



## **Methodology for the Regulation of Over-the-top (OTT) Services: The Need of A Multi-dimensional Perspective**

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### **ABSTRACT**

Over the past decade, the contemporary literature has addressed the emerging factors influencing the new economy of over-the-internet and over-the-top (OTT). The growth of the OTT market conveyed the need for the discussion on the best possible and most appropriate regulatory approach that should be undertaken. This study emphasizes the importance of a multi-dimensional outlook for OTT regulation in order to uncover different types of OTT services. This outlook includes the diverse forms of relationship between new and current influential factors (i.e., market model, business impact, infrastructure requirements) and area of regulation. This paper describes a balanced regulatory framework based on a cooperative approach that is more effective for OTTs. Similarly, the OTT regulation has not been included in the regulatory agenda in Turkey due to low penetration rates and cooperative approach between OTT service providers and telco companies. As a result, this work proposes a multi-dimensional methodology for this emerging new area that requires regulation.

**Keywords:** Over-the-top, Services, Regulation, Market, Network, Policy, Competition, Telecommunications, Internet

**JEL Classifications:** G28, L86, L96

### **1. INTRODUCTION**

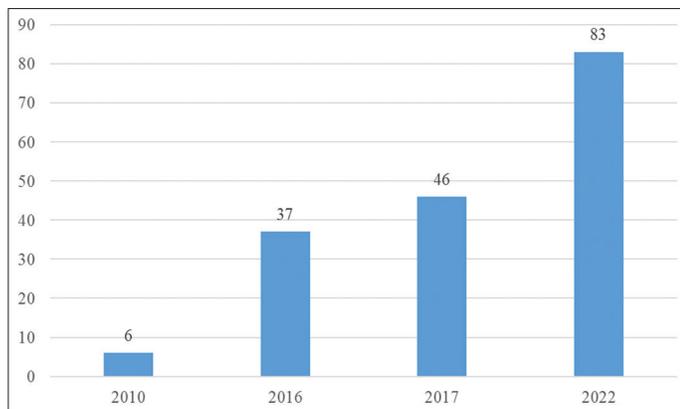
The over-the-top (OTT) market has been expected to grow with a significant rate by 17.1% over the next decade, and to reach approximately USD 3.49 billion by 2025. Figure 1 presents the growing OTT revenue worldwide, indicating an estimated 80% increase between 2017 and 2022 (Figure 1). Likewise, according to the International Telecommunication Union (ITU) telecommunication trends report, with machine-to-machine communication, cloud systems, and OTT services, the mobile traffic is expected to grow by 61% from 2013 to 2018 (BTK, 2014).

The regulation and authorization of OTT services by the national authorities and regulatory bodies are yet to be established, and are currently in the discussion phase in many countries (BTK, 2016c). This review work analyzes the breakthroughs made and constraints encountered in creating OTT regulation. In addition, the key factors in this new technological and business area are identified, while the diverse regulatory schemes from a cooperative approach in order to understand Turkey's position in OTT regulation, are also explained.

This paper categorizes internet service providers (ISPs) as internet access providers, and connectivity providers as the same groups defined by the Body of European Regulators for Electronic Communications (BEREC, 2015). The structure of this paper is given as follows: First, the different definitions of OTT services, and as well as their advantages and disadvantages in the telco industry is analyzed. Next, the problem of regulatory imbalance with the emergence of new competitions, namely OTT services, are identified. Then, a summary of literature surveys on OTT services, along with explanations on global OTT regulation and regulatory approach in Turkey is presented. Finally, in the last section, a multi-dimensional perspective to study OTT services and their regulation is proposed. The methodology of this study is based on the case study approach built on content and document analyses as well as in-depth interviews with experts from information technology and communication authority and the competition authority.

### **2. DEFINING OTT SERVICES**

OTT services that generate traffic on fixed and mobile networks include: (1) Communication (Skype, Whatsapp, iMessage,

**Figure 1:** Over-the-top revenue worldwide (2010–2022) (billion \$)

Source: Digital TV Research, Statista, 2017

Facetime), (2) real-time entertainment Netflix, Hulu, YouTube, Spotify), (3) social networking (Facebook, Twitter, LinkedIn, Instagram), (4) market places for downloads (Apple iTunes, Google Android Marketplace, Amazon), (5) file sharing (BitTorrent, eDonkey, Gnutella), (6) storage (Dropbox, Google, Apple, Microsoft), (7) video and computer gaming, and (8) web browsing (HTTP, WAP browsing) (Peitz and Valletti, 2015). Given that there is currently no universally accepted definition of OTT, the following list summarizes the diverse definitions of the concept that have since been introduced:

- “Newcomers in the fields of broadcasting and content delivery, OTT content means online delivery of video and audio without the ISP being involved in the control or distribution of the content itself. The traffic is not managed (Busson et al., 2016, p. 17)”
- “Internet application that may substitute or supplement traditional telecommunication services, from voice calls and text messaging to video and broadcast services” (ITU, 2017)
- Services “... generally do not own an extensive infrastructure, but rather use the existing infrastructure of traditional telecommunications service providers (telcos) has led to disruptions in the traditional internet ecosystem (Kraemer and Wohlfarth, 2015, p. 71)
- “A service platform built on the Internet that provides video streaming (e.g., Netflix) or communication service (e.g., line). For OTT TV as an example, the audience enjoys video application service through the Internet, which makes OTT TV a broadcasting platform independent of traditional means. Hence, OTT TV is a substitute for cable TV and vice versa, and its boom or bust has effects on the number of cable TV subscribers and thus revenue” (Liu and Chuang, 2015, p. 989)
- “OTT services consist of a variety of services, including electronic communication and publishing, through which content is delivered to end users over the Internet. Radio or other music content that can be listened to over the Internet, voice and messaging services that do not require the infrastructure of any telecommunication operator; to various video content (video content created by movies, series or users) through catch-up and over-the-air devices and on-demand viewing (catch-up) of TV programs”
- “Medium used for delivering diverse media content using the Internet. It is different from video-on-demand where the users need not subscribe to the traditional satellite or cable

service such as Comcast and Time Warner Cable” (Research and Markets, 2016a)

- The term that “encompasses an overtly broad category of services. Any service delivered over IP can fall in that category, despite having very different characteristics” (Digital Europe, 2017, p. 1)
- “The modular architecture of broadband GNP’s has enabled new market (non-network owners) players to carry out “permission-less innovation” to provide voice, video, and applications. This also created a new value chain including manufacturers, operating systems, network providers, advertising intermediaries and OTTs. Below is a brief discussion of such innovations and their effects” (OECD, 2016)
- “Services as content, a service or an application that is provided to the end user over the open Internet” (BEREC, 2015).

The debate on OTT services have mostly originated from the following studies: (ITU, 2017; Kodatku, 2014; Liu and Chuang, 2015; Research and Markets, 2016a; OECD, 2016; ITU, 2017; CTO, 2016a). The Table 1 summarizes the advantages and disadvantages of the emergence of OTTs in the telco industry.

### 3. THE PROBLEM OF “REGULATORY IMBALANCE”

OTT services are among the most popular communication services that have created a long-lasting debate in scholarly articles, reports, and policy documentation processes. Several literature works have discussed the different aspects of OTT services including economic impacts, competitive effects on the telco industry, and as well as their regulatory frameworks with regards to future media regulation that covers both new media and influential elements (i.e., search engines, social networks and manufacturers). The availability of more revenue has increasingly made regulatory intervention inevitable (Table 2). Some examples of this include taxation and unfair competition, as well as a biased playing field, thus giving the OTT services an unjustified advantage over their traditional counterparts (Nakajima, 2015). OTT services are also likely to be treated as a direct competition due to the free services they offer. General competition exists among different pre-paid TV operators, and Telco operators that provide non-linear video services. As such, this competition factor usually and directly triggers a fall in market prices (BTK, 2011).

The OTT regulation is a new area of interest in media distribution, and is presented in this literature review from different viewpoints. The literature survey focuses on the overarching regulation of OTT services, such as, the regulation of the cloud storage/computing platform in emerging online media systems including traditional public service TV providers (BBC), technological companies (Google, Apple), and hybrid technological-media businesses (Netflix, Amazon) (Noam, 2014). There is a general consensus among the studies conducted on the new regulation of these technologies to provide “a-la-carte offering of service elements” (Noam, 2014). Although the question of “what to regulate” has

**Table 1: Advantages and disadvantages of OTT services**

Advantages	Disadvantages
High adoption rate of OTT services by end-users	Low customer retention
Benefits from worldwide coverage via the Internet, and also quick to deploy	Lack of a reliable and high-speed network
Exploits different economical scales, and cheaper with increased usage	Declining demand for traditional voice and text messaging services
Broadband connectivity support, and pushes the demand for broadband (data usage) services	Increasing traffic load
Benefits from publicity revenues, and offers cost-efficient ways to market a product/business	Increasing the investment need of ISPs and operators to meet increasing data demand
High negotiation power with suppliers in terms of generating revenues	Despite the discussions on increasing competition with new competitors coming into the market, there is also another debate as to whether OTT services and network operators can jointly operate within the same market
Increasing demand for data	Difficulties in assuring end-to-end quality control, and in maintaining QoS across different domains
Increasing data revenue for operators	Proximity issues, and consumer experience related requirements
Dynamic customer base	Lower capability for national dependent services, and inability to contain an operational model within a jurisdiction
Low switching costs	Lack of contribution to the USF, and difficulty in generating OTT revenue towards USF
Rise in consumer interest in online media contents accessible over multi-screen platforms	Revenue loss in voice and messaging services despite adoption of mobile handsets and SIM cards
	Problem of OTT tax evasion in non-domicile jurisdictions
	Personal data protection and privacy issues hardly addressable by national regulation
	Security concerns, as users have no control over data collected
	The lack of direct and clear regulation on OTT

