OTT and related on-line services in Arab Region

Release 1.2

28/02/2017	Reality of OTTs in Arab Region

The objective of this study is:

1- to have a global view on OTT and on-line services worldwide with the impact and trends of these services on national players and economies,

2- to have an overview on associated practices and relevant public policies worldwide and in the Region,

3- to propose recommendations on methods and approaches for preparation of associated policies and frameworks.

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Note : As the subject of OTT is being regularly debated and reviewed in almost all regions with potential move and change in the related positions and decisions, some information reported in the present report may have become outdated at the time it is considered by the reader.

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Executive Summary

With the increase of global mobile broadband penetration, as well as the rapid adoption of connected devices, consumers have been provided with an access to a wide variety of on-line services which go beyond the traditional voice and messaging services provided by telecom operators (*alias telcos **).

These on-line services are reshaping the entire telecommunication eco-system, and are of great benefit to consumers worldwide, to the global economy and ubiquitous connectivity. At the same time, the economic impact on national telecommunications industry and on telecom operators and hence on national ICT sector and economies, is being increasingly recognized and considered.

These services are based on Business Models that allow affordable access and use of services to everyone relying on data resources valorization and advertising demand and offer.

On the other hand, these services are delivered through the internet, relying on the existing network infrastructure operated by international and national ISP/Operators and on ad-hoc Computer /Storage Infrastructure and Content Delivery Networks (CDN).

The main impact that have been considered and addressed by many stakeholders is the decrease of telecom operator's revenues due to the competition on voice and messaging. The QoS issue and the negative impact on customer perception, because of difficulties in demand planning, have also been raised.

Policy markers and regulators in many countries and regions have been addressing this issue very seriously and some have defined or are preparing related frameworks and rules for these services and models. Some countries have even implemented local/national measures even though most of them are likely temporary measures and established frameworks are evolving regularly due to the fast evolution of the eco-system.

Countries in the Arab Region have had different approaches to the issue of OTTs, either for economic aspects but also for security and social considerations.

The Arab Region, with its large potential and market for both global operators and OTT players, is globally at "transitioning" level of digital development and has the opportunity to maximize its benefit from the digital era. This needs to define appropriate policy schemes taking into consideration its economic, cultural and social specificities and allowing to capture maximum value from digital eco-system opportunities.

Legal and Regulatory frameworks fostering the emergence of local and regional content and applications players and relying on Telco's champions in the Region may be a strategic target for the Region.

(*): *telecommunications operators may be referred to by the terms "telecom operators", "telcos", "ISPs" or "operators" in the rest of document.*

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Preambule

Since more than a decade, OTT services have been raising many issues and challenges for the whole telecommunication ecosystem, and especially for telecom operators. Although OTT actors have much contributed to the development of global economy and value of the sector, and are growing and sustaining the demand of connectivity and capacity thanks to the innovative services and applications, the economic impact on telecom operators is observed as a decline of their traditional revenues and hence is having a significant effect on their capability of investment and particularly in low end and rural areas.

The subject of OTT and on-line services have been considered in many works, studies and forums during the past decade and associated regulation schemes have been worked out in many countries and regions of the world, most of them under the pressure of telecom operators.

Moreover, not only telecom operators are impacted by the rise and development of OTTs. Many traditional sectors have been living a strong and growing transformation of their market by competition from on-line services provided by local and global players and based on new business models.

All these transformations and their impact on national economies and societies have brought policy makers worldwide to put particular attention on how to get benefit from these services while preventing excessive disruption in many sectors of their economy.

The Arab Region has been active on the subject since many years. During *ITU-T SG3* meeting in November 2014 in the Region, the participants "*identified over-the-top-services as an area of **particular relevance to developing countries**, recognizing that service convergence and the growth of over-the-top voice, video and text communications… and **have called for the review of aspects of regulatory frameworks and competition policy.**"*.

During this meeting, the Arab group had also called for ITU to commission an analytical report on the subject, which was done in 2016 (ITU-SG3 Economic impact of OTTs, March 2016) [10].

More recently, during WTSA 16, OTTs subject was one of the most hot topics that have been discussed and particularly on a draft resolution on the subject submitted by the African Group and supported by the Arab Group and other regions.

It appears then very important that, in the frame of this on-going reshaping of the entire eco-system thanks to the digital transformation, Arab countries have a global and extensive view on the state-of-the-art in this regard, as well as a prospective view of the evolution of the eco-system, including challenges and opportunities that these transformations will generate for the Region.

The Arab Region, with the specificity of its socio-economic environment may consider appropriate guidelines for national policies and frameworks, based on assessment of the impact of such transformation on its economy and society and with the objective to maximize benefit to its economic players and citizens.

This report could be a contribution to this objective.

1   Introduction

OTT issue have been and is being subject of many studies since more than ten years. Some studies were conducted by National Regulation bodies such as TRAI in India or groups of Regulators such as BEREC in Europe and some others by telecom operators either directly or by independent consultancy firms, as well as by international organisations such as GSMA or ITU (cf…Work item under Q9 of ITU-T Study Group 3 , on a study of the economic impact of over-the-top (OTT) services.

Due to the fast evolution and the growing impact of OTT on the existing eco-system, and under the pressure of national telecom operators, regulators and policy makers have been addressing the subject on a regular basis (almost every year) and have initiated many ruling decision and procedures, either permanently or temporarily.

That was particularly the case in United States where Federal Communications Commission (FCC) have made three subsequent ruling in less than five years. BEREC, representing European regulators has regularly the subject on its agenda to update the assessment of OTTs impact and to adapt associated framework.

Almost all the studies or papers addressing the OTT subject confirm that while bringing much benefits to people with innovative services and contributing to generate demand of connectivity and data services for all telecommunications networks, and also contributing to the global sector growth and digital economy at a large scale, these OTT services are challenging seriously local/national telecom operators/ISP on their traditional business and models for voice, messaging and data.

While most regulators and policy makers have been cautious about the innovation and the openness of the net while addressing the issue, many telecom operators, including in the Arab Region, have reacted to these impacts by defining and implementing management network solutions (such as FUP, throttling, etc…) and some have even blocked some OTT services at least temporarily.

However, it looks like that, after a period of decrease in revenues and margin due to OTTs competition, telecom operators in many regions are adapting their service offer and pricing models to this new context and most of them are recovering growth of their revenues and potentially profit.

Beyond the direct impact on the ICT sector itself, OTT and on-line services are increasingly impacting almost all other sectors of the economy as well as people way of life, cultural, societal, etc.. This on-going transformation is bringing additional challenges to national stakeholders and policy makers on the proper way of maximising benefit from these opportunities.

The Arab region, as an intermediate region in terms of market size, technology and innovation power, has a very promising potential due to the evolution of its population and public policy strategies. Developing national/regional content, applications and managed proximity services, in cooperation with regional telecom operators may create much value and benefit to the region economy and citizens.

The above should usefully be considered in the approach to deal with OTT and on-line services and in setting-up legal and regulatory framework.

2   General aspects of OTT services

2.1 Definition(s) and scope of OTTs

Definition of OTTs has been and is still being by itself subject of a large debate in the literature and among experts in the domain.

While addressing the OTT subject, many studies have limited their scope to OTT services competing with traditional communications services, while others have addressed the global environment of on-line services and their impact of the whole eco-system.

In fact there is no one but multiple definitions of OTTs that have been proposed and used in various studies and documents according to the context of the study and its objective.

In its 2015 report [7], the Board of European Regulators of Electronic Communications (BEREC) , whose members include the national regulatory authorities (NRAs) of all Member States of the European Union, defined OTT services with the following terms :

"is considered over-the-top, any content, service or application that is provided to the end user over the open Internet." [7].

Considering thus, all services running over the internet as being over-the-top services (on-line services).

Many recent studies, either independent or dedicated to policy organisations, have much limited the scope of OTTs, as in [10] to :

"over-the-top (OTT) service is an online service that can be regarded as potentially substituting for traditional telecommunications and audio-visual services such as voice telephony, SMS and television"

This definition is making thus a difference between this category of OTT and other on-line services delivered over the internet and potentially managed by other entities than telecom operators. This is mainly because the related study was focused on the impact of new IP-based services on traditional Voice and messaging services with the aim to address particularly the level playing field of these OTTs services as competitors to traditional telecommunications service providers.

An intermediate view, that could be potentially considered if one is needed, would be the one used by the Indian regulator (TRAI) in its 2015 "*Consultation Paper on Regulatory Framework for Over-the-top (OTT) services*" [8].,

In this consultation document, TRAI considered that : *"The term over-the-top (OTT) refers to applications and services which are accessible over the internet and ride on operators' networks offering internet access services e.g. social networks, search engines, amateur video aggregation sites etc.",* and considering then that :

"An OTT provider can be defined as a service provider offering ICT (Information Communication Technology) services, but neither operates a network nor leases network capacity from a network operator."

In the context of the present study, we propose the following generic definition of "OTTs and on-line services".

