing radio services.

While the WRC-15 made good progress in identifying additional frequency bands and globally harmonized arrangements below 6 GHz for the operation of IMT, it also recognized the potential future requirement for large contiguous blocks of spectrum for this application. Consequently, it called for 11 frequency bands above 24 GHz to be studied by ITU-R as additional frequency bands that may be identified for future use by IMT and the matter will be addressed at the next WRC-19.

There is no single spectrum management approach or technique that will be appropriate for all countries in all contexts. However, frameworks that can adapt to changing needs are indispensable. Policy-makers must continually question whether historical uses of certain frequencies remain appropriate, and assess whether those uses can coexist with new services and technologies.⁹⁷

2.13 How should online service providers be taxed?

In contrast to obligations imposed on national operators, global online service providers and services are often not subject to the same taxation on revenue and profits, despite being involved in the economic life of a particular country and obtaining financial advantages. This is perceived as a critical

⁹⁷ ITU, GSR16 discussion paper on emerging technologies and the global regulatory agenda, www.itu.int/gsr16

issue that countries need to address in particular in relation to the regulatory regime applying to online service providers.⁹⁸ Discussions focus broadly on:

- How to ensure a level playing field linked to material competition issues for selected online service providers that do not pay taxes or not subject to similar taxation regimes for similar services and hence operating under a different and more preferential cost regime.
- Another issue relates to scale and how to participate in the success of the online service provider business model at the global level.
- Finally, there is the question of declining revenues of domestic telecommunication operators and broadcasters due to changing business models.⁹⁹

Often having their principal place of business and registered office in the United States or a low income tax country or haven, has meant that online service providers have been 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 and 10 per cent of global revenue from corporate income tax is lost through BEPS by multinational enterprises (MNEs), including a majority of online service providers.¹⁰⁰

While these corporate tax planning strategies rely on carefully planned interactions of a variety of tax rules and principles, the overall effect of this type of tax planning is to erode the corporate tax base of many countries in a manner that is not intended by domestic policy.¹⁰¹ In some cases, this sort of activity has been seen to undermine the fairness and integrity of tax systems, with global online service providers being seen to gain a competitive advantage over enterprises that operate at a domestic level. Moreover, this sort of activity arguably undermines voluntary compliance by all taxpayers.¹⁰²

Increasingly, countries are now moving towards applying taxation more consistently and even-handedly, meaning that global online service providers that are offering substitutable services are being subjected to the same taxation on revenue and profits as MNOs. There is the realization that taxation and related regulations will need to be addressed in order to ensure that there is not a significant erosion of the tax base. This applies to the app economy as well as across the sectors.

⁹⁸ 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 https://www.itu.int/en/ITU-D/Conferences/GSR/Documents/GSR2015/Discussion_papers_and_Presentations/GSR16_Discussion-Paper_Taxation_Latest_web.pdf

⁹⁹ www.detecon.com/sites/default/files/detecon_opinion_paper_ott_regulation_options_final.pdf

¹⁰⁰ OECD, 2015, 'Information brief: summary', see www.oecd.org/ctp/policy-brief-beps-2015.pdf

¹⁰¹ http://law.unimelb.edu.au/__data/assets/pdf_file/0007/1550653/Michael-DAScenzo-Spotlight-BEPS-Tax-Avoidance12.pdf

¹⁰² www.oecd.org/ctp/beps-about.htm

Summary of OECD base erosion and profit shifting (BEPS) recommendations

Base erosion and profit shifting has been the subject of considerable debate in a number of countries and in international institutions such as OECD. Recognising that existing tax instruments have not kept up with global economic developments, the 2013 OECD Action Plan on BEPS seeks to close the gaps in international tax rules that allow MNEs to artificially shift profits and avoid paying taxes.¹ The project was the product of broad international cooperation, and was carried out by OECD and non-OECD G20 countries on equal footing.

The OECD BEPS project delivered its final recommendations in October 2015. The final BEPS measures included 15 central actions for governments to implement. Central arms of policy and reform can target digital economy business models such as online service providers by:²

1. **Updating the definition of a 'Permanent Establishment'** to strengthen tax treaty provisions, in an attempt to catch corporations that do business in a country without having a taxable presence therein (such as a substantial physical presence or a dependent agent).
2. **Reinforcing transfer pricing rules** by upgrading the 'arm's length principle' to ensure what dictates results in an economic rather than paper reality, as well as substantially increasing transfer pricing documentation.
3. **Bridging gaps among domestic laws** by including model rules and provisions to tackle hybrid mismatch arrangements through more effective foreign corporation rules (CFC) in countries where headquarters are located.

In summary, the reforms aim to improve, tighten the substance, and ensure more transparency in international taxation. As required, collaboration will be required between telecommunication/ICT sector regulators and domestic taxation authorities. It may also be necessary for smaller country markets to utilise their membership of regional associations (e.g., ASEAN, GCC, ECOWAS, SADC, etc.) in order to collectively secure better taxation outcomes.

¹ OECD (2013), *Addressing Base Erosion and Profit Shifting*, OECD Publishing. <http://dx.doi.org/10.1787/9789264192744-en>

² OECD, 2015, Executive Summaries, see www.oecd.org/ctp/beps-reports-2015-executivesummaries.pdf

2.13.1 Taxation case studies

In response to the OECD report and growing concerns over global tax avoidance, several countries and regions across the globe have attempted to bring global online service providers under their domestic tax regimes.

For example, soon after the Netflix introduction into Australia at the beginning of 2015, the Australia Federal Government proposed to amend the goods and services tax law to ensure digital products and services receive an equivalent tax of 10 per cent, whether they are provided by Australian or foreign entities. Although this was originally rejected by Netflix, as they argued that the service was provided from the United States, taxation for digital products and services such as Netflix came into effect on 1 July 2017.

This approach of the Australia Government is an attempt to level the playing field for domestic businesses in Australia and to close a 'digital tax loophole'. The scheme is estimated to have cost the Australian Tax Office (ATO) AUD 1.5 million to establish, and is forecast to raise AUD 150 million

from Australian consumers in its first year of operation and AUD 200 million in its second year.¹⁰³ In addition, the Multinational Anti-Avoidance Law (MAAL) applies to ‘significant global entities’ including online service providers and their transfer pricing practices came into effect in Australia on 11 December 2015.¹⁰⁴

Similar taxation laws aimed at targeting the digital economy have been introduced in the European Union (EU), Japan, and South Africa following the OECD recommendations.¹⁰⁵ At the start of 2015, the EU began to overhaul its value added tax (VAT) to extend it to providers of broadcasting and electronic services based on the location of their customers, instead of where the companies set up their head offices. Digital downloads and services sold to European retail consumers are taxed VAT rates of up to 27 per cent, making the digital retail economy a significant source of tax revenue. The complexity and variation of VAT regimes in different EU member countries, however, has created huge challenges for the EU and digital companies.¹⁰⁶

The topic of online service provider specific taxes has also been widely discussed across Latin America. Colombia has recently passed new tax rules in January 2017 targeting online services such as Netflix, Uber, Spotify and Airbnb. Article 180 of the regulation states that issues of credit, debit and prepaid cards must apply a 19 per cent value added tax (VAT) to electronic or digital services purchased through foreign providers.¹⁰⁷ In addition, another 4 per cent tax has been applied to large mobile data packages.