Source: Combined by the author from various sources. OTT: Over-the-top

**Table 2: The comparison of the regulation area between OTT and telcos services**

Regulation area	Telco industries	OTT services
Bank-to-government guarantee	Yes	No
Fees	Customer fees support the financial costs to back the network	Services offered without any relationship to the underlying cost of the network
Infrastructure/network	Investing in networks to deliver services to end users; Available technologies to use resources efficiently (e.g., multicasting)	No investments in networks that reach end users; telcos are obligated to deliver competitive services regardless of the impact on their networks
Interconnection	Yes, required as part of stipulated regulations. Requirement to interconnect involves financial incentives	No such interconnection required as they are "OTT" networks
Licensing	Yes, different licenses and their associated costs including licensing fee	No licensing or related fees required
Net neutrality	Must offer best effort in data transport without discrimination, and independent of source or nature of data	No obligations (control over content and freedom of choice concerning customers)
Number portability	Obligation to offer number portability between providers	OTT services are independent of mobile numbers
Operating area	Only serves customers within the regulated jurisdiction	Serves any user globally
Price changes	The approval of regulators is needed in advance	No need for authorization; Loose agreement is offered which is subject to change at any time
Content and Privacy	Strict data protection and privacy requirements for users	Practiced on a limited and generally voluntary basis
Proper record keeping including methodology	Required	Required through other acts
Public safety services	Mandatory	No such obligations
QoS	Licenses include requirements for SLAs	No QoS guarantee; QoS issues blamed on network provider
Space related charges	Needs to handle the costs	No such costs
Spectrum allotment and use	Needs to bear the cost burden and adhere to rules	No such costs
Spectrum related charges	Needs to handle the costs	No such costs
Taxes	Local and national taxes	Locating operators in low-cost locations and tax havens

Source: Combined by the author from various sources. QoS: Quality of service, OTT: Over-the-top

been identified, the query of “how” remains in discussion, and is a perplexing one.

#### 4. REVIEW OF OTT GLOBAL REGULATION

The telecommunication industry is widely recognized as a heavily regulated market, and corporate strategies can be mostly based on non-market actions like political strategies (Sutherland, 2014) and non-economic considerations (Brennan, 2017). On the contrary, OTT business models are depicted as mechanisms for escaping “politico-regulatory games and trade-offs” (Sutherland, 2014, p. 13). Çalışır (2015) identified the supporters of the global IPTV industry within the telecom sector (operators), TV business (publishers, content producers, advertisers), device manufacturers (TV screens, set-top box devices, network devices), and state (primary and secondary regulatory authorities).

Literature surveys on the telecom industry regulations have studied the processes of regulation, deregulation and re-deregulation from different aspects (Kelly and Ying, 2014), including prices (Anstine, 2004); internet governance with the layers of control, access, networks, transport, and content (Collins, 2006); the competition between private operators and national monopolist that characterizes asymmetric duopoly in local networks and technology competition in mobile networks (Dornisch, 2001); and the roaming regulation in the European Union (EU) (Falch and Tadayoni, 2014) (Herrera-González and Castejón-Martín, 2009) and (Hills and Michalis, 1997; 2000; Tardiff, 2007) focused on asymmetrical regulation, and technological convergence and fragmented regulation, respectively. The lack of regulatory certainty in the EU was addressed by (Huigen and Cave, 2008), while (Howard, 2008) studied regulatory inconsistencies. Studies on the potential growth of the telecom industry with new competitions were conducted by (Kelly and Ying, 2014), and the different regulatory types (statutory regulation, co-regulation, self-regulation) by (Marsden, 2008). (Onwurah, 2009) reviewed the effects of innovation and network systems, and the investigation of policy recommendations that guarantee open access, enforces reasonable pricing plans, and encourages innovative content was carried out by (Papacharissi and Zaks, 2006) (Prüfer and Jahn, 2007) reported on capacity paradox and policy-based remedies, while details of world-class governance systems was provided in (Sutherland, 2017). Political-cultural dynamics, network interconnection, digital divide, next generation technologies, and consumer aspects were described by (Yang, 2007), (Yan, 2001), (Connolly et al., 2017), (Yaman, 2017; Kushida, 2013), and (Stocker and Whalley, 2017), respectively. However, in spite of these recent comprehensive literatures, there remains a fundamental need to create an absolute approach in understanding the complex nature of the OTT market, and consequently establishing a multi-dimensional regulatory perspective.

Literature reviews on OTT services have mostly focused on the areas of growth, market penetration, impact on the telco industry (Kim et al., 2017; Kim et al., 2016), the development of new models (Han, 2014), and user motivations (Kim et al., 2016). The main

policy considerations on the OTT regulation include authorization, personal data processing, security, taxation, network neutrality, competition rules, privacy, platforms, traffic management, and network discrimination. The network discrimination may include blocking of applications and services, slowing or “throttling” internet speeds, blocking websites, preferential treatment of services and platforms, best efforts internet access, prioritization of certain traffic (Hazlett and Wright, 2017; Federal Communications Commission [FCC], 2015).