 "OTTs : Over the Top services are applications and services delivered over national telecommunications networks and directly to end-users by entities that are not necessarily operators of those networks "

This definition covers a larger scope that the one used in some literature and is appropriate when addressing the subject by policy makers, particularly due to the fast evolution of the business models and the ecosystem as a whole. Naturally, regulatory measures should be clearly related to the concerned type or category of OTT service.

2.2 Categories and examples of OTTs

Beyond the definition that may be considered for OTT, it is important that services and players involved are defined and categorized.

Classification of OTT services as per their scope and business models can be much more appropriate than generic definitions, to assess and evaluate their role and impact on global and national ecosystem.

In its report [7], BEREC presents a "taxonomy of OTT services that consists of :

(a) OTT-0 services, which are OTT services that qualify as ECS,

(b) OTT-1 services, which are OTT services that do not qualify as [Electronic Communications Services (ECS)] but do potentially compete with ECSs and

(c) OTT-2 services, which are the remaining category consisting of OTT services that are not an ECS and do not potentially compete with ECSs."

In fact many studies have considered or referred to this taxonomy while considering definition of the scope of OTT they are addressing. (ex OTT-1 and OTT-2 services have been considered in the report for SG3-ITU [10], while the three sub-categories together correspond roughly to online services as used in this report.

TRAI in its consultation document [8] have considered that: "*Based on the kind of service they provide, there are basically three types of OTT apps: (i) Messaging and voice services, (Communication services); (ii) Application eco-systems (mainly non-real time), linked to social networks, e-commerce; and (iii) Video / audio content*".
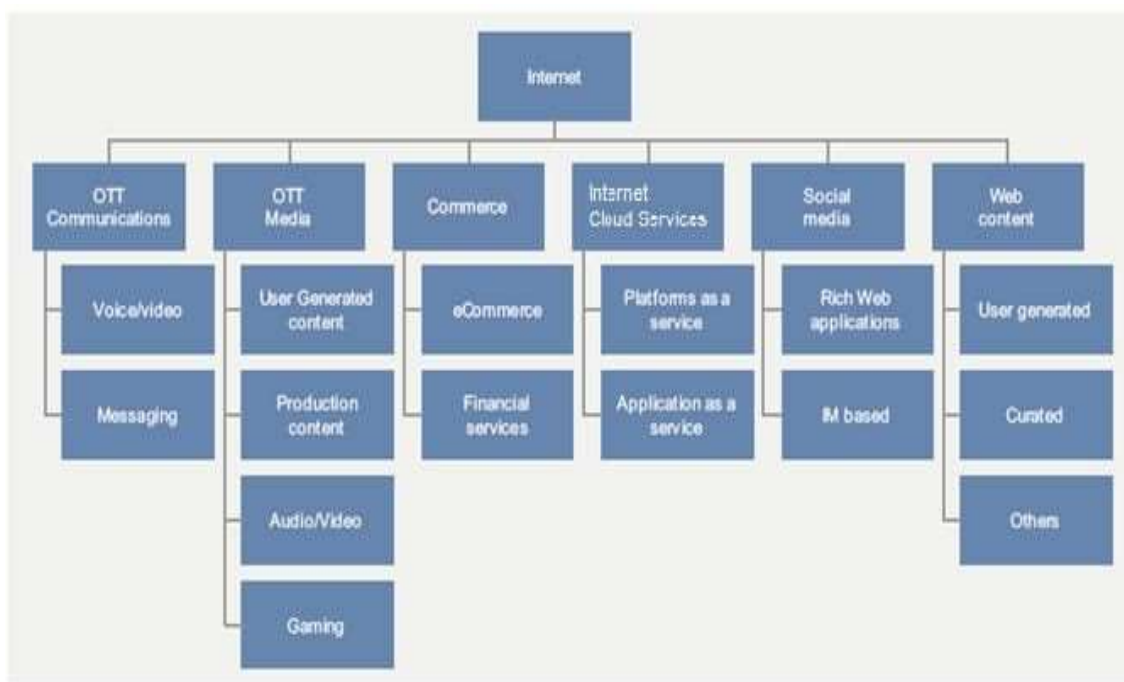

Fig 2.1 OTT and on-line services

The most common and basic classification of OTT can be the following, with some examples for each class :

- **Voice services:** Skype, Viber, KakaoTalk (S.Korea), as well as various voice calls capabilities integrated into social networking and other applications of firms such as Google and Facebook. Some of these services provide voice communications solely or primarily to traditional phones that have phone numbers (e.g. Vonage); some complete calls only to users who have the same application (e.g. KakaoTalk); and many provide both (e.g. Skype).
- **SMS services:** A range of chat services are prominent, most notably Whatsapp and Viber.
- **Teleconferencing:** Skype, Google Hangout as main providers offering affordable or free videoconferencing with a range of value-added features.
- **Broadcast (linear) video:** A range of IPTV offerings compete with traditional broadcasting.
- **Video on demand:** proposed by platforms such as YouTube, but there are many more.

Another classification, in the frame of assessing their impact on telecom operators, is the one considering the role of these operators in the management of these services and the control on their delivery:

- **Managed service:** a service where the provider offering the service has substantial control over the fixed or mobile access network used for its distribution. The provider may be able to use this control to size its network, or to reserve network capacity to guarantee the quality of the service.
- **Online service:** a service that depends on the public Internet for its delivery, at least in part; consequently, no single network operator can guarantee the quality of the service delivered.[i]

2.3 Opportunities and challenges of OTT and on-line services

It is a fact that the continuous development of OTTs during the last decade has had and is having a remarkable impact on many aspects of the economy and social environment at global and national level. The most visible to the sector experts is the direct impact on telecom operators business almost everywhere in the world.

2.3.1 Opportunity and challenges for telecom operators

OTTs impact on telecom operators is generated on one hand by the "direct competition" of VoIP to traditional voice and messaging services, "cannibalising" part of traditional operator's revenues, and on the other hand, by the boost given by on-line services to customer demand and usage of telecom services and particularly mobile and broadband services.

As a consequence, many telecom operators have first suffered a decrease of their revenues and margin due to OTTs competition and many of them have experienced issues in adapting their network development to this rapid growth of demand and usage, impacting their quality of service and particularly on mobile data.

A good summary of OTT types and examples as well as the potential impact on telecom operators is presented in the following table, extracted from TRAI consultation document [8].

Table 2.1: Types of OTT services

OTT	Examples	Minimum Speed Req. for good quality service	Challenge for the network operator	Implication for the network operator
Messaging and Voice Services (Communication Services)	VoIP, Skype, Chat with and without video, Gmail, WhatsApp, Wechat, Line, Viber	<1MBps	Fixed and Mobile telephony substitute, SMS substitute	Competition, Loss of value of traditional services offered
Application eco-systems	Social networks, Facebook, Linkedin, Twitter, Instagram, WeChat, various e-commerce apps including m-payments, m-wallets- Amazon, Flipcart, Snapdeal Alibaba	<1MBps	Another medium for communications. (In case of e-commerce apps, it is another market place)	Competition, Loss of revenue of traditional services offered. (In case of e-commerce apps, loss of revenue to existing brick and mortar establishments)
Content	OTT-TV, OTT Video, streaming and video on demand(VoD), Netflix, Netmovies, Hulu, Cuevana TV, Youtube	4-10 MBps	Substituting TV	Not in direct competition/ Loss of audience (hence advertising) for traditional TV services

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Table 2.1 Types of OTT and implication for Telcos (source TRAI [8])

In fact, we can consider that Innovative services and business models that allow proliferation of OTT and on-line services have dramatically contributed to the boost of the ICT sector during the last decade, even though with 'challenging" the stability of telecom and Internet Service Providers market that have reached a certain maturity by the mid-end 2000's.

2.3.2   Opportunity and Challenges for the global economy

Far beyond the direct impacts observed on telecom operators, the development of on-line services is being impacting almost all the sectors of economies and social environment, ranging from business opportunities to individuals all over the world, to challenges for traditional brick and mortar sectors where large productivity gains are observed but associated with increasing competition on traditional services.

On-line and OTT services have transformed the economies of both developed and developing countries. The digital economy is expanding at a tremendous pace while the entire economy is being digitalized.

With this digitalisation of the economy, productivity gains have been recorded in almost all economy sectors. This is the particularly the case in the developing world where the economic environment is not always properly organised and with lack of efficiency of basic traditional services (transportation, information, documentation, etc …).

The most impacted sectors today are particularly :

- E-services : Booking, travel and associated services
- Digital Media : Video, Music, games, Publishing, news
- Digital Advertising
- FinTech : Payment, Business and Consumer Finance
- E-commerce,

Additionally, digitalization is growing rapidly in some other sectors such as :

- E- education
- E- health
- E-home and Connected objects, etc..
- E-administration

According to OECD in its 2015 Report [12], this transformation is made possible thanks to the dropping of prices in ICT and a constant drive for innovation. Innovative digital business models, mostly based on advertising and valuation of customer data made access to technology and internet much more affordable and efficient.