In addition, Paraguay is preparing a new law to regulate the growing Internet-based TV service to level the playing field between local cable companies and online services such as Netflix. Similar taxes have been planned or implemented in Argentina as well as in Brazil.¹⁰⁸

In Jordan, the government is considering several ways to generate additional revenue from the sector, including a controversial fee for using VoIP services. Amongst the measures under consideration are a JOD 1 (USD 1.4) to JOD 2 per month fee for using applications such as Viber or WhatsApp to make calls, a JOD1 per month additional deduction from post-paid subscriptions, extra fees for customers purchasing SIM cards, and a sales tax increase on Internet services from 8 to 16 per cent. The objective is to support the treasury while at the same time not harm users or investment by operators in the sector.¹⁰⁹

In Thailand, while the National Broadcasting and Telecommunications Commission (NBTC) has no direct authority to shape taxation, it will have to cooperate with other bodies such as the Revenue Department, the Bank of Thailand, and the Finance Ministry to bring OTT-related businesses into the tax system.¹¹⁰ On 1 October 2017, it was announced by the Office of Electronic Transaction Development Agency (ETDA) that the Electronic Transaction Act would be adjusted to cover the care of local e-commerce operators and the digital advertising industry so as to impose tax on online players from 2018.¹¹¹

Finally, in August 2017, the Indonesia Ministry of Communications and Informatics (MOCI) issued a new draft ministerial regulation on OTT services, building on the 2016 draft regulation. The primary aim of the 2017 draft regulation is to establish criteria to ensure that the owners and operators of

¹⁰³ www.news.com.au/finance/economy/federal-budget/australians-to-pay-millions-more-for-digitalmusic-movies-games-and-apps-under-federal-budget-plan/newsstory/7ac55733c877a0ca0a657ef226cb08c7

¹⁰⁴ www.ato.gov.au/business/international-tax-for-business/in-detail/doing-business-in-australia/combating-multinational-tax-avoidance---a-targeted-anti-avoidance-law/

¹⁰⁵ <http://theconversation.com/the-netflix-tax-coming-to-a-country-near-you-40475>

¹⁰⁶ [www.ey.com/Publication/vwLUAssets/EYDigital_products_and_services_in_2015/\\$FILE/Digital_VAT_Campaign_Brochure.pdf](http://www.ey.com/Publication/vwLUAssets/EYDigital_products_and_services_in_2015/$FILE/Digital_VAT_Campaign_Brochure.pdf)

¹⁰⁷ <http://nextvnews.com/ott-services-included-colombias-tax-reform/>

¹⁰⁸ www.telecompaper.com/news/brazil-seeks-more-regulation-for-ott-services--1163845

¹⁰⁹ www.telegeography.com/products/commsupdate/articles/2017/02/02/consumers-revolt-as-amman-mulls-increasing-levies-on-telecom-sector/

¹¹⁰ www.connectedasia.com/new-ott-regulations-in-indonesia-and-thailand-inching-towards-a-level-playing-field/

¹¹¹ See <http://m.thansettakij.com/content/214266> (in Thai).

foreign OTT services, which make their services available in and generate revenues from Indonesia, will be subject to the payment of domestic corporate income tax set out under Article 17 of Income Tax Law 2000. This will be equal to a 25 per cent rate of taxable income. However, where the local company is not established an additional 20 per cent branch profit tax is assessed, the latter being a levy payable only by foreign entities.¹¹² Service providers would also be required to:

- register its form of business entity and line of business and also submit periodical reports to the Indonesia Telecommunication Regulatory Body (BRTI);
- set up a local contact centre to accommodate user questions or complaints;
- apply content filtering and censorship mechanisms that conform with prevailing regulations;
- use a national payment gateway (for paid OTT services);
- use an Indonesia IP number and place a part of its server in a data centre located within the Indonesia territory;
- guarantee access to lawful interception and collection of evidence in criminal investigation by law enforcement authorities.

On 1 December 2016, new rules were promulgated by the MOCI requiring global online service providers to establish data centres in the country within two years.

2.13.2 Specific telecommunication taxes need to be addressed

It should also be noted that certain countries have taxed or are taxing inbound international calls in the form of a surtax on international inbound termination rates. This is an easy tax to impose because all such calls are recorded by carriers and therefore the calculation of tax liability is simple.

A study by GSMA¹¹³ points to the consequences of this type of tax: reduced call volumes from overseas, lost export opportunities, reduced competitiveness, higher local business operating costs and so on. Such taxes are ultimately counter-productive because they discourage economic activity and investment therefore leading, over time, to a smaller tax base. In the move to an IP environment, which characterises the app economy, the continuation of taxes on international calling is non-sustainable and changes will need to be implemented.

In general terms, leaving aside the positive effects that taxes play in terms of their contribution to the provision of public services¹¹⁴, taxes also tend to affect the incentives of a company to invest, and consequently can reduce the supply of funds available to finance them. In industries that provide broadband services, a critical platform to deliver information and ensure economic growth, taxation tends to reduce the level of capital investment for the development of infrastructure, which is fundamental for the provision of services everywhere.

With regards to broadband services, broadband penetration faces an affordability barrier in terms of consumer adoption, especially in developing countries, where price of service is relatively high. However, given the impact of digital technologies on the economy, by increasing efficiency of production processes, facilitating the circulation of goods, creating new businesses, etc., taxation of digital goods and services should be approached with care to prevent any erosion of their spill-over contribution to GDP growth. It has also been shown that excessive taxing of digital goods and services could limit adoption, restricting the positive contribution to GDP. In developing fiscal policies, governments need to consider the trade-offs between revenue generation and the potential negative impact of the development of the digital sector.

¹¹² HHP Law Firm, The Indonesian Government Resumes Discussions on Over-The-Top Regulation: Client Alert, August 2017.

¹¹³ Mobile taxation: Surtaxes on international incoming traffic: www.gsma.com/mobilefordevelopment/wp-content/uploads/2011/09/Mobile-taxation-Surtaxes-on-international-incoming-traffic-Executive-Summary-English.pdf

¹¹⁴ ITU, GSR15 discussion paper on taxation in the digital economy, www.itu.int/gsr15

Imposing an equitable and harmonized taxation regime and other rules on global online service providers is nonetheless a challenge as the toolkit for dealing with large globe-spanning companies is limited. In larger markets such as the China, European Union, India, Indonesia, and United States, governments and regulators have greater bargaining power because online service providers cannot afford to ignore such markets. In smaller jurisdictions, however, governments and regulators have few practical options. Participating in and using international and regional forums (e.g., ASEAN, ECOWAS, SADC, etc.) would seem to have considerable merit.

3 Conclusions

In conclusion, governments and sector regulators need to find a balance between maximizing the benefits of the disruptive app economy in the new ICT ecosystem and securing optimal policy and regulatory objectives designed to address potential and actual negative consequences such as abuse of market power, abuses of consumer rights, and loss of local content production. Such a balance will optimise sector-specific regulation and create an enabling environment that contributes to innovation and investment.

In order to achieve these goals, it is critical that regulators have the appropriate tools to protect consumer interests and industry regulators have the ability to balance, if required, the – often global – market power of the app economy and other players in the new ICT ecosystem. Progressively effective regulation will need to consider its effects across sectors and industries and this will require collaborative regulation between the regulators of various sectors (as well as economy-wide regulators including, but not limited to, central banks, competition and tax authorities) who have traditionally not needed to work together. Further, international co-operation between governments and regulators will be necessary to address global issues such as taxation and the market power of MNEs. The search for the right regulatory measures recipe is a significant challenge and is ongoing.