According to a report published by OECD, groundbreaking innovations have turned into “disruptive innovation,” where the introduction of new applications and services diminishes, and in some cases, eventually displaces the market share of seasoned and existing stakeholders. One of such example is the OTT’s provision of voice, video, and data services over fixed and mobile networks (OECD, 2016). OTT providers have become a major competitor to existing operators. However, most, if not all OTT services are provided over the networks of these operators, thus indicating that OTT services rely on third-party infrastructures to some extent (p. 11). In a similar view that can be interpreted as disruptive, Elert (2016) defined OTT platforms as “a radical, widely applied innovation that transformed the internet landscape, yet its founders became convicted criminals because of it” (p. 176). Peitz and Valletti (2015) claimed that the increasing role of OTT supporters in providing services over networks requires the introduction of new market definitions and reassessment of market power (p. 910).

The inconsistency in OTT regulation is based on the disparity between one-sided infrastructure and two-sided content markets. The telco industry embraces the one-sided business model for offering internet service, while many other OTT service providers, such as, Facebook, Google Search, eBay, YouTube support the two-sided business model, and therefore becoming a separate technological business faction. Substitution as a business model is assumed to alleviate the monopolistic grip of ISPs. The market share and the competition for customers is also leveled for ISPs and OTT services. Based on the competition between current and new market shareholders, the need for “regulatory rebalancing” was identified as “asymmetric” with an “unequal regulatory regime” to create competitive disadvantage for the existing market shareholders due to new competition (Busson et al., 2016, p. 23) (i.e., telco players - such as Turk Telekom, Orange, Telefonica - versus OTTs - such as Amazon, Facebook, Google, Netflix, WhatsApp, Twitter). Such a balancing approach can be exemplified via the Single Market Communication released by the EU in October 2015, in order to encourage innovation, while also ensuring that consumer protection rules were being observed (i.e., General Data Protection Regulation; Digital Europe, 2017).

A balance approach has been proposed for the global OTT regulation with shared responsibilities between OTT and telco service providers, and a consistent regulatory framework that would bring confidence and stability to companies. This initiative presented an opportunity for deliberations between these companies through a conference on classic telecommunication network operators and the role of OTT providers that was organized by BNetzA and held on October 27, 2015. Several

representatives from the industry, politicians, scientists, and regulatory authorities were invited to attend and make appropriate contributions. The balance approach requires a clear separation between traditional regulations on access and price regulations as well as data protection, data security, transparency and consumer protection (BTK, 2015a).

## 5. AN OVERVIEW OF GLOBAL OTT REGULATION

Palfrey (2010) described four phases of internet regulation, “open internet” up until 2000, “access denied” present until 2005, “access controlled” which was valid till 2010; and most recently, “access contested” due to the “hybrid” environment including both public and private domains (p. 991). The underlying problem is not whether the internet can be regulated, but rather, how, and the effective implementation of the regulation. This therefore introduces competing forms and standards of regulation (p. 994). The ITU proposed that governments could play a significant role in encouraging the transition to new technologies by “creating an enabling environment for the deployment of data networks, ensuring an appropriate level of regulation and applying measures that enable competition on a level playing field with a view to brokering the international agreement of standards able to assist the creation of a win-win situation for network operators and OTT players” (ITU, 2017, p. 1). In light of this, the ITU aims to develop “standards that promote fair competition, consumer protection, dynamic innovation, sustainable investment and infrastructure development, and accessible and affordable international services” (p. 1).

In 1997, the WTO basic telecommunications agreement was signed by sixty-nine nations in order to foster liberalization and eliminate telco’s monopolistic structure (Chong and Chow, 1999). In the USA, the regulation of the telecommunication industry is conducted in a unique way by employing a “joint jurisdictional model” (Gasparini, 2014, p. 125), with the federal government handling the regulation, as opposed to a central figure of authority. By virtue of the 1934 communication act, the FCC was established with a broad mandate to regulate interstate traffic. In 1989, following the segregation of AT and T, a new era of competition that departed from the customary monopoly model was ushered in. With the 1996 act, the “layers model” (p. 126) was adopted for network design and regulation, whereby competition could exist at multiple levels and subdivisions within the industry. These policies that promoted competition propelled the fiber and wireless network technologies, and generally established growth in the industry. Such deregulatory efforts also allowed mergers and acquisitions to strengthen both old and new medium of the internet (e.g., the merger of CBS and Viacom) (Levi, 1999). In 2015, however, the Open Internet Order initiated by FCC was characterized as a “sharp” return to deregulation (Figure 2), as it prohibited paid prioritization<sup>1</sup>; “blocking” access for end users (restricting the content of certain websites) and “throttling” access for end users (partially restricting the content of certain websites) (Hazlett and

Wright, 2017, p. 488; FCC, 2015). This drastic shift was labelled as unconvincing and inefficient for the growth of the industry. This was viewed as indicative of the future internet regulation, largely owing to the fact that the FCC is treated as a single authority with the power to legally regulate existing internet networks, and hence, greatly capable of influencing the development of the global Internet industry (i.e., the minimum price set by FCC turns out to be the new market equilibrium price) (Prüfer and Jahn, 2007).