2.3.3 Challenges for Governments and policy makers

The development of OTT and on-line services is also a key transformation factor of citizens communication methods and habits, access to information, learning and culture, with observable impacts on social and day to day life.

There are still however some barriers to a large development of these services in the developing world, most of them coming from infrastructure development and quality, but also due to what is called " **complements**" by the World Bank in its report " WDR2016 World Development Report 2016 " [6] (cf Chapter 5.2). Cultural and trust aspects play also an important role, as shown in the following table by TRAI in its 2015 consultation document [8].

Table 2.2: OTT Usage Pattern

Category	OTT Usage	OTT Usage Frequency	Barriers to OTT Usage
Communication	Messaging	High	Poor network
	VoIP	High	Poor network
Entertainment	Social Networking	High	Lack of Local Content, Poor Network Services
	Downloading Content from Web	High	
	Gaming Applications	High	
	Instant Messaging	High	
	Playing Music from the internet	Medium	
	Watching Videos	Medium	
	Live Broadcast	Low	
Online market place	e-commerce sites	Medium	Safety and Privacy ,Lack of Trust, low penetration of plastic money
Finance	Booking Tickets	High	Safety and Privacy, Poor Network Services, low penetration of plastic money
	Banking Transactions	High	
	Stock quotes and Trading	Low	
Education	Distance Learning and Collaborative Services	Medium	Lack of customisation, Poor Network Services
Health	Health Information	High	Lack of Trust, Poor Network Services
	Remote Monitoring and diagnostic services	Low	
Other	Email	High	Lack of Apps in local languages, Poor Network Services
	App Downloads	High	
	Job Sites	Medium	
	Maps and Directions	Medium	

Table 2.2 OTT and on-line services usage (source TRAI [8])

The rapid adoption and extended use of OTTs in many region of the world are because of business models allowing free access and usage of service and based on customer data gathering and monetizing.

In terms of applicable legislation as well as tax consideration, OTTs are mostly location-agnostic and don't have any direct presence in most of countries where their users are.

All these factors and impacts have created challenges for governments and policy makers both in terms of socio-economic development but also in regard to citizen protection and models of administration and governance.

3 OTT impact on ICT Sector and players

3.1 Impact on Telecom Operators

As mentioned in previous chapter, OTTs innovative services have been boosting the connectivity demand and the usage of internet and services, impacting positively the intake and traffic on telecom networks and particularly mobile and broadband networks, they have also direct impact on telecom operator revenues and profitability and particularly on traditional services such as voice, messaging and international calls.

The Arab Region have globally followed the same trend as the world average. However, investment strategy in many countries have made it possible to benefit from the growth of demand and usage observed in the Region.

In the following part, these impacts will considered for the following items:

1. Subscriber base evolution
2. Traffic and usage
3. Revenues
4. Quality of service
5. Investment and profit

3.1.1 Subscriber base evolution

As reported by GSMA in its 2016 report, mobile penetration will come close to saturation in many region of the world since 2017, including in MENA Region and it will be very likely the average in Arab Region, even in some countries such as Libya, Syria, Somalia and some others, saturation may be reached around 2018-19.

As the penetration rate is already very high in many regions of the world, including in Arab Region, the evolution is more related to broadband subscription, the access and use of internet thanks to the use of appropriate devices (smartphone, tablets, …).
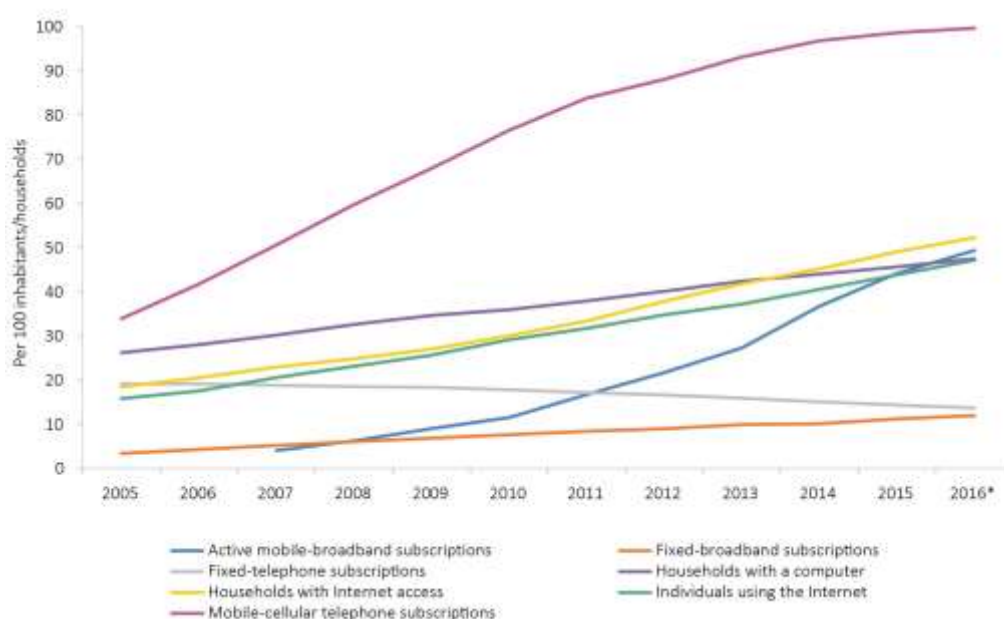

FIG 3.1 Global changes in levels of ICT uptake per 100 inhabitants, key ICT indicators, 2005-2016* Source ITU [1]

It is worth to note however, that many new subscriptions are highly motivated by internet and applications access and particularly social networks, with, as big challenge for telecom operators, a progressive loss of control over their customer relationships and the need to engage in adapted business scenario and customer management.

3.1.2 Traffic and Usage

The intensive and continuous use of OTT services is not only impacting the telecom operators' voice and messaging services, but is also leading to an exponential increase in the data traffic on their networks.

In fact, and according to a forecast by Cisco on data traffic evolution [21], it is expected that mobile **data traffic will grow at a CAGR of 57% from 2014 to 2019**, reaching 24.3 Exabytes per month by 2019 compared to 2.5 Exabytes in 2014.
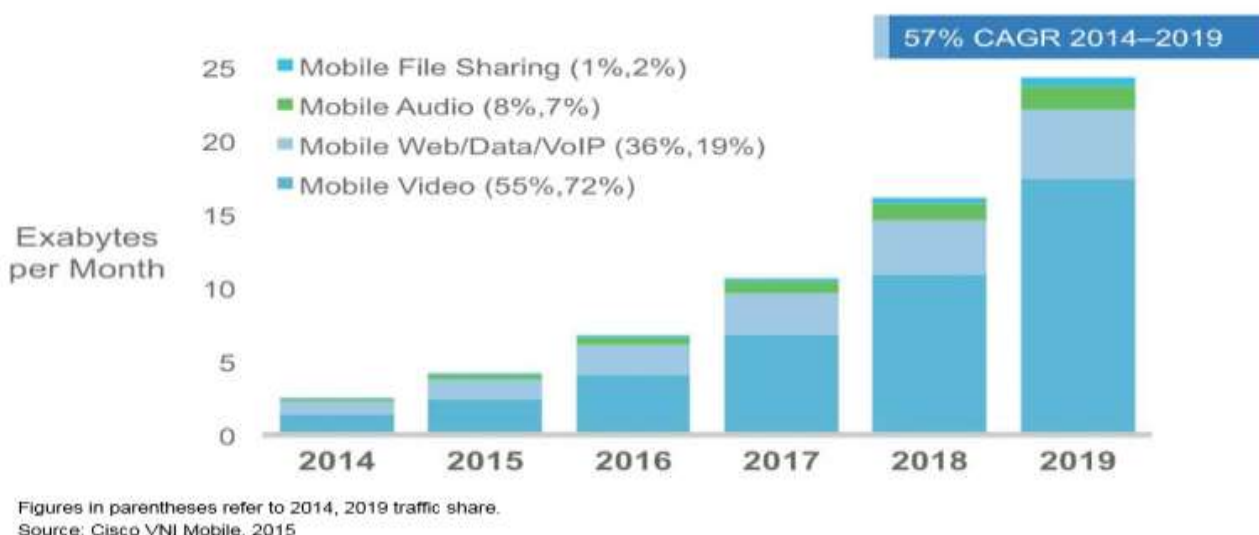
Fig 3.2 Mobile Data traffic growth 2014-2019 (source CISCO [21])

Mobile video, largest consumer of network resources, is expected to reach **72% of the mobile traffic by 2019 compared to 55% in 2014**. This is particularly driven by the increasing availability of contents, provided by global OTT players such as YouTube, Netflix, Amazon Instant Video, etc., as well as the emergence of new customers' trends like streaming videos or posts on social networking sites.