Importantly, as highlighted by some regulators, “While specific changes can facilitate particular services and resolve individual problems, incremental changes risk creating fragmented, rather than coherent, regulatory schemes.”¹¹⁵

In determining what a coherent regulatory scheme should comprise, it is important to appreciate that any assessment of the costs and benefits of the increasing use of online services will find that there are both winners and losers, possibly within a sector and certainly within an economy. Globally between countries there are likely to be winners and losers as well. A range of countries are attempting to position themselves for the digital/app economy including but *inter alia* Thailand, the Republic of Korea, Kenya, and United Kingdom.¹¹⁶ Smaller countries like SIDS and LDCs also have a range of additional challenges.

Table 8: Benefits and costs created and redistributed in the app economy

Group	Benefits	Costs	Outcomes
Consumers	<ul style="list-style-type: none"> – Better, lower cost services – Wider range of innovative, content and services offerings 	<ul style="list-style-type: none"> – More advertising – Loss of personal information 	<ul style="list-style-type: none"> – Hugely positive for consumers

¹¹⁵ ACMA, *Six emerging trends in media and communications*, Occasional paper, November 2014, page 8.

¹¹⁶ See United Kingdom *UK Digital Strategy* paper released 1 March 2017. Available at www.gov.uk/government/publications/uk-digital-strategy

Group	Benefits	Costs	Outcomes
Non-communications businesses	<ul style="list-style-type: none"> – Better, lower costs services – Increased competitiveness – New distribution and marketing channels increasing customer engagement 	<ul style="list-style-type: none"> – As telecommunication/ICT increases as a proportion of GDP, non-communications businesses may see demand for their services decrease – Possible industry disruption 	<ul style="list-style-type: none"> – Positive for business except sectors disrupted
Online service providers	<ul style="list-style-type: none"> – More users, more revenues – Monetising personal info – Opportunity to IPO, capital raisings, etc. 	<ul style="list-style-type: none"> – Increased provisioning costs – May need to invest to address bottlenecks 	<ul style="list-style-type: none"> – Hugely positive for online service providers
Existing fixed and mobile network operators and broadcasters	<ul style="list-style-type: none"> – Increased demand for and revenue from data services – Falling costs due to simplification and move to lower cost IP infrastructure 	<ul style="list-style-type: none"> – Reduction of revenue for legacy voice and SMS services – Loss of market power – Need for additional investment to handle demand, congestion 	<ul style="list-style-type: none"> – Currently negative but increased data demand may make positive – Partnering may be positive
National governments	<ul style="list-style-type: none"> – Increased telecommunication/ICT efficiency – Ability to provide government services online 	<ul style="list-style-type: none"> – Reduced taxation revenue and fees – Decreased capacity for regulatory intervention – Reduced ability to provide national security and policing 	<ul style="list-style-type: none"> – Negative except in developed/tax haven markets where online service providers are based
Country/national level/economy wide	<ul style="list-style-type: none"> – Increased telecommunication/ICT efficiency and consumer welfare – Platform for the establishment of new and innovative disruptive businesses 	<ul style="list-style-type: none"> – Increased imports, loss of tax – Reduced ability to pursue national objectives – Fragmentation of national markets and undermining of national culture/sport markets 	<ul style="list-style-type: none"> – Variable depending on the country and its policies – Active policy setting required

Source: Windsor Place Consulting, March 2017.

Importantly, other industry stakeholders, as well as consumers, can secure positive outcomes from the app economy especially if the policy and other settings are optimal. Existing network operators can also be winners given the growth in data demand so long as regulatory settings provide for, *inter alia*, tariff flexibility, permitting operators to adopt the most cost effective and efficient technological innovations and key inputs like licence, and spectrum fees are priced fairly and reasonably. To ensure a level playing field, it is critical that the taxation regimes apply equally especially to those players that provide substitutable services.

In conclusion, an approach of continuing to monitor and putting in place legislative mechanisms and international co-operative forums so regulators have the ability to further regulate online services (even if they currently choose not to) is the most prudent approach. Such measures should include, as a minimum: (i) facilitating the partnering between online service providers and network operators and; (ii) putting in place fair and equitable taxation arrangements.

The need for changes to the applicable taxation arrangements has become acute. The time for discussion has passed and all jurisdictions ought to be legislating for online service providers who provide competing services to face similar taxation regimes both in respect to goods and services taxes (GST) and income tax regimes. This is necessary in order that there is a level playing field in the app economy with respect to taxation for all including domestic entrepreneurs and network operators.

Ultimately, the optimal approach to the app economy does not mean more regulation but rather better regulation. Better regulation in the brave new world of the app economy is regulation which is:

- (v) harmonised regionally or globally
- (vi) acknowledges the move to IP services
- (vii) regulates for the new competitive paradigm
- (viii) accepts the need to collaborative regulation between sector regulators and
- (ix) embraces the new reality that OTT services are no longer over-the-top. Instead they are an integral and important part of the telecommunication sector future and the global move to the app economy.

The hallmark of the app economy is ever deepening interconnectivity – everything is connected to everything else and more so every day. Regulation that has evolved in the world of twentieth century ‘industrial silos’ is now obsolete. New forms of regulatory cooperation across industries and across the globe are the only way to ensure that the positive dimensions of the app economy are enjoyed by consumers who are assured protection against its negative potentials.

4 Strategic recommendations for regulators and policy makers

Many governments, telecommunication/ICT National Regulatory Authorities (NRAs) and other agencies are examining how to move from traditional legacy approaches to innovative ones. But they are uncertain whether, or even how, to regulate or create optimal rules to govern and guide new entities, applications and services in the new ICT ecosystem, bearing in mind that such activities also contribute materially to sector revenues, consumer welfare and to bridge the digital divide. They also facilitate national economic growth, and productivity improvements.

Governments and NRAs need to find a balance between maximizing the benefits of the app economy and securing policy/regulatory objectives. Such a balance will optimise sector-specific regulation and create an enabling environment that creates opportunities for business, consumers and government, and contributes to innovation and investment. At the same time, it is critical that regulation protect consumer interests and industry regulators have the ability to counter, if required, the – often global – market power of the app economy players. Progressively effective regulation will need to consider its effects across sectors and industries and this will require collaborative regulation between the regulators of various sectors (as well as economy-wide regulators including, but not limited to, central banks, competition, financial and tax authorities) who have traditionally not needed to work together.

This paper is very mindful that many of the App innovations and disruptions have been achieved without or with very little regulatory intervention. The main objective is to guide the transition from a legacy policy and regulatory solution to a multi-faceted innovative and adaptive policy environment.

Suggested advice to policy makers and telecommunication/ICT regulators

Undertake a review of the regulations applicable to network operators and OTT players:

Assess whether such regulations are appropriate, whether forbearance should be applied to network operators, whether additional rules should apply to OTT providers and map how regulation of market participants – especially for substitute/competing services – should converge over time. Likewise review content regulation to ensure in a global market with greater levels of realism (e.g., virtual reality and similar) are appropriate and consistent with domestic conditions and cultural policy objectives. A key element of such a review is to consider market definitions and whether such definitions currently permit a differentiated regulatory treatment for OTT services.¹

Update the licence conditions and as required provide deeming provisions for non-resident OTT providers, etc.: Update analogue/legacy licence conditions so as to reflect the move to digital/IP services and as required enact legislative amendments to provide for deeming provisions (e.g., to be say, a special class licence) for non-resident OTT providers, etc.