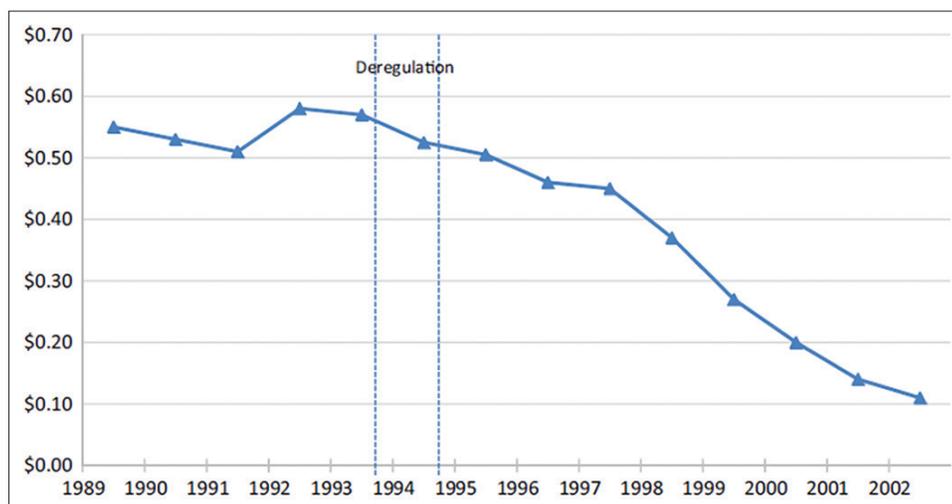
In the EU, discussions on OTT is mainly based on the protection of personal data in relation to the US OTT services, which controls the largest share of the global market and “dominates” the European market (Ciriani, 2015, p. 44). The EU approved rules in April 2014, to ensure equal access of firms and individuals to online services, and also harmonized rules across national borders to create a unified European market. European countries like France and Spain have blocked OTT providers when offering voice services that connect to the public switched telephone network (ITU, 2016). On August 6, 2015, in France, a new law extended the authority of the Regulatory Authority for Electronic Communications and Postal Services to authorize operators as an electronic communication network and/or service provider (BTK, 2015b). In the UK, the government’s priority concerning the regulatory framework is to base any regulatory change on an economic reason (CTO, 2016a). On December 29, 2003, the Office of Communications (Ofcom) - the UK’s single communications regulator - officially replaced five separate broadcasting and telecommunications regulators: The Independent Television Commission, the Broadcasting Standards Commission, the Radio Authority, the Radiocommunications Agency, and the Office of Telecommunications (Önen and Tanyıldızı, 2010), in order to converge regulatory policies of television, telecommunications, and computing technologies, facilitated by digitalization (Smith, 2006). However, such technological convergence needs to be regulated in the “same (minimal) fashion” for all services (Storsul and Syvertsen, 2007). Therefore, the creation of a single regulatory body cannot ensure the regulatory convergence (Doyle and Vick, 2005).

Mergers and acquisitions are some of the solutions for overcoming the decreasing revenue base of voice and messaging services due to OTT services and in the process, eliminates customs taxes, and interconnection price controls (e.g., the agreement between Telefonica and E-plus). While such strategies aid companies in providing new opportunities, in the long run, more effective and perennial strategies such as the adoption of next-generation technologies, are recommended (BTK, 2013b). Based on a study that compared the taxation regulation for telco companies and the tax optimization for OTT companies, it was revealed that OTT service providers, such as, Amazon, Apple, Facebook, Google, and Microsoft, paid €37.5 million in tax fees, and that if these companies were based in France, this would only amount to 22% of the total sum paid (BTK, 2013c).

## 6. OTT REGULATION IN TURKEY

In 2016, the head of BTK (Information Technology and Communication Authority) emphasized that, “OTT service providers have been appreciated for their steps to comply with

1 Where ISPs and content providers contract for quality-of-service levels that may include faster delivery to end users (Hazlett and Wright, 2017, p. 488).

**Figure 2:** Average cost-per-minute, U.S. retail mobile services, 1989–2002

Source: Hazlett, 2003, p. 497

the financial and legal requirements of the countries in which they operated. Furthermore, he pointed out that it is necessary for countries to have international technology companies produce appropriate strategies for their sovereign rights, while complying with universal legal principles and local laws. Likewise, with regards to cyber security, he also highlighted the importance of the collaboration between the public and private sectors in anticipation of the growing user base” (BTK, 2016; Press Release, February, 15) (i.e., collaboration between content and local IPTV provider such as Netflix in Korea). On January 06, 2004, and March 13, 2013, following the enactment of the laws 2014/DK-ETD/21 and 2013/DK-ETD/142, respectively, the tariff prices were regulated based on the increasing expansion of OTT services (BTK, 2016a). However, there was no direct mention of OTT in telecom regulation, as evident in the Strategy Plan prepared by BTK (BTK, 2016b).

Based on the analysis on the OTT regulation in Turkey, Kodatku (2014) identified 7 policy areas within the Turkish telecommunication regulation. These are (1) authorization; (2) consumer rights; (3) competition regulation; (4) network neutrality, (5) taxes; (6) fees; (7) control and audit. As a reference to these regulatory areas; despite the lack of direct regulation for OTTs, a few articles of the Law on Electronic Communication No. 5809, might be associated with OTTs indirectly (Kodatku, 2014). For instance, for authorization, Article 8, clause 1; Article 9, clauses 1 and 3; Article 19, clause 1; Article 3, clause 1; Article 12, clause 1; Article 63, clauses 1 and 2 might be referred to OTT services. However, there are gaps due to the lack of the definition of OTT services to be authorized. Again, as regards with consumer rights, Article 49; Article 6; Article 51<sup>2</sup>; Article 52 as well as Regulations on Electronic Communications Service Quality, Personal Data and Privacy, Traffic Regulation Applications might be associated with OTT services.