Hopefully for network load, CISCO reported [21 that a large part (70-80%) of data download is made in "private places" such as home, office as well as WIFI hotspots, limiting thus excessive overload of broadband networks and particularly mobile.
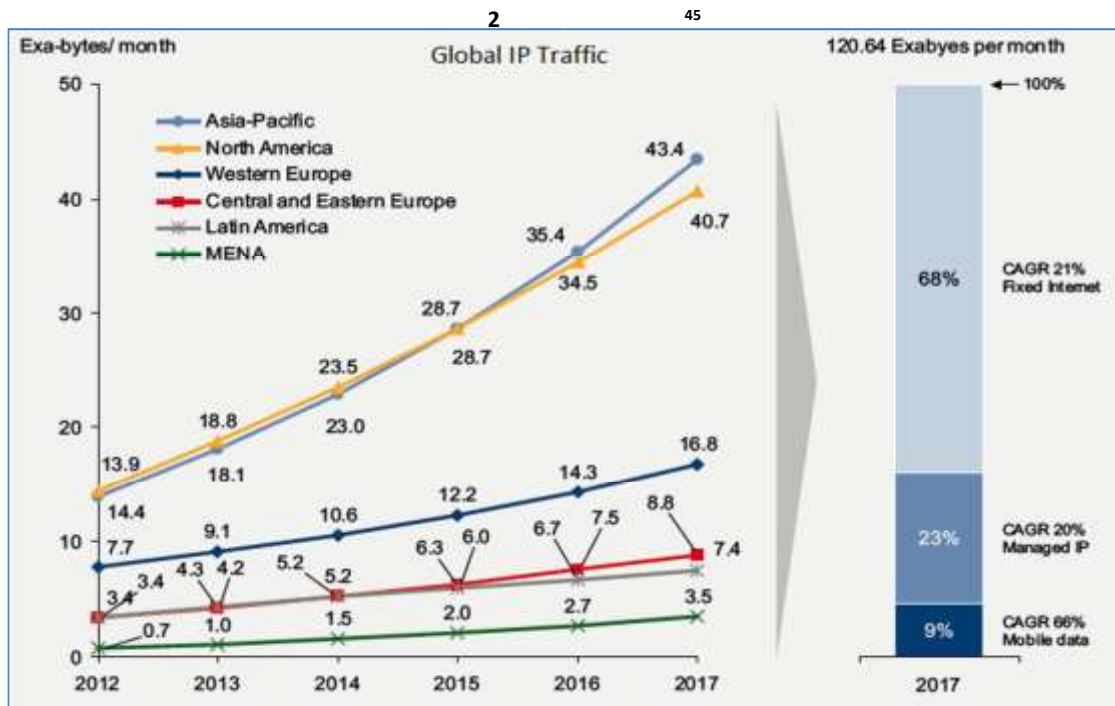
Fig 3.3 Gobal IP Traffic evolution per region (source GSMA **[4]**)

Arab Region:

According to GSMA report on Mobile Economy in MENA 2016 [3], data traffic in the MENA Region will grow as six times between 2015 and 2020 (an average annual growth rate close to **48%**).

According to the report [3], the use of additional services is driving strong growth in mobile data traffic, reporting the following figures in some Arab countries:

- **Egypt :**   Vodafone Egypt reported **87% growth in data**
- **Algeria :**   Djezzy stated that mobile data traffic **more than doubled** in one year (Q2 2015-Q2 2016)
- **Iraq, Jordan** : Zain reported annual data traffic growth of **144% i**n 2015 across all its networks, driven mainly by the 3G launch in Iraq and LTE launch in Jordan
- **Lebanon** : according to Touch (Zain) CEO Peter Kaliaropoulos, reported by GSMA [3], data traffic tripled from 15 TB per day to 45 TB in 2015 as a result of the launch of its '4.5G' multi-carrier LTE-A network. Daily volumes of more than 350 TB are expected before the end of 2020

The amount of data used monthly by each unique subscriber will increase substantially from an average of 0.7 GB in 2015 to 4.4 GB in 2020 (according to GSMA [3], based on Ericson and GSM intelligence sources [4]).

Mobile data consumption is particularly high in **Saudi Arabia**, where an average subscriber will consume more than **10 GB of mobile data by 2020,** by which time mobile will account for around a quarter of total IP traffic (up from around 10% in 2015)

However, the continuously increasing data traffic especially for video, continues to put a lot of pressure on the telecom network and leads to serious issues such as network congestion and QoS deterioration and consequently poor customer experience, even though, as reported by CISCO [3], a large video download portion is done in "private places".

In North Africa for example, where fixed broadband is not well developed, the QoS Impact and particularly network congestion have led to high level of dissatisfaction among customers in 2013. Polls performed then have shown that main dissatisfaction comes from connection quality (in fact data congestion). Telco's were blamed for that and had to cope with serious customer dissatisfaction and untrust.

To support this growth of data traffic generated by the demand side, telecom operators were almost obliged to speed-up investment in infrastructure and capacity out of their initial plan and even though many of them did not expect a satisfactory ROI.

3.1.3   Revenues

A decline of Telco's revenues in many regions of the world including Europe, Africa and Arab Region have been observed during 2012-2015 period, with a large impact of IP –based voice and messaging and particularly on international communications

One of the significant impacts, causing the decline of operators' revenues, comes from OTT VoIP services as they are directly competing with traditional voice and sms services, still a major source of operator's revenues and contributors to margin.

In Europe for example, a decrease of revenues of mobile operators in 2013 of around 5% is reported by the Broadband Commission in its 2015 Report [20] based on a Megabuyte Consultancy study. In France in particular, a study performed in 2015 for French Federation of Telecom by ADL [5] evaluated a decrease of 17% of telecom operators' revenues between 2010 and 2014.

This trend have been observed in many developing countries including in Arab Region and particularly in North Africa.

In fact, voice revenues are still counting by more than 70% of total revenues for many operators in the Region while international calls and sms are major contributors to margin.

On the other side the subscriber base increase and the growing demand on data fostered by OTT and on-line service have contributed at a certain extent to compensate the loss of revenues on traditional segments.

Thanks to this increase in subscription and data usage, telecom operators in many regions of the world are today "recovering "satisfactory trend of their revenues since 2015.

However, while admitting that their revenues are getting back to growth, telecom operators are considering that, beyond the fact that OTTs are playing unfair competition with IP-based communication, the business model of data is much different from voice and SMS and is significantly less profitable, particularly considering the associated data pricing models being used by most of them.

Arab Region :

In the Arab Region, it appears that most of the operators recurring revenues are back to growth, even at a much less levels that in the recent past.

According to GSMA[3] in its 2016 report, during 2013 and 2014 telecom operators in MENA Region (including Turkey , Iran and Israel), saw a decline in recurring revenue by 1.9% in 2013, then declining a further 1.5% in 2014.

Some countries have registered much higher decrease in operator's revenues. In North Africa, some operator's revenues have declined by around 6% over the considered period. This is mainly due to the type of OTT usage and traffic mix of this sub-region compared to the rest of the Region.

Between 2010 and 2014, ADL [5] reported a CAGR of 3,6% of mobile revenues in GCC countries while in North Africa countries revenues have decreased at CAGR of -2,4%.

Signs of recovery are however observed in 2015 with recurring revenues in the region growing by 2.1% on the previous year, according to GSMA [3].

Some of the major performances are reported in Saudi Arabia and Egypt:

- **Suadi Arabia :** Zain Saudi reported an **8% increase** in revenues annually in 2015, compared to **5% decline in 2014.** This was mainly due to the increase in mobile data revenues.
- **Egypt :** Vodafone reported **12.3%** annual growth in recurring revenues in 2015, compared to **5.7% decline in 2014,** as a result of increased data and voice usage and a more stable economic environment.

According to GSMA [3], recurrent revenues are likely to grow modestly in the future as mobile operators continue to monetize the strong growth in data traffic (for example, by offering a range of data bundles).

Data Revenues contribution

Growth in **data traffic** is leading to rapid growth in **data revenues** across MENA Region. According to GSMA [3], on average across the region, data revenues grew by 27% in 2015 and were to reach a contribution of 27% to recurring revenues, compared to a contribution of 14% in 2012 and 23% in 2014. It is expected to account for 35% in 2020, growing at an annual average of more than 6%.