Assess and continually monitor the state of competition in the market: It is critical to assess and critically monitor the state of competition in ICT markets. Ensure there are no gaps in regulation between telecommunication regulators and general competition regulators including where services are offered from outside the jurisdiction. Promote competition whilst recognising that ICT services markets are no longer national and that there is a range of competing services which are domiciled domestically. Ensure that operators with significant market power do not foreclose or significantly dampen the innovative service offerings and OTT services. Further, acknowledge as outlined earlier in this paper that while initially they may have provided strong disruptive competition, as new digital businesses grow and scale almost exponentially, they may be tempted to exercise their market power. Regulators will need to be watchful that the digital economies of scale and scope are not exploited contrary to law.

Collaborate with tax authorities: Ensure that there is, to the extent possible a level playing field for competing services. Such analysis should include the applicable income and value added taxes applicable to competing services.

Promote and facilitate ubiquitous broadband: Recognising the political, economic and societal need for ubiquitous broadband formulate policies to facilitate nationwide broadband using a mix of cable/fibre, wireless, satellite and other technologies. In particular, given the growing importance of wireless broadband to the meeting of global broadband density targets that there is sufficient International Mobile Telecommunication (IMT) spectrum of at least 760 MHz but preferably 840 MHz IMT spectrum available and allocated to such services by 2020. In addition, to promote investment in backhaul transmission and higher speed broadband services in urban/economically viable regions.

Ensure adequate and up to date data protection, privacy and cyber security legislation based on global exemplars: Ensure that domestic legislation for data protection, privacy and cyber security is based on global exemplars and that agencies charged with ensuring compliance and promoting education are properly resourced and staffed by experts. The scope of such legislation should be wide and include legacy and new systems including the Internet of Things (IoT). It is also critical to enact digital identification (digital ID) legislation.

¹ A more detailed examination of a number of key regulatory issues can be found in Section 4 of this Report.

Assess and investigate the implications on domestic operators and stakeholders from the take up of online services:

To assist this process, in Figure 14 is provided an outline of preliminary methodology which might be adopted by regulators and Government to assess the impacts of the uptake of OTT services in their country market. Some of the data/information required is detailed in [Appendix B](#). Any such assessment ought to provide a quantitative understanding of the impacts, what regulatory options may be open to regulators and whether transition arrangements may be necessary. It is also a catalyst to collaboration between sector regulators, tax and competition authorities, and other Government agencies.

Secure fair and equitable taxation arrangements as the need has become acute to level the playing field in this area. The time for discussion has passed and all jurisdictions ought to be legislating for OTT players who provide competing services should to face similar taxation regimes both in respect to goods and services taxes (GST) and income tax regimes. This is necessary in order that there is a level playing field for all including domestic entrepreneurs and network operators. It is worth highlighting that the approach of the Latin American countries in charging value added or consumption tax¹ through the credit card schemes has merit, ought to be administratively simple and has a high degree of transparency.

Establish co-ordination procedures between regulators: Establish co-ordination procedures between communications sector regulators and regulators of broadcasting/content (if separate), competition, financial services and privacy/data protection to ensure consistent regulation and comprehensive inter-working arrangements.

Engage in greater public awareness and advocacy campaigns in relation to digital/ICT services: It is important that the public including all sections and age groups in society are well-informed as to their digital rights and responsibilities.

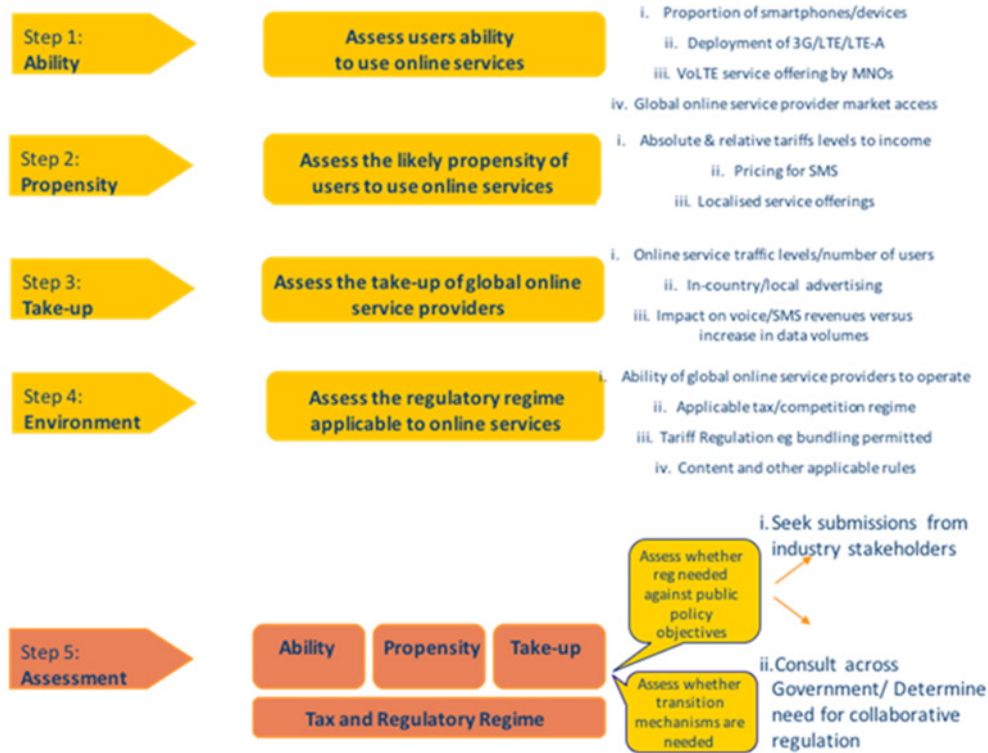
Engage more broadly with education and training sector: As many skills needed in the future and indeed the jobs of the future are very different from today, there is a role for sector stakeholders lead by the regulator to engage with Education and training Ministries, universities, tertiary institutions, schools and other places of learning to ensure that curriculum and syllabus reflect the app economy and the move to a digital society.

Concert at the regional level to come up with harmonized regulatory responses that may have a greater chance of success in relation to many regulatory issues (e.g., content, taxation). Regional organisations such as ASEAN, ECOWAS, etc. and regional telecommunication regulators such as *Regulate!* (the Latin American Forum of Telecommunications Regulators), and ASEAN Telecommunications Regulators' Council (ATRC) have an important part to play. Smaller markets in particular need to prosecute their positions through such umbrella organisations.

Source: ITU, adapted from GSR16 Discussion Paper on the app economy, www.itu.int/gsr16 and additional analysis.

¹ Examples include Goods and Sales Taxes (GST).