In Turkey, most operators provide OTT TV/video and multiple gaming options, together with their usual and default paid services.

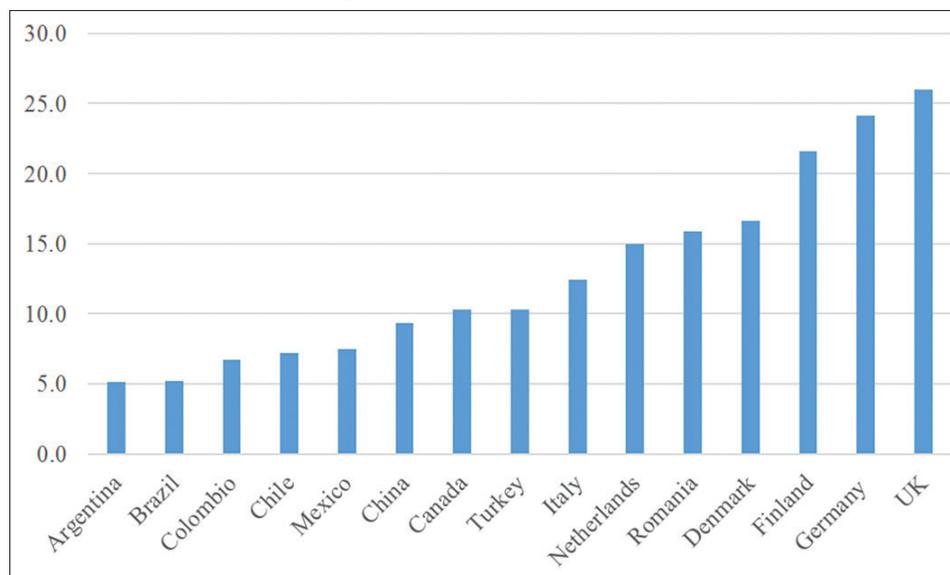
2 This article was cancelled by the Constitution Court on July 26, 2014; RG: 29072.

This business model and strategy allows their customers to access TV or video contents at any time, place and on any device (Figure 3). As such, they are able to increase the value of the paid services they offer, while overcoming the competitive effect of independent/third party OTT TV/video services (Competition Authority, 2017).

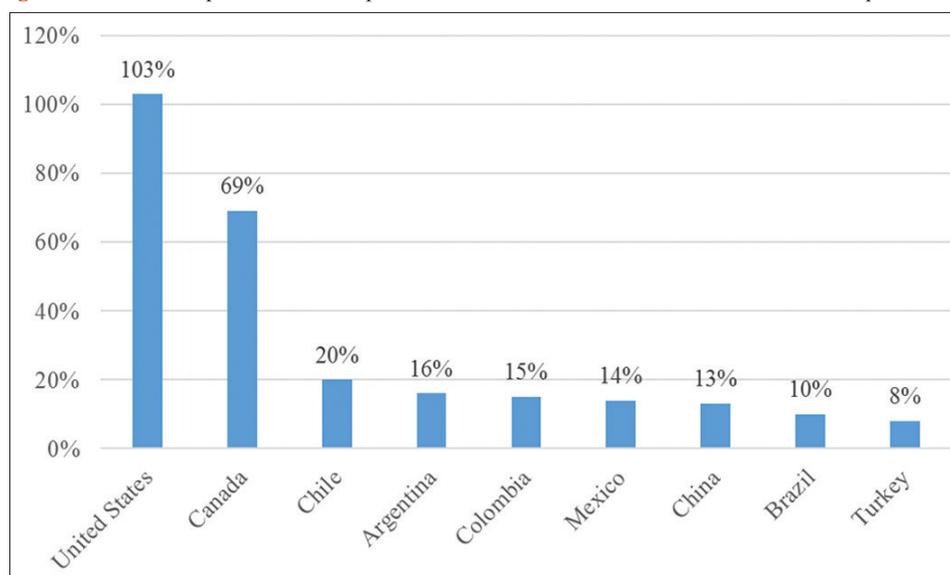
The low penetration and competition levels of OTT service providers in Turkey is commonly related to the underdevelopment of broadband internet services, such as, infrastructure, capacity, speed, and quality (Figure 4). While investigating other countries, the highest average mobile connection speeds were measured in: United States - 10.7 Mbps; Australia, 15.7 Mbps; UK, 26.0 Mbps; Kenya, 13.7 Mbps (Akamai State of the Internet, 2017).