Even more **data revenues** growth has been registered in the most advanced mobile markets of the MENA region and particularly in some Arab countries:

- **Saudi Arabia** : Zain reported a 58% rise in data revenues in 2015 (excluding SMS and VAS) as the operator invested heavily and expanded its 4G LTE network;
- **Iraq :** Asiacell (Ooredoo) reported double-digit growth in data revenues in 2015 following the launch of 3G services in January 2015.
- **Bahrein :** Zain, has reported 38% increase in data revenues in Q1 2016
- **Oman** : Ooreedo has reported 48% increase in Q2 2016

In **Tunisia**, according to national TRA (INTT) report end 2016 [22] after revenues decrease during 2013 and 2014, total sector revenues (all three operators) have increased by 1,3% in 2015, with the last entrant, Orange Tunisia, being the major contributor to this increase.
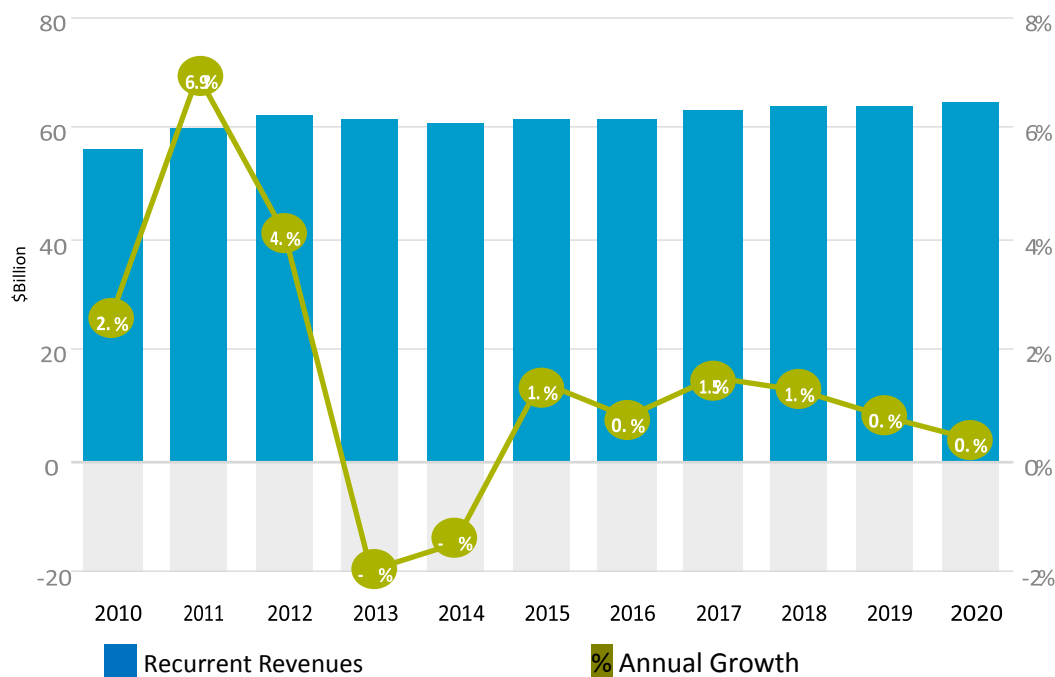
Fig 3.4 Revenue trends in MENA 2010-2020 (*)   (source GSMA [3]).

(*) Including All Arab Countries, Turkey, Iran and Israel

However, despite this important data revenue growth, it is not expected that recurrent revenues growth could return to the levels recorded in the region before 2012 due to further slowing of subscriber intake and continuous competition on traditional revenues by IP voice and messaging platforms.

Finally, it is worth to mention that the impact of political, economic and social conditions (political and security instability, currency devaluation, etc..) in some parts of the Region is limiting further the growth potential.

At the same time, mobile operators throughout the region are recording significant growth in their data revenues. Zain in Saudi Arabia reported that data accounted for 20.5% of recurring revenue in the final quarter of 2014, up from 7.1% in the same quarter of 2012. For Ooredoo in Oman data as a percentage of recurring revenue increased by 10 percentage points in the first two quarters of 2015 alone (reaching 43.9% in Q2 2015). For MTN Sudan data as a percentage of recurring revenue reached almost 20% in Q4 2014, up from 9.2% for the same period in 2013.

3.1.4 Investments and Profit

In order to cope with the growing data demand and traffic on their networks, telecom operators need significant and continuous capital investments in upgrading and enhancing their networks capacity and features (including spectrum, licenses fees, etc…). They also have to endure significant operational costs in optimizing traffic and particularly video traffic.

According to GSMA [3], operators will need to increase Capex in their networks with a CAGR of 4.7% between 2013 and 2020 and that, in order to satisfy consumers' requirement for bandwidth.

However, where these investments are necessary to cope with traffic and demand growth, they have to be considered in the perspective of the evolution of operators' revenues, that were either stagnating or decreasing during the period 2012-2014, and, even almost stabilized since, are expected to have lower growing ratios during the rest of the period.

This trend have also been observed in many developing countries.

In MENA Region, the recovery signs observed in recurrent revenues of telecom operators thanks to the increase of data revenues and intake of broadband mobile subscriptions, have been supported by important investment plans and efforts across the region and particularly during 2013-2015.

These investments have been engaged for the rollout of mobile broadband networks during the past three years with a peak of 20% of recurring revenues in 2014. Capex levels are expected to grow modestly until 2020 at an average rate of 18% of revenues [3].

Finally, while most of region operators have reviewed their investment plans in order to cope with the additional data demand, most of them are reporting a pressure on their margin and ROI, even though some of them are reporting an increase of margin, such in Egypt for example, where Vodafone reported an increase of its EBITDA in 2015 to 36.5% of total revenues, up from 34.8% in 2014 [3].

3.1.5 Key Findings

Even if the decrease in operators' revenues observed during the recent period is slowing down since one year and many operator's revenues are back to growth, this has significantly disrupted the operators' investment capability as we observed rationalization of these investments in broadband infrastructure and priority was given in many countries to satisfactory ROI areas and high end populations.

However, after the sudden OTT effect observed on telecom operators revenues during two-three years, most of them have managed to recover acceptable revenues levels particularly with subscribers base growth and appropriate data pricing models.

The challenges created by OTT and on-line services models are however still there as they are the "Market shapers" either in terms of usage or in value sharing and investment capabilities. Telco's need to continue to have incentives to build out and continuously improve networks capacity and quality.

If the "stress" created on networks by OTT is to continue, this may impact the accessibility to Broadband services in rural regions and low income areas, may consequently derail many national plans for affordable and ubiquitous telephone and broadband access across the country.

3.2 Impact on ICT sector Development

OTT applications and services are key enablers of the growth of the demand for basic telecoms services, i.e. connectivity and data capacity, but also for an ever-growing development of innovative services in almost all traditional sectors of the economy.

It is a fact that the growth of demand and extensive usage of OTT services is transforming the business models of all ICT sector players and particularly telecom service providers, but also all sector stakeholders such as content providers, media companies, etc..

At a global scale, i.e. worldwide investments in the whole sector, including OTT platforms and services are growing regularly. OTTs platforms are investing heavily to sustain the demand for their own services, particularly in Data centers, Fiber Optic links, CDNs and application development.

Figure 4.1: Investments in networks, facilities, and equipment required at each stage of the Internet value chain [Source: Analysys Mason, 2014]
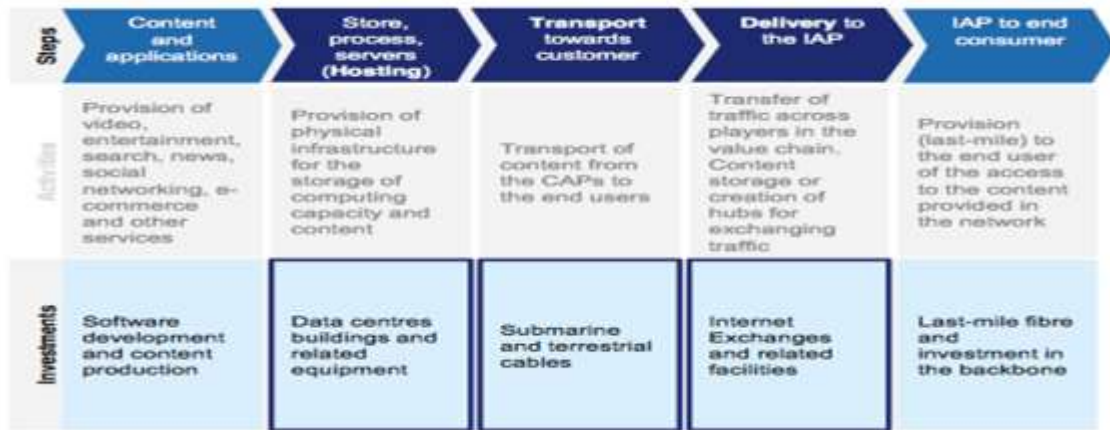
Fig 3.5 OTT & On-line services - Value Chain and Investments (source Analysys Mason [18])

When considered at national level however, while telecom operators are investing directly and indirectly in the ICT sector in all countries where their market and customers are, it is not the case of OTT players and on-line service providers which investments are more centralized and located in their production countries.

3.3 Impact on other sectors of the economy

OTT and on-lines services development is impacting profoundly various sectors of the economy. Some sectors have seen a dramatic change in market structure (e-services such as travel booking, ..) some other have benefited from important productivity gain, (Fintech, Transportation, energy, etc...). Global benefits on macro-economic performance thanks to productivity gains are reported in almost all sectors.

According to OECD [12], direct contribution to GDP worldwide in 2015 is 5%, with 2,4% coming from productivity gains.

Direct and indirect 2015 contribution to GDP by the mobile ecosystem is reported by GSMA [3] to be at 4% in the MENA Region, out of which 2,4% as productivity gains in all sectors of the economy.