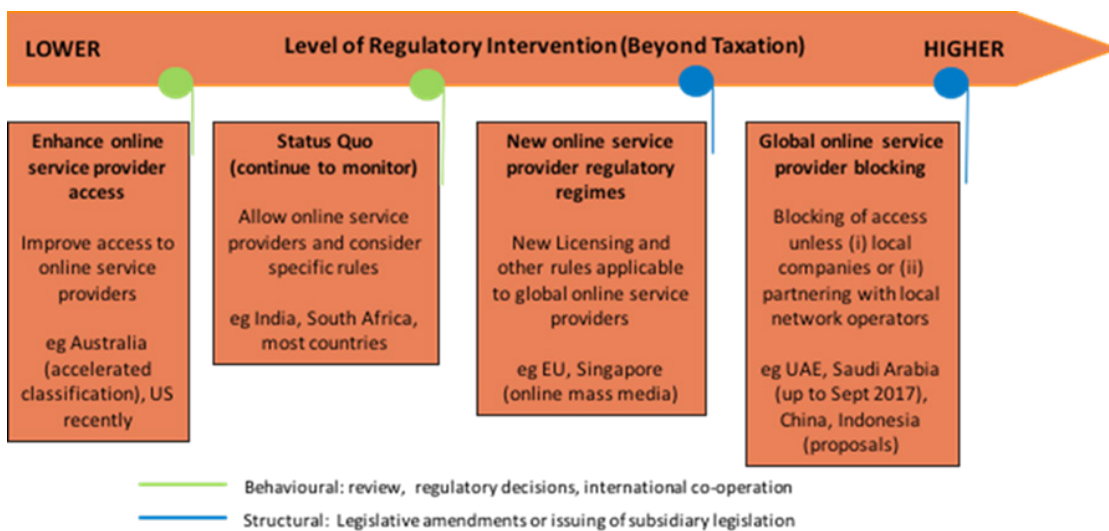
Figure 14: Outline of preliminary methodology to assess the impacts of the uptake of online services



Source: WPC, May 2017.

Notwithstanding challenges of all kind faced by the app economy players, regulators should remain pro-active in analysing and monitoring market as well as in providing appropriate regulatory processes and policies. Indeed, there is a continuum of possible regulatory responses which provides options (summarised in Figure 15) in theory. These extend from behavioural remedies including simple rules changes, measures to facilitate access, etc. to those that are more structural requiring legislative amendments and/or issuing of subsidiary legislation (e.g., decrees, regulations, etc.).

Figure 15: Continuum of possible regulatory responses on online service issues



Source: Windsor Place Consulting, October 2017.

Governments and regulators do though need to be mindful that because the consumer benefits generated by online services are so significant, there is a political dimension to restricting the availability of such services which are in high demand and in respect of which consumers have invested so as to use.¹¹⁷

Even where industry regulators decide on higher levels of regulatory intervention, history indicates that restrictions placed by governments on technological advances are difficult to maintain and cannot be sustained in the long run. It is also important to recognise that suppressing technological change such as that which driving the app economy is also usually associated with a loss in competitiveness and innovation which impacts negatively on economic growth and development – as such care is needed.

¹¹⁷ For example, in the higher costs of smartphones, and wireless data access.

Acronyms and abbreviations

ACMA	Australian Communications and Multimedia Authority
ADSL	Asymmetric Digital Subscriber Line
ASEAN	Association of South East Asian Nations
ATRC	ASEAN Telecommunication Regulators' Council
BAK	Bill and Keep
BEPS	Base erosion and profit shifting
CAGR	Compound Annual Growth Rate
DAUs	Daily Average Users
DSL	Digital Subscriber Line
ECOWAS	Economic Community of West African States
EC	European Community
EU	European Union
FCC	Federal Communications Commission of the United States
FDI	Foreign Direct Investment
GCC	Gulf Cooperation Council
GDP	Gross Domestic Product
GSMA	GSM Association
GST	Goods and Service Tax
ICTs	Information Communication Technologies
IMSI	International mobile subscriber identity
IMT	International Mobile Telecommunication
IoT	Internet of Things
IP	Internet Protocol
IPO	Initial Public Offering
ITU	International Telecommunication Union
ITU-D	ITU Telecommunication Development Bureau
ITU-T	ITU Telecommunication Standardization Bureau
ITU-R	ITU Telecommunication Radiocommunication Bureau
LDCs	Least Developed Countries
LTE	Long-Term Evolution
LTE-A	Long-Term Evolution Advanced
MAUs	Monthly Average Users
MNEs	Multinational Enterprises
MNO	Mobile Network Operator

MOCI	Ministry of Communications and Informatics (MOCI) Indonesia
NBN	National Broadband Network
NRA	National Regulatory Authorities
OECD	Organisation for Economic Cooperation and Development
OTT	Over-the-top
PSTN	Public Switched Telephone Network
QoS	Quality of Service
RCEP	Regional Comprehensive Economic Partnership
SADC	Southern African Development Community
SMS	Short Message Service
TPP	Trans-Pacific Partnership
UN	United Nations
UNESCO	United Nations Educational, Scientific and Cultural Organization
USF	Universal Service Fund
USOs	Universal Service Obligations
VoLTE	Voice over Long Term Evolution
WDR	World Development Report
WRC	World Radiocommunication Conference
2G	Second-generation mobile
3G	Third-generation mobile
4G	Fourth-generation mobile
5G	Fifth-generation mobile

Appendix A: Introduction to the app economy

A1 Defining the app economy and its ecosystem

The ITU discussion paper, GSR-16 *The race for scale: market power, regulation and the app economy*, describes the app economy as “the sum of all activity, products and services required to deliver app functionality to end consumers”. Among a range of other global organisations and industry associations, the OECD has also released a paper¹¹⁸ exploring the scope of the app economy including within its scope platforms and app stores, developers, device manufacturers, and network operators.

Another good summary of what constitutes the app economy can be found in a recent ITU report *The app economy in Africa: Economic benefits and regulatory directions*.¹¹⁹ The component parts of the app or digital economy are shown in Figure A1.

Figure A1: Component parts of the app economy



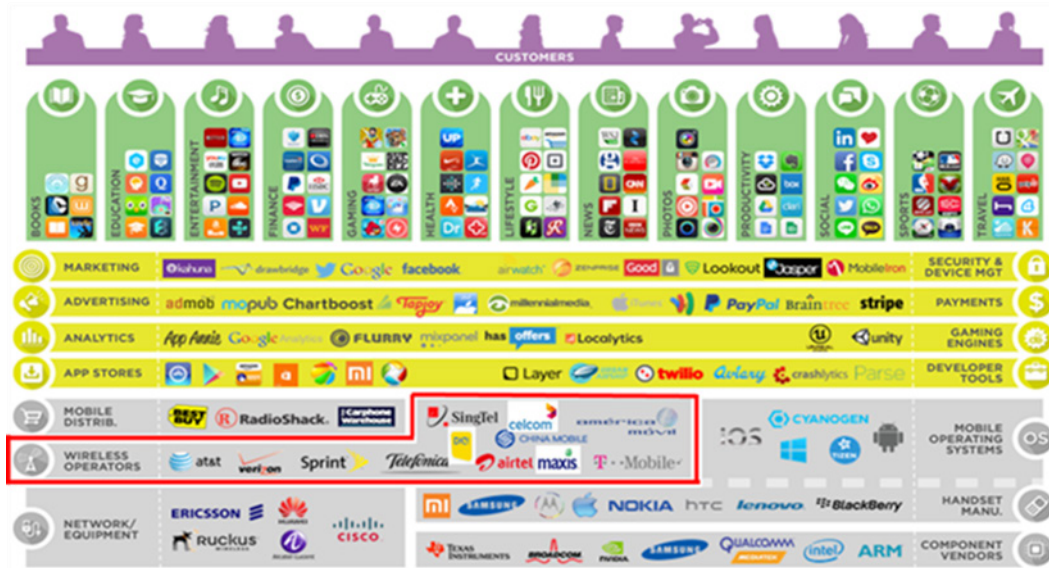
Source: Adapted from Systems Knowledge Concepts (www.skcn.net.au).

It is important to note that the digital economy and value chain have become complex and global in nature. Measuring its size remains challenging not only for international agencies such as the ITU but also for national statistical agencies. Despite these challenges, by understanding the app economy value chain, the key players and breadth of activity can be assessed.