The “fair-usage quota” regulation in Turkey is also another obstacle that limits the penetration and attachment rate of OTT. Most users prefer access to unlimited internet data plans, but this quota application, however, decreased the internet bandwidth after a usage threshold was reached. On December 27, 2016, based on the 2016/DK-THD/518 law and since March 2017, new enhancements have been continuously rolled out depending on the bundle tariff (BTK, 2016d). The challenges with regards to the competition implications of tariff and data bundles are summarized as: (i) Bundling creates complexities in terms of market analysis and definition, (ii) The dominance of the bundling strategy might create isoers in the market due to the fact that they may not be able to afford the bundles (e.g., mobile services) and, (iii) the emergence of non-traditional telecommunication services. In order to compete with OTT service providers, telecommunication operators began providing VoIP applications as part of their services (OECD, 2016). Therefore, OTT services are not substitute options, but complementary new technologies to ISPs in Turkey.

The local Turkish OTT services have been mostly initiated by existing network providers, such as, IPTV service of TTNet called Tivi GO (launched in 2014), Turkcell TV and Superonline Turkcell TV+(launched in 2014), Digiturk Play, D-Smart’s Blu TV (launched in 2012), and Doğuş Group’s Puhu TV (launched in 2017). With reference to more globally recognized brands,

**Figure 3:** Average connection speeds (IPv4) for mobile connections, 2017, by country/region

Source: Akamai State of the Internet, 2017

**Figure 4:** Over-the-top video services penetration rate in select countries worldwide in 1<sup>st</sup> quarter 2017

Source: Instituto federal de telecomunicaciones de México; Ovum, Statista, 21017

in 2016, Netflix started its operations in Turkey. Following this event, the relationship between OTT service providers and the telco industry in Turkey has been primarily based on a cooperative attitude, where both sectors are determined and contented with the idea of jointly and evenly sharing the domestic market dominance (Bouncken, et al., 2015). A similar approach was proposed by ITU (2017) as follows:

“Network operators aim to provide secure, reliable, high-speed networks that deliver services valued by end-users. Network operators will gain competitive advantage by investing in the expansion and improvement of their networks, helping OTT players to reach new customers and deliver high-quality services. If a network operator’s main business is voice, that operator will face strong competition from OTT voice services. However, if a

network operator’s main business is data service provision, that operator will view OTT players as collaborators. The situation today is that most network operator’s main revenue stream comes from voice and text messaging services. A win-win collaboration model will emerge only if network operators’ main revenue stream shifts towards data service provision” (p. 3).

## 7. METHODOLOGY FOR STUDYING OTT SERVICES: THE NEED OF A MULTI-DIMENSIONAL PERSPECTIVE

Several literature studies have reported that OTT regulations are based on different categories due to the complex nature of the OTT market. However, each of this category has challenging drawbacks.

For instance, the Telecom Regulatory Authority of India provided the following classification for OTT services: Communication, entertainment, online market place, finance, education, health, and others (TRAI, 2015). This classification, however, overlooks vertical and horizontal relations. BEREC (2015) defined OTT-0: As an OTT service that qualifies as an electronic communication service; OTT-1: As an OTT service that is not an electronic communication service, but potentially competes with such service; and OTT-2: As other OTT services. Again, this categorization does not differentiate OTT-2 services, such as, local or global video providers (i.e., Tivibu and versus Netflix). This section therefore provides a combination of different OTT classifications.

The proposed analysis for OTT regulation describes a multi-dimensional perspective to unravel the intricacy of the OTT market and position it in a suitable regulatory framework. The model is based on four levels of analysis: (1) Service-level analysis, (2) analysis of business models (one-sided or two-sided market models), (3) analysis of the competitive interaction with the telco industry (substitutive or complementary), and (4) analysis on the level of infrastructural requirements (high or low) (Figure 5).

First, the OTT regulation scope needs to cover a diverse group of services, which require different market models, infrastructures, and business impact. These services may include but not limited to:

- Entertainment (TV/video), Media (Netflix, YouTube, Spotify)
- Real time communication (Skype, Viber, WhatsApp)
- Telework/telepresence (Facetime)
- Cloud computing/storage (Dropbox)
- Social media (Facebook)
- Financial services (BKM express)
- E-commerce (Gittigidiyor.com, eBay)
- Internet of things
- Smart homes (Smartcam)
- Online gaming.

Next, in two-sided markets, the “service provider (the platform operator or intermediary) facilitates transactions between two distinct

groups (e.g., buyers/sellers, viewers/advertisers), by bringing them together to interact via its platform.” While two-sided markets generally include intermediary platforms, such as, eBay, Facebook, Google Search, and YouTube, they also comprise of one-sided service providers like, Netflix and WhatsApp. OTT platforms enables the incorporation of both one-sided and two-sided business models. For instance, Apple can function as a one-sided platform, as a retailer with iTunes, and as a two-sided platform with AppStore (p. 75). Then, with regards to the impact of OTT services on the telco business, OTT services may provide alternative services ranging from communication (WhatsApp, Facebook, Skype) to video (Netflix, Hulu), and other complementary benefits (information services).