For emerging businesses, the most visible benefit is the reduction in fixed costs, cost of entry as well as production costs. A particular benefit is the opportunity given to entry of new SMEs where no much investment is needed to set-up, start and sustain activity.

However, some OTT and on-line services models have created unexpected competition to many brick and mortar sectors, especially in the retail sector. This of course, may have direct and systemic impact on national economies. Because of the emergence of global OTT players, located and providing service from abroad, the macro-economic benefits accrue unequally to the country of customer than producer.

Moreover, market position reached by such global companies – with significant market power, may make it difficult to local/national players to enter and sustain position even in their domestic market.

Finally, the issue of local Investment and tax revenues to "consumer-only" countries may create an unbalance of the expected benefit from the digital economy as shaped by OTT and on-line services.

3.4 Conclusion

In the beginning of 2000's almost all the countries introduced competition in telecommunication sector and inception of telecom operators –particularly mobile- allowing a large offer of services , reduction of prices and improvement of QOS for the benefit to customers, while Regulators were taking care of "fairness and sustainability of this competition" and had the legal instruments to do so.

During the last decade, while OTT have been a real challenge and even a threat for telecom operators and their traditional business, they have allowed a tremendous boost in data demand and usage and hence contributing strongly to the development of those operators' business and to the digital economy.

Most of Experts recognize today that OTT and on online services have initially had a negative impact on traditional service providers. That was particularly reported as loss of revenues, increased network costs and stress on investments for telecom operators.

As direct impact on national level was loss of tax revenues (including contribution to USO plans), and transfers of value (welfare) from consumer's countries to producer's ones.

Things look to be moving positively for most of telecom operators who have addressed appropriately the issue and operators business is almost stabilized or having a slight growth.

Considerations related to local Investment and tax revenues, as well as balance trends of the digital economy benefits, remain however under scrutiny by policy makers in the so called "consumer countries".

Finally, customer protection and security aspects, privacy, data protection, etc.. are becoming more and more a matter of concern for citizens and policy makers in many regions in the world.

4 Policies and practices in regard to OTT and on-line services

4.1 Major policy challenges and considerations

While policy makers and sector regulation bodies have so far been very cautious on not to breach important principles such as **"Net Neutrality"** and openness to foster "Innovation", they have however been questioned by telecom operators who are arguing against the "unfairness of competition" by OTTs and the big impact OTT services are creating on their networks and their profitability.

Net neutrality, as defined by BEREC [7] is " *the principle that all electronic communications passing through a network is treated equally. That all communication is treated equally means that is is treated independent of i) content, ii)application, iii)service, iv) device, v) sender address and vi) receiver address. Sender and receiver address implies that the treatment is independent of end user and content/application/service provider"*.

Telecom operators and their professional associations such as GSMA or ETNO and many others have been putting pressure on regulators and policy makers in almost all countries and regions, requesting them to act against the unfair competition of OTTs.

The main argument for telecom operators remains the "regulatory imbalance" in the market of voice and messaging where OTTs are directly competing with them.

From policy makers point of view, even though they mostly admit the existence of imbalance and its impact on operator's business, they have to consider global economic and social consequences of any legislation or regulation on the subject, with relation to :

- Market openness and fair competition
- Innovation and global contribution to national economy
- Citizen protection (security, privacy, etc……)

The main set of legal and regulatory tools and Instruments as considered by policy makers and regulators include:

- Licensing and authorisation
- Competition law and economics
- Quality of Service standards and obligations
- Privacy, personal data protection laws
- Investment & Tax contribution
- Security and Safety legislation

It is admitted today almost worldwide that while telecom operators, OTT and on-line services are the major contributors to the development of ICT sector and digital economy, it is a fact that these players may address the same customers with the same service and have totally different legal and regulatory environment.

While Telco's environment have constraining rules and limitations:

- Subject to National Obligations: License, Tax, USO, Lawful interception, emergency obligations,.
- Strict Regulation (Competition rules, QOS, Transparency, portability, interoperability, Control…)
- High pre-investment required and Resources Cost (spectrum, sites, etc..)
- Mostly local market space and rules

OTT's world is characterized by:

- No Regulation (own policy/rules)
- No service license required, no interco Obligation
- Disruptive models (free, freemium, Ad based etc)
- The World as Market Place
- Scalable investment (no obligation of availability)
- Limited direct employment

The challenge is still there for most of policy makers and regulators. They have been investigating the various aspects of the subject and following closely its evolution. Many of them have been working with stakeholders on appropriate solutions and framework and some of them are reviewing regularly these frameworks. Some examples of guidelines and regulation are given in chapter 4.3 below.

The challenge to Policy makers and regulators could be summarized through the following statement on the matter made in April 2015 by Dr. Syed Ismail Shah as Chairman of Pakistan Telecommunication Authority , who said : **"***We have to :*

- *Protect our citizens' interests,*
- *Provide incentives to the industry,*
- *Attend to national-level needs and issues,*
- *Create and sustain investor confidence, and..*
  remain mindful of future needs of the consumers and the industry. "

On the telecom operators side, after a period of "hesitation" in front of OTT's impact, most of them have reviewed their strategies and policies and reorganized themselves to manage the new and fast evolving environment.

4.2 Operators Strategies and Practices

Beyond the well known trilogy of strategic approaches of Operators in dealing with OTT issues, i.**e Control, Compete or Collaborate**, it appears that, considering the large and ever growing number and types of OTT players, a mix of all these strategies are being considered by telecom Operators.

Telecom Operators have a set of technical and operational tools and techniques allowing them to implement each and any of the above approaches. They are mostly based on **traffic management** and **differenced rating schemes**. However, all their plans and actions are under close scrutiny by national watchdogs (regulators).

4.2.1 Traffic management and differenced rating

Traffic management is at the heart of "Net Neutrality" debate. It consists globally in "*managing scarcity of bandwidth by differentiating the traffic streams conveyed over the network*" [8], e.g. by giving priority to certain services or throttling others.

There are two broad forms of internet traffic management :

- **'Best-effort'** internet access, under which telco's attempt to convey all traffic on more or less equal terms. This results in an 'open internet' with no specific services being hindered or blocked, although some may need to be managed during times of congestion. This form generally **favors real time communications** traffic over other non-time sensitive traffic (non-neutral tiered Internet).
- **Managed Services**, under which telecom operators **prioritize** certain traffic according to the value they ascribe to it. An example may be the prioritization of a high quality IPTV service, or specialized service

that requires specific quality level such as sensitive e-health applications. This appears to be a form of discrimination, but may be excluded from the NN scope.

Traffic management is performed using various techniques like deep packet inspection, layered segmentation, and traffic differentiation.

From operators point of view, traffic management, by controlling the flow of data to maintain the quality of service and to ensure that <u>all</u> users have a reasonable internet experience, is essential to protect the consumer experience, especially in times of potential extreme network congestion.

However, traffic management is particularly used by some telecom operators to bring OTTs to cooperate with them by slowing or "throttling" internet speeds and/or offer preferential treatment of specific services and platforms. Such cooperation may allow an adequate quality of service to users of a given service or differential pricing for selective OTT applications (including differentiation based on volume of usage, speed and validity)

From the market and regulation point of view, "traffic management" may be considered as "network discrimination techniques" to earn more revenues, either from the content/service providers or the users.

Terms such as "**prioritizing"**, "**paid priorization**", "**zero-rating**", "**fast line**", "**access tiering**", "**differenced rating",** but also **"toll-free data"**, **"Sponsored data**", **"freemium",** etc..... are commonly used as specific traffic management implementations.

As per FCC, **"Paid prioritization"** refers to the management of a broadband provider's network to directly or indirectly favor some traffic over other traffic, including through use of techniques such as traffic shaping, prioritization, resource reservation, or other forms of preferential traffic management, either (a) in exchange for consideration (monetary or otherwise) from a third party, or (b) to benefit an affiliated entity.

Another implementation of "management" is based on **differenced rating** of data delivered over the network according to the type of service it is related to. They allow differential prices and fees for selective services and applications. The most used is the **"zero-rating"** mode.

Zero-rating ("toll-free data" or "Sponsored data") is that the data traffic generated by a specific service or category of services, such as video, is free and does not count towards the customer's data allowance. It is the practice used by Telecom operators to not charge the users for restricted internet access. It consists of offering unlimited access to certain online services - typically social media sites, music streaming or online television that are **"sponsored"** through prior agreements with specific content providers or own Operator services. (Facebook's " free Basics" or "internet.org" are well known examples).