¹¹⁸ See OECD (2013), *The App Economy*, OECD Digital Economy Papers, No. 230, OECD Publishing, Paris. Available at <http://dx.doi.org/10.1787/5k3tftlv95k-en>

¹¹⁹ https://www.itu.int/pub/D-PREF-EF.APP_ECO_AFRICA-2017

Figure A2: Busy mobile landscape with a highlight on mobile operators

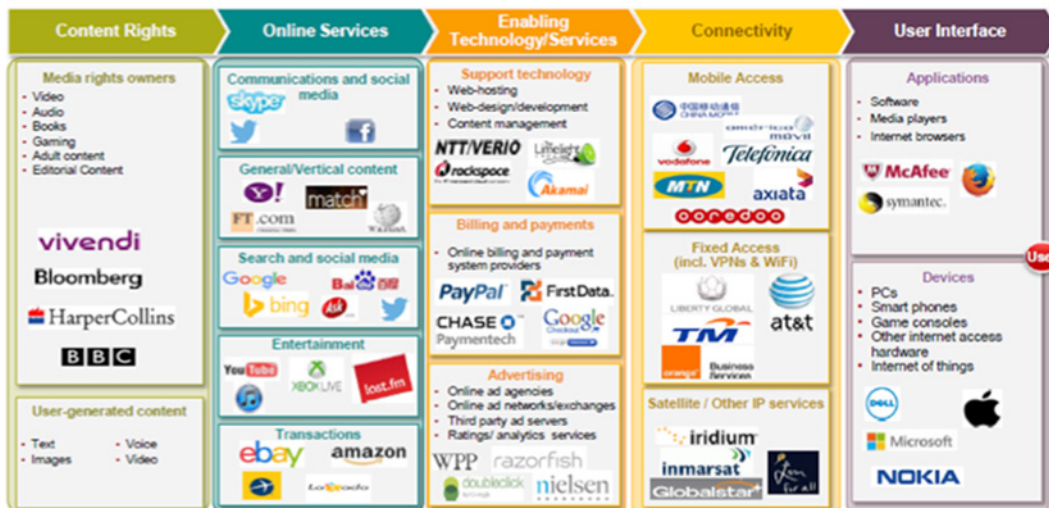


Source: Industry sources, 2016.

Without connectivity (Figure A3- fourth column), there is no connection or interface with consumers, both business and personal users. In economics terms, the final consumer access to app services is mediated by network operators including access to app stores over either mobile or fixed broadband networks. Consumers use telecommunication services – in essence bandwidth- to update their mobile operating systems (in the case of iOS but rarely for Android), access the app stores, search for apps, and install them.

Many apps also require ongoing wireless connectivity between the end user mobile devices and the cloud, and operators provide the connectivity services (including location services) that permit such interactions.

Figure A3: Simplified digital economy value chain



Source: Industry sources, 2016.

Thus, operators, especially mobile network operators (MNOs), play a pivotal role in the app economy, and its evolution has enormous consequences for this sector. One of the most important consequences for mobile operators is the move away from legacy circuit switched services to app/IP environment with is underpinned by ‘always on’ broadband connectivity.

Numerous apps such as WeChat, Viber, Facetime Messenger/WhatsApp, Google Voice and Apple FaceTime/iMessage offer telecommunication/ICT services that directly compete with traditional network operators voice and messaging offerings which have traditionally comprised relatively high margin components of an operator service offering.¹²⁰

In a data world, the demand for capacity is growing rapidly requiring substantial new investment in mobile infrastructure (and fixed backbone), and at the same time operators are being driven by competition and market forces to become commodity mobile bandwidth suppliers. This arguably represents a significant decline in significant market power (SMP) previously enjoyed by operators included fixed operators and MNOs.

A2 The economics of the app economy

Perhaps the most central and powerful effect of the app economy¹²¹ is that it deepens and extends the reach and influence of media and telecommunication/ICT networks so that they encompass an ever-greater share of economic activity.

The combination of handheld, personal, powerful general computing devices connected to highly available broadband wireless networks along with the emergence of large app markets, have created larger and more numerous network ecosystems. Because of the app economy, more than ever before, everything is connected to everything else. These networks are driving new ways in which market power is created, preserved and used.

ITU discussion paper, GSR-16 *The race for scale: market power, regulation and the app economy*, emphasised the ‘winner takes all’ nature of the app economy. Once a particular firm begins to pull significantly ahead of its competitors in terms of the number of its users or their scale of its business, it begins to enjoy cost savings and network benefits that mean it becomes increasingly difficult to compete with. The larger firms have significant competitive advantages because:

- they enjoy open-ended economies of scale – that is, lower per unit costs, but, unlike production in the physical world where eventually economies of scale run out and diseconomies set in, in the online software world economies of scale go on no matter how many users the business has or no matter how large it becomes;
- network effects or ‘network externalities’, which refer to the benefit that each user gains from a greater number of users in total being in the network, accumulate disproportionately as the number of users grows and benefits the largest players and penalises new entrants;
- branding benefits accrue to firms with the most profile and these benefits are of critical importance in the online world where trust is more difficult to establish and maintain;
- big data benefits to the largest firms ensure that they have access to behavioural information that enables them to fine tune their offerings to consumers; and
- lock in effects become more powerful as firms provide more extensive feature sets in app platforms which make it increasingly costly for consumers to leave.

All of these factors combine to propel the most successful companies in the various niches of the app economy towards greater levels of market power. The results are that monopolistic or concentrated oligopolistic market structures develop in app economy niches and firms operate at a global or regional scale in these markets. The global reach and scale of these companies present incumbent competitors and regulators with formidable challenges.

¹²⁰ Even as far back as 2009, data comprised 85 per cent of mobile traffic but only generated 39 per cent of the revenues in the major four mobile operators in the United States.

¹²¹ ITU discussion paper, GSR-16, *The race for scale: market power, regulation and the app economy* describes the app economy as “the sum of all activity, products and services required to deliver app functionality to end consumers”.

An off-setting factor, at least to some extent, is that app-based technologies enable the exploitation of ever more narrow niches. While Facebook, for example, remains unchallengeable as the dominant force in social media, relatively new players such as Snapchat, which accesses a younger market on average, or services such as WeChat and QZone in China, where Facebook is not permitted, illustrate how niches enable new players to emerge and prosper.

A3 Telecommunications/ICTs and the app economy

The ongoing discussions between the app economy and the telecommunication/ICT industry is so multifaceted that understanding it and formulating regulatory responses requires beginning with an appropriately high level perspective. There are two central economic concepts that have driven the design of regulatory interventions in the telecommunication industry:

- competition delivers benefits to end consumers; and
- telecommunication networks tend to be natural monopolies.

In the era of twentieth-century landline-based telecommunications when incumbent natural monopolies dominated many markets, the second concept was a primary consideration in the formation of regulation. In the mobile era, where local markets may have two, three or more providers, markets are more like 'natural oligopolies'. In many markets, however, traditional incumbents have continued to wield disproportionate market power and dominated these oligopolistic market structures. Even in the absence of powerful incumbents, oligopolies often need to be regulated in the interest of customers. Mobile telecommunication regulation has focused on interconnection, transparency, affordability and consumer protection, universal service, and a range of other interventions designed to maximise access, encourage competition, and restrict the abuse of market power to protect the long-term interests of end users. The ongoing rise of the app economy demands a reassessment of our perspective and assumptions about market power in the sector.