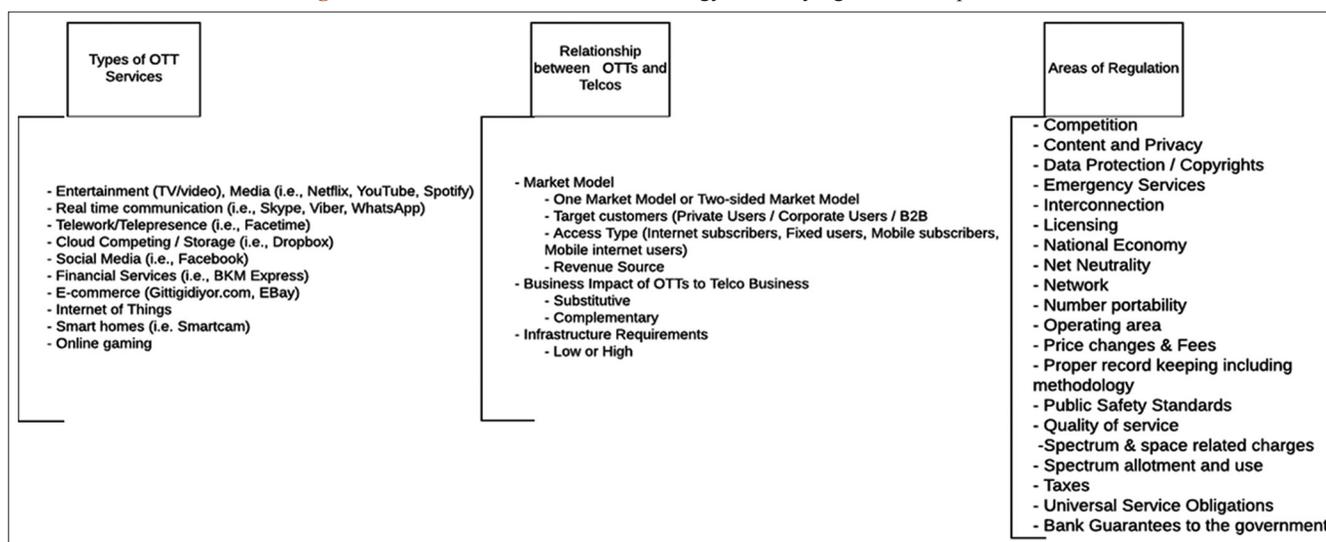
Finally, with regard to the influence of OTT services on data transmission network traffic and infrastructure, these services might provide different levels of media content or transmission capacity (i.e., YouTube, Skype with high requirements that forces the telco industry to invest and carry out upgrades on their networks) (Kraemer and Wohlfarth, 2015) (Figure 6).

## 8. CONCLUSION

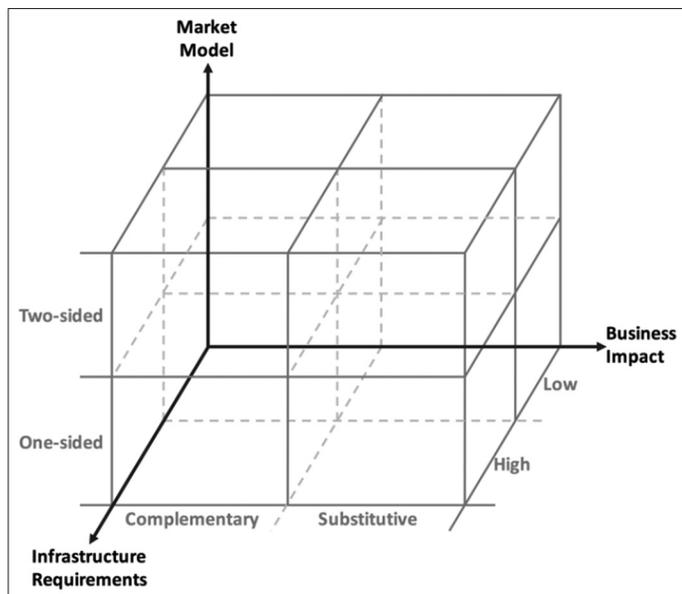
The OTT regulation requires a multi-dimensional approach to comprehend the complicated and dynamic nature of the OTT market. The challenges encountered by regulators to maintain parity in internet service, regulatory balance, and innovation without discouraging industry growth, and traffic management by ISPs, has prompted governments to intervene to ensure privacy, data protection, price control, effective competition and appropriate taxes. Despite network operators seeking new ways to collaborate with OTT content and application providers, the innovation in platform industries has created new services and market models that affect the telecom industry’s structure, dynamics and infrastructures. Therefore, the formation of new partnerships might still create gaps in the regulatory framework.

Instead of considering the single or double dimensional viewpoints, classifications or the effects of the OTT market, it is

**Figure 5:** A multi-dimensional methodology for studying over-the-top services



Source: Adopted by the author (Kraemer and Wohlfarth, 2015; TRAI, 2016; ITU, 2015; 2016)

**Figure 6:** Relationship of over-the-tops and telcos

Source: Kraemer and Wohlfarth (2015, p. 73)

important to establish new ways for understanding the market from a broader perspective. This enables discussions to be narrowed down and focused on the areas of market restructuring, market power rebalancing, or short-term cooperative relations between the market shareholders. With the multi-dimensional regulatory approach, industry experts can hold open communications with regulators and multi-stakeholders to create initiatives that would engage new and current market stakeholders in the policy-making process.

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