The following chart from TRAI[8], summarizes generic practices of Operators regarding OTTs, ranging from "normal traffic management" to "blocking".
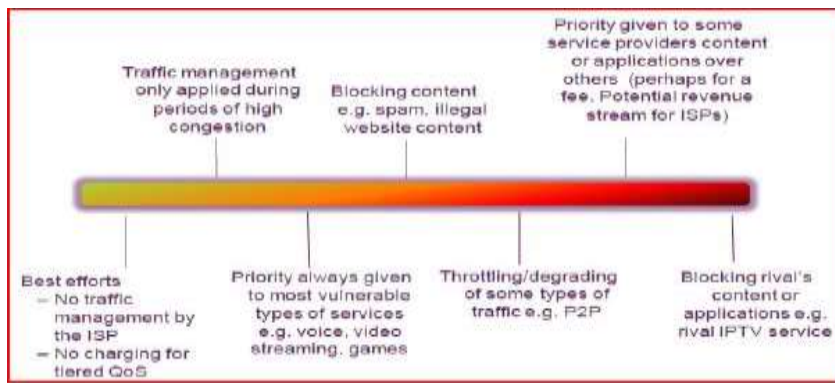
Fig.4.1 Traffic management practices (source TRAI [8])

These techniques and tools give large possibilities to telecom operators to implement the strategy they select in front of the challenge of OTT players.

4.2.2 Collaboration Strategy:

Almost all sector experts consider that partnering between Operators and OTT players is the most sustainable model and the one benefiting mostly to all stakeholders including customers.

It appears however that:

- It is quite difficult to set-up partnerships between operators and biggest OTT players. Partnerships are then mostly limited either between global Telcos and OTTs or between local/regional Telco's and OTT players (at national or regional level).
- These partnerships are carefully watched by ICT watchdogs (TRAs), as they may be overpass the Net Neutrality principle.

Concerning partnerships between big OTT and telecom players, very few information are disclosed on these potential deals. The case of partnership between Korea Telecom and Kakao is one example.

On the other side, while the issue of OTTs and their impact on telecom eco-system are mostly addressed at national level, it looks unlikely that partnerships with big OTT players are possible with local operators and particularly isolated ones.

Regulators pay however much attention to such partnerships as they may easily end up in a breach of "net neutrality" principle with **"discrimination"** between different services and applications provided locally by other operators.

The 2012-14 period saw an important increase in partnerships between traditional telecommunication operators and OTT providers. The most known partnerships have been set-up in developed countries such as US and some European countries, where telco's have enough market presence and power to bring OTTs to cooperate.

Mots of partnership involve video service providers such as Youtube, Dailymotion and Netfllix as well as on-line music services.

- In UK, France and sweeden, local operators are partnering with Netflix and are including the video service as part of their offer.
- in Finland, France,Ireland, the Netherlands, new Zealand, slovenia, slovakia, spain and Sweden, operators are offering **online music services** such as spotify or Deezer as part of bundles.

Some partnerships are however implemented in the developing world. Some examples of recent deals include the following :

- In **Korea,** a partnership between national incumbent Korea Telecom and Korean Kakao giving premium was set-up. It gives premium service to the latter. The question of legality of such partnership is still on the table.
- **Indonesian** operator Axis, allows customers to buy exclusive Viber data services rather than a full data plan to give them flexibility of choice.
- **Malaysia**'s DiGi partnered with WhatsApp to offer unlimited access to WhatsApp for a flat fee. Similar agreement was followed by 3-Hong Kong and India's RCom.
- Telekom **Malaysia** has partnered with Viu – a freemium OTT service, to launch over-the-top (OTT) video-on-demand (VOD) services from Vuclip, in Malaysia.

It is to note however, that national regulatory authorities are watching carefully some OTT–telco partnerships and monitoring their effects on the level of competition in their respective markets. In particular, regulators in countries where strict net neutrality rules are enforced have kept an eye on potential cases of discrimination between services.

The most common issue in these partnerships relates to the practice of zero-rating. This mode have been considered as breaching Net Neutrality rules, as by **FCC** against ATT and Verizon, **TRA India** against Free Basics of Facebook and **Hungary** against Telekom own video service. **Chili** and **Canada** have also clearly banned zero-rating practice.

At global level, it seems that no scheme of agreement was or is expected to be discussed with Operators organisation such as GSMA, as OTT players don't seem to have a unique scheme to be implemented worldwide and rather work on case by case.

4.2.3 Competition Strategy:

Many operators have developed a "competition" strategy with introduction of their own "OTT like" services and applications.

Successful examples of operators who have developed their own OTT services include "Bobsled" application launched by T-Mobile USA, "Tu Me" by Telefonica, "Libon" by Orange as well the Joyn initiative launched in 2012 by major European operators, within GSMA (based on RCS standard).

In Asia Pacific, according to a recent study performed by Alepo *"Over-the-Top (OTT) Services Outlook in Asia Pacific, June 2016 »*[13] have shown that nearly two-thirds of respondents directly compete with OTT providers with their own video, messaging, or content services, while just over half of respondents have working partnership agreements with OTT providers today, nearly all expressed interest or intent in forming OTT partnerships.

Such model enables telecom operators to have full control over the service, own the consumer relationship, and reach a wider customer base, including with potential differentiation of their brand services.

However, the opportunity for an operator to compete with OTT players at national or regional level is more open when it comes to provide digital content or proximity services (i.e based on localization, WIFI spots, tailored offer base on "big data" and using flexible tariffing and payment schemes).

As an example, most telecom operators in Europe have started since two or three years offering an unlimited voice service in their packages. In Korea, Mobile operators launched in 2015 data usage based plans with

unlimited voice (both on-net, offnet, and fixed) and SMS usage. This practice is being considered by a large part of telcos worldwide.

Some examples of "competing strategies" have been implemented worldwide, such as Vodafone with tDC play in Danmark, nOs and portugal telecom (portugal) have chosen to develop online music stores.

An interesting case of global competition strategy is in **Turkey** where **Turkcell i**ntroduced a full set of services with its own IP-based communication platform (BiP entirely developed in Turkey), music application (fizy), contact and call management application (UpCal)l and cloud solutions. Turkcell reported having already "millions of customers" by September 2016. Turkcell have also launched in 2016, a TV service platform, Turkcell TV+.

On the opposite, the GSMA "Joyn" initiative was experienced by some operators haven't reached so far the expected market position. In Korea for example, in order to compete with Kakao Talk , national operators SKT, KT, LGU+ together launched a mobile messenger that supports SMS, LMS, MMS, file transfer, location sharing, video sharing, etc. following the GSMA standard. Nevertheless, Joyn failed to expand the market share and the service came to an end in February 2016.

At a larger scale, Telecom Operators have engaged in an investment in existing OTT and media companies. In the US, Comcast, AT&T and Verizon have recently made (or are planning to make) large investments in content companies. (Yahoo for Verizon, TWarner for ATT&T and Hulu for Comcast).

4.2.4   Control (Defensive) Strategy:

It looks like almost all telecom operators have had to "control" OTT services at a certain time and particularly when facing a huge traffic increase impacting dramatically the quality of service offered to their network users.

They use various methods and techniques for this purpose within the "traffic management" scope. These can include fair usage policies, bandwidth caps, throttling, etc.

In fact, "blocking" specific application or services have been used by many operators in almost all regions of the world but in most cases, that was a temporary measure to bring attention of Regulatory bodies on the issue, or to bring OTTs to discuss partnership schemes.

Many case of "opportunistic approach" have been reported, which consists of charging premium data for OTT VoIP services. A good example was when Nordic operator TeliaSonera who, after a failed attempt to block Skype, started offering Skype service but only with select data plans.

Regulatory requirements and net neutrality laws often prohibit operators from blocking or throttling specific applications or classes of applications, as described in the following chapter.

4.3 Policy and Regulatory Practices on OTTs

The issue of OTT and on-line services is particularly tied and addressed as such with the "Net Neutrality" issue.

The basic principles of "Net Neutrality" as mentioned in Chapter 4.1 have almost always been governing the way policy makers and regulators have been addressing the OTT issue. It is to note however that during the past few years, there have been significant evolution and updates of rules applicable to the subject by major regulation and policy bodies, introducing a kind of "flexibility". That was the case particularly in US and EU but also others regions of the world.

During the past five to ten years, while main national and regional watchdogs have **prohibited any type of discrimination for the sake of 'Net Neutrality'**, many operators in the world have implemented some of the options mentioned above at least as temporary measure.

Today, we can classify the different approaches that have been adopted worldwide for dealing with "Net Neutrality", into the following categories:

- **Active Approach** : some countries specifically prohibiting "traffic management " by Telcos but most often subject to an exception for reasonable management. Some others restrict the usage of services such as VoIP to a licensing regime. The approach taken by these countries, ranges from the passing of legislation through parliamentary process (eg. Brazil) to regulations (eg. US, EU) to voluntary guidelines (eg. Norway, Japan).
- **Light Refinement**: It consists in following a light-handed approach, with some refinements to their existing regulatory regime, but not going so far as to prohibit certain behaviors from Telcos or OTTs.
- **Cautious Observation**: Many countries have taken note of OTT and NN issues and so far didn't decide to take any specific measures to address them. This is mostly the case in developing countries.

However, given the rapid changes in technology and services and related business models, even "active approaches' considered by some countries are regularly revisited to check their relevance to the evolving ecosystem and potentially adapt them to the new environment.

4.3.1   US and Europe

United States :

In US for example, FCC have ruled the issue three times during the past 4 years.