Competition from the app economy in the telecommunication/ICT space is prodigious. All of the technology companies shown in 30, except Amazon¹²², offer consumer online services that compete directly with the voice and SMS services offered by telecommunication companies. In addition, there are other app economy online service providers such as WhatsApp (owned by Facebook), Viber, and WeChat (valued at USD 84 billion).¹²³

By way of comparison the first second and third largest telecommunication companies in the world in 2015 were China Mobile Ltd (USD 280 billion), Verizon Communications Inc. (USD 203 billion) and AT&T Inc. (USD 173 billion).

Thus, the first driver of the new dynamics of market power is that the new app-driven technology companies are significantly larger than telecommunication/ICT companies and, in addition, they have global reach. Their global nature along with the fact that much of their value creation is through intellectual property and data assets, enables them to structure their businesses so that they pay little tax. The taxation situation of companies operating within the digital sector was clearly set out in the ITU GSR-15 discussion paper the Impact of taxation on the digital economy¹²⁴. This key factor that leads to calls for 'a more level playing field' is also explored later in this report.

Figure A4 shows, in a very simplified form, the various types of actors in the app economy. The diagram indicates that only telecommunication/ICT operators and the sellers of smart phone handsets actually have 'touch points' with final consumers – end users must access apps and the android and iOS operating systems via telecommunication operators. Nonetheless, customers experience their

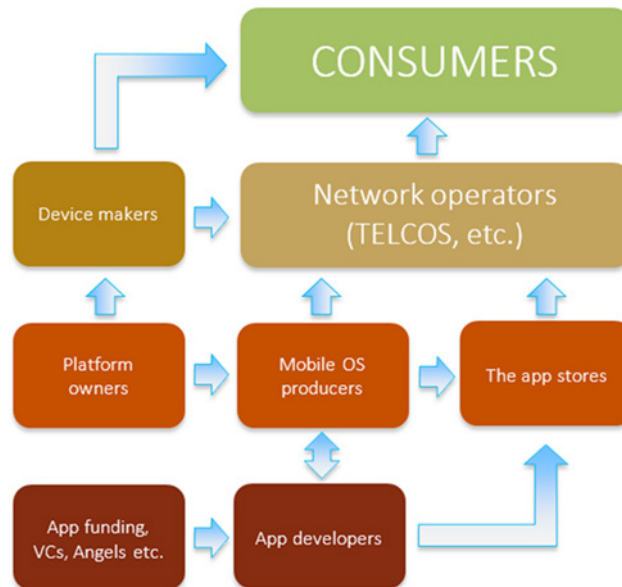
¹²² Although Amazon has just announced the launch of 'Chime' a comprehensive business-focused video conferencing service see: <https://techcrunch.com/2017/02/13/amazon-chime/>

¹²³ www.google.com.au/webhp?sourceid=chrome-instant&ion=1&espv=2&ie=UTF-8#q=wechat+market+value

¹²⁴ See: www.itu.int/en/ITU-D/Conferences/GSR/Documents/GSR2015/Discussion_papers_and_Presentations/GSR16_Discussion-Paper_Taxation_Latest_web.pdf

relationships of brand allegiance, including direct transactions such as subscriptions and purchases of media content and apps, with Apple and Google even though operators provide the ultimate connectivity.

Figure A4: App economy ecosystem and value chain



Source: Systems Knowledge Concepts (www.skcn.net.au).

It is important to emphasise that there are not one, but multiple, interconnected ecosystems clustered around each of these types of actors in the app economy. The thousands of app development entities around the world that populate the app stores with millions of apps are perhaps the most obvious example of an app economy ecosystem. But there are also important ecosystems clustered around the main handset manufacturers. Apple, for example, maintains an enormous iPhone supply chain network that extends around the globe and includes leading United States (Corning – gorilla glass) and Chinese (Foxconn – assembly) companies.

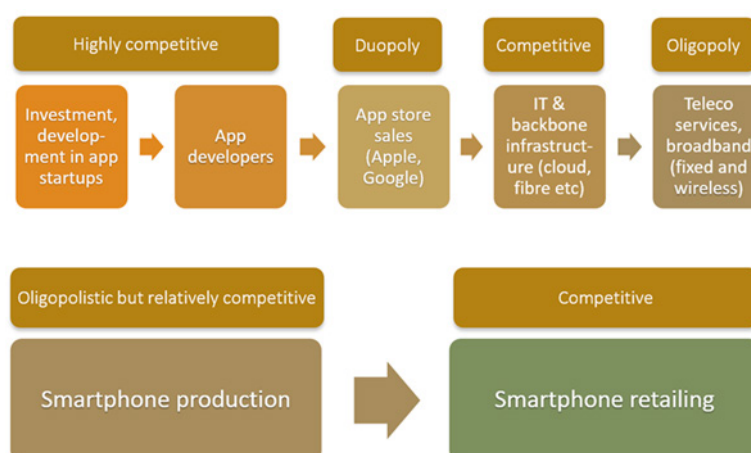
On the retail side, Apple maintains a network of 490 strongly branded Apple stores in 20 countries around the world.¹²⁵ All hardware manufacturers distribute their products through thousands of third-party retailers, telecommunication operators and online stores.

Figure A5 presents a simple representation of the supply chain for apps (upper panel) and handsets (lower panel) as well as indicating the types of market structures that exist in each of these parts of the app economy. This treatment suggests a degree of separateness in these different parts of the app economy that does not fully capture the interconnectedness of these various components.

While it is true that there are multiple ecosystems and components of the supply chain with varying levels of competitiveness, the centre of gravity for the app economy is the Apple and Alphabet (Google) platforms. These platforms consist of a combination of hardware, mobile operating systems, associated app stores, retail outlets, and a range of other services that are branded with the primary platform including music services, map services, online services and other branded information services.

¹²⁵ https://en.wikipedia.org/wiki/Apple_Store

Figure A5: App economy value chain and competitiveness



Source: ITU, The app economy in Africa: Economic Benefits and Regulatory Directions, 2017.

For most consumers (that is, excluding hackers and iPhone ‘jail breakers’) buying an iPhone means running iOS and buying a phone from Google, Samsung or other vendors means running Android. Running iOS means using apps from the Apple App Store and, while running Android enables users to buy from a number of app stores, there are 11 Google apps that Google insists come pre-installed on every Android smartphone that has access to its Play Store¹²⁶ and users cannot install iOS apps on the Android operating system. These interrelationships between parts of the app economy have profound implications for how markets are defined, how products are defined and how market power is analysed. In the brave new world of the app economy, *the platform is the product*. Although the main platform players compete across multiple hardware and software – operating system (OS) domains, the overall strategy is guided by the objective of preserving, protecting and growing the platform.

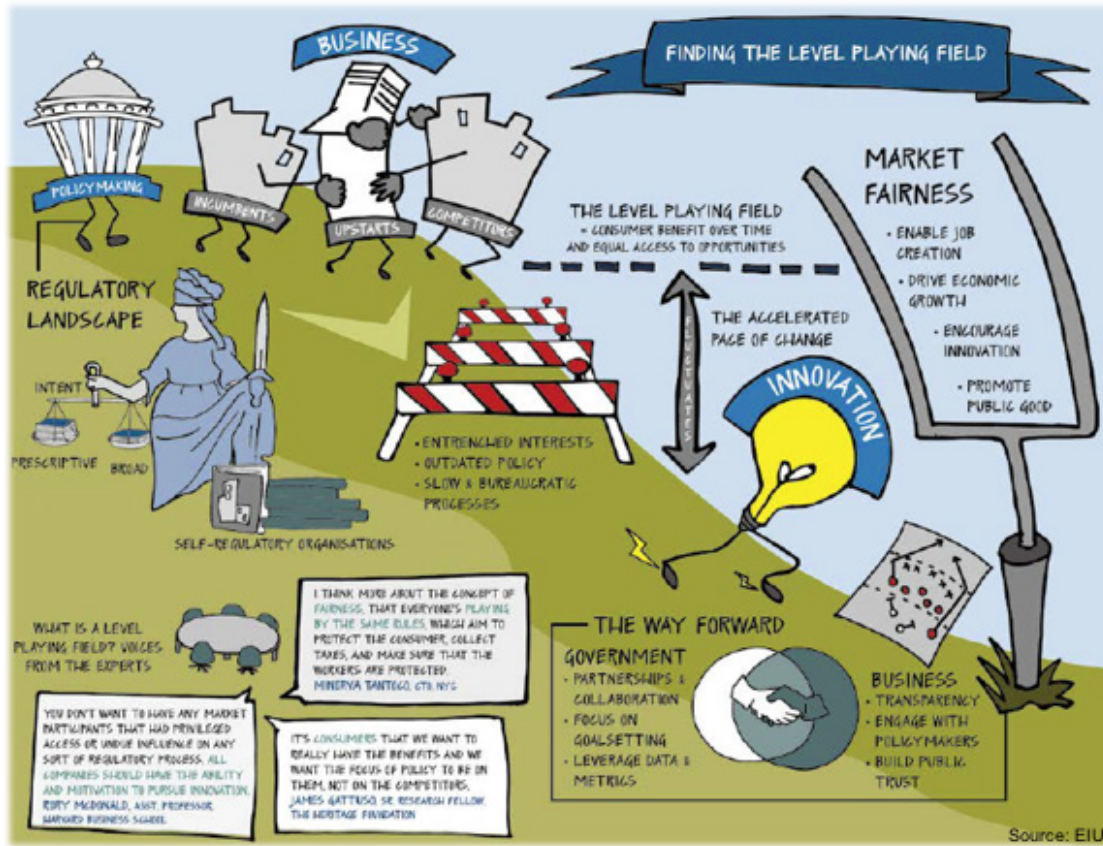
This broader platform level competition is an additional context that regulators need to consider in forming regulatory responses to app-based telecommunication/ICT products. Users of Apple Facetime, for example, pay nothing directly for the service – it is simply a service from the Apple iOS mobile operating system and yet it is a sophisticated and high quality video calling system. To the extent that platform companies consider that their online services as components of the broader platform competition, they may be willing to cross-subsidise these online services over considerably longer timeframes.

Further, and somewhat related to the previous point, any analysis by regulators based on underlying costs of provisioning these services will inevitably run into problems of joint costs and cross-subsidisation that will make such an analysis of little use.

None of these factors, however, mean that the network operators cannot formulate effective innovative responses to the challenges from the app economy. New technologies such as LTE and 5G offer significantly enhanced performance characteristics which consumers will find attractive and potentially offer significant operating cost savings to operators. These technologies also offer the possibility of designing and delivery new products to consumers.

¹²⁶ www.theguardian.com/technology/2016/aug/16/duo-video-calling-app-google-android

Figure A6: Finding a level playing field for the sector



Source: Economist Intelligence Unit (EIU).

Appendix B

Summary of regulatory imbalances between operators and online service providers (i.e. OTT providers).

Table B1: Regulatory imbalances between traditional and OTT operators

	Areas of regulation	Network operators	OTT players
1	Applicable laws	Domestic law or in Europe EU regulations	Home jurisdiction maybe; many gaps in applicable laws
2	Taxes	Local and domestic taxes	Located in low cost locations and tax havens
3	Licensing	Must be granted or acquire licence from national Governments	Mostly exempt
4	Operating Area	Only serve customers within the jurisdiction	Serve any user globally
5	Infrastructure / Network	Investing in new technology networks to deliver services to end users	No investments in networks that reach end users while telecommunication operators must deliver competitor services
6	Competition	Strict rules applying including ex ante and per se rules, mergers and acquisitions restrictions	Mostly exempt except mergers and acquisitions if OTT subject to domestic competition law
7	Fees	Customers' charges contribute to the costs of network provisioning	<ul style="list-style-type: none"> Services offered without any relationship to the underlying costs; two sided markets
8	Quality of Service	License requirements include SLAs and/or mandatory QoS standards	<ul style="list-style-type: none"> No QoS guarantee QoS issues blamed on network provider
9	Inter-connection	<ul style="list-style-type: none"> Required as part of regulatory regime Additional costs 	OTTs have no interconnection requirements for calling or messaging
10	Net neutrality	<ul style="list-style-type: none"> If applicable, best effort data transport without discrimination, independent of source or nature of data. Only typically traffic management permitted 	<p>No obligations (control over content and freedom of choice concerning customers)</p> <p>OTTs could be affected if Network operators apply traffic management restrictions</p>
11	Emergency services	Mandatory provisioning as part of licence conditions	Typically no such obligations
12	Interception	Strict regimes with costs borne by operator	Typically no such obligation
13	Retail Prices	Regulators' approval is typically needed in advance	No need for approval and maybe free for users

	Areas of regulation	Network operators	OTT players
14	Universal Service	<ul style="list-style-type: none"> Mandated USO contributions as a percentage or network revenues 	No contribution
15	Spectrum fees	Required to acquire in an auction or pay market based fees for usage	No additional costs for OTT
16	Privacy	Strict data protection and privacy requirements for users	Practiced on a limited and generally voluntary basis
17	Number Portability	Obligation to offer number portability between providers	OTT service independent from mobile number

Appendix C

Table C1: Preliminary set of data gathering questions in relation to the possible regulation of online service providers

No.	Internal Regulator Questions	Mobile Network Operator Questions
1	What tariff regulation applies to voice, SMS and data? Are there any prohibitions on bundling?	What is the proportion of smartphones on your network in early 2017 (including proportion of 2G/3G/4G(LTE) capable handsets)? How has that changed in the past 12 months? What is the expectation for the next 12 months? 24 Months?
2	What, if any, taxation or other licence fees do online service providers pay? Including both income and any sales tax or goods and services taxes (GST)?	What is your network plan for the deployment of LTE and VoLTE?
3	How has the cost of international capacity changed over the past 3 years, and what is the forecasted price?	What is the proportion of traffic generated by online service providers (e.g., Facebook, Viber, iMessage, WeChat, Line, Netflix, iflix, etc.) in 2016 and 2017? What are your forecast going forward?
4	How is online content regulated? What objectives and priorities does the regulator have for such regulation? Is there any classification system for online content?	What is the overall average data usage per subscriber in 2016 and 2017? What are your forecasts? How much of your Internet traffic is international versus domestic?
5	Can you provide information on licensing under the Law? Are there any proposals for change? Is Netflix or any other online service provider licensed?	Are there any partnerships between you and online service providers? If so, what form do they take?
6	Are there any other matters/comments would you add which you consider are important input for the formulation of a regulatory framework for online services?	What video streaming services have launched? (e.g., Netflix, etc.)
7	Do you have any relevant statistics or data that may be useful to assessing the online service provider issues and related regulation (if any)?	How has the cost of international capacity changed over the past 3 years, and what is the forecasted price?
8	n.a	Are there any other matters/comments would you add which you consider are important input for the formulation of a regulatory framework for online services (if any)?

Source: WPC, May 2017.

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