In March 2015, FCC released the draft new internet rules which the following new rules (bright-line rule) applying to both fixed and mobile broadband, strengthening Net Neutrality concept:

- **No Blocking**: broadband providers may not block access to legal content, applications, services, or non-harmful devices.
- **No Throttling**: broadband providers may not impair or degrade lawful internet traffic on the basis of content, applications, services, or non-harmful devices.
- **No Paid Prioritization**: broadband providers may not favor some lawful internet traffic over other lawful traffic in exchange for consideration of any kind—in other words, no "fast lanes." This rule also bans ISPs from prioritizing content and services of their affiliates.

However, in its order document, FCC considered that "***Reasonable network management** shall not be considered a violation of this rule"*.

Some recent statements by new FCC officials may potentially end into additional adaptation of the 2015 rules as stated by FCC.

The specificity of the US telecom and internet market is however much appropriate to close cooperation between telcos and OTTs due particularly to the scale of major players in both segments respective business in the country.

Europe :

The case of **Europe** is particularly interesting due to the fact that, while the region is particularly sensitive to market openness and innovation, the reality and evolution of the eco-system and the concern raised by European operators, made it unavoidable for **European Commission** to address deeply the issue in order to find appropriate frameworks and solutions.

The European legislation on the subject, as set in June 2015, prevents:

- unfair blocking
- connection speed throttling,
- paid prioritization of web traffic.

However, telco's are still allowed to provide so-called **'specialized services'** like Internet TV, provided it does not degrade the performance of the public Internet. European Regulators are invited to **judge "zero-rating", 'specialized services' on case-by-case basis.**

Again during 2016, EU telecom operators (represented by the ETNO Group) have been calling for a 'level playing field' with OTT providers in terms of regulation and that they want over-the-top (OTT) communication providers to be subject to the same rules as telco's, pointing out the regulatory imbalance between Telecom and OTT service providers.

The European Commission considered to consider the principle that **comparable services will be subject to comparable regulations**.

The EC is today in the process of drawing up proposals to update its approach to telecoms regulation. With the ongoing reviews of the telecom regulatory framework, where some rules for telco's may be withdrawn and **some rules such as confidentiality requirements may be extended to online services**.

On his side, the Body of European Regulators for Electronic Communications (BEREC) launched, in June 2016 a consultation seeking feedback on proposals for how to implement the EU's net neutrality law.

BEREC's consultation aims to hammer out the details, proposing, for instance, in the case of **specialized services**, that regulators should consider whether said service could be provided adequately using a **best-effort connection**.

The consultation also addresses **zero-rating.** Under BEREC's proposed guidelines, continuing to provide access to **zero-rated services** once the customer has used up their data allowance would contravene EU net neutrality rules.

It advises also Regulators to review the market strength of the Telecom operators offering the zero-rated tariff and that of the service being zero-rated, and consider the impact that it could have on competition and end-user choice.

Beginning of January 2017, the European Commission released a **draft directive on e-privacy** which currently only applies to telcos, as **to be expanded to OTT services**. This could be a way for regulatory decision makers to address the imbalance in rules governing customer data monetization between Telco's and OTT players.

With this directive, **OTT are to be accountable to the same level for privacy and confidentiality of communications as traditional telecoms operators.**

At the same time some countries in the European Union, such as **Italy**, work on national specific measures. In June 2016, Italian telecoms regulator AGCOM has published the results of its study on electronic communications services, and in particular over-the-top (OTT) social messaging tools such as WhatsApp, Skype, iMessage and Facebook Messenger.

AGCOM said it was considering **introducing regulations for such apps** which will help to create a more **level playing field** to compensate network operators for the lost voice traffic on their own networks. It plans to examine regulations – both at a national and an EU-wide level – to see where changes can be made to **benefit operators whose networks support the OTT apps with little financial benefit for themselves.**

At the other side, in **Norway** for example, regulator have decided to rely on voluntary compliance to the NN principles and they just organize annual stakeholder meetings to monitor the status of the issue.

4.3.2 Other countries

Worldwide, Telecom Regulation Authorities (TRAs) are working on national schemes and approaches to the subject. Some most significant of them are summarized in the following paragraph.

India :

Indian telecom regulator TRAI have initiated consultancy process on the subject since 2015 **[8]**.

Beginning 2016 , TRAI has laid down rules that **strictly prohibit the differential pricing of data on the basis of content**, with however some exceptions such as health and emergency situations. These rules effectively banned zero-rating initiatives such as Facebook's Free Basics and Airtel's Airtel Zero program and marked for the first time an official attempt at defining how net neutrality will be upheld in the country.

In January 2017 TRAI released a consultation paper on Net Neutrality **[8b]** that included a draft recommendations relating to the traffic management aspects, stating that *"legitimate traffic management practices may be allowed subject to the core principles and that the general criteria against which these practices can be tested may inter alia include:*

- *Adequate disclosure to users about traffic management policies and tools to allow them to make informed choices.*
- *Application-agnostic controls may be used but application-specific control within the "Internet traffic" class may not be permitted.*
- *Practices like deep packet inspection should not be used for unlawful access to the type and contents of an application in an IP packet. 25*
- *Improper (paid or otherwise) prioritization may not be permitted. Thus, the DoT Committee recommended a framework that goes beyond testing for commercial motivation ("paid or otherwise") to broader principles of transparency and nondiscrimination. They also took a strict view of prohibiting application-specific controls, while suggesting that application-agnostic controls could be utilized."*

Indonesia :

Indonesia's Ministry of Communications and Information Technology (MCIT) has published in May 2016 a draft ministerial regulation governing the provision of content over the internet by over-the-top (OTT) providers.

The draft requires that: **the OTT operate in the form of a permanent establishment** [but can be] either foreign or local players; **OTT players must register their business forms and activities to the Indonesian Telecommunications Regulatory Body** (ITRB) no later than 30 working days prior to providing services in Indonesia by attaching the required documents;

Pakistan :

Pakistan Telecom Authority (PTA) is working on a framework to regulate OTT services and applications. A committee working on the framework was tasked mid 2016 to formulate recommendations through which OTT services, mainly the mobile apps, will be brought under regulation in Pakistan.

According to revised Telecom Policy 2015 that has been approved by ECC Pakistan Telecommunication Authority (PTA) has been mandated to revise licensing framework for telecommunication services in the country **to particularly include selected OTT services into the telecom licensing regime**.

Once new licensing framework is finalized by PTA, certain OTT services (WhatsApp, Skype, Facebook etc.) are likely to be asked to obtain license from regulator order to operate in Pakistan.

The country Telecom Act defines in particular, which over-the-top services should be licensed under a "general authorization" …. Licensing process, to be managed by PTA, will be applicable to certain types of OTT services may include obligations related to national security equipment, lawful interception, etc..

Korea :

The process in Korea is continuously moving and particularly during last year. In April 2016, Korea Communications Commission (KCC) preannounced a revision of legislation on Telecommunication Business Act (TBA), that was faced by opposition opinions submitted by the Korea Internet Corporations Association as well as by Korea Telecommunications Operators Association. Following the Regulatory Reform Committee (RCC) request, KCC revised the initial TBA revision considering the opinions of the market.

So far, it is legal for telecom operators to charge their customers extra fees to use VoIP apps or block their use entirely.

Brazil :

The Brazilian law on Internet rights refers to a **prohibition on "blocking, monitoring, filtering and analyzing the content of data packets"**. This law allows however discrimination of traffic if it "is deemed essential for the prioritization of emergency services". Authorities in Brazil have recently initiated a consultation process to narrowly tailor the definition of emergency services.

In September 2016 however, the Brazilian government and local companies have called for a "more evolved" regulatory framework for OTT services such as Facebook, Netflix and WhatsApp. National Agency of Telecommunications (Anatel) is in charge of drafting revision of related rules in 2017.

African countries :

In South Africa, as per third quarter 2016, the regulator is assessing the current and future impact of OTT services on competitiveness, investment and innovation in the telecoms sector, before releasing a related law.

In other African countries, operators but also regulators are mostly following the debate in South Africa and beyond before taking decisions. Some of them have already the subject on the table such as in Zimbabwee for example where the regulator (POTRAZ) and the Ministry of ICT are **not in favor of regulation**, despite evidence of the effect of OTT services on operators' revenues, but with the argument that regulatory efforts may prove more fruitful if they focus on stimulating market growth and investment [23] .

4.3.3   Major regulations and practice in Arab Region

As per a recent (2016) study on MENA region by ADL [5], *"Conundrum in MENA Region"*, during the last five years, almost all MENA countries have been concerned by protecting their local operators and limiting 'disruption' from OTT players.

As it is the case in many countries in the developing world, most of Arab policy makers and regulators have not defined so far a complete framework regarding the OTT and on-line services provision in their respective countries, nor they have stated clear positions in regard to "net neutrality" aspects.

However some countries have already addressed one or more aspects in relation to OTT and on-line services and have implemented legislation or regulatory scheme in this regard.

Main initiatives have mostly been achieved through **restrictions on provision of VoIP** or "allowing" **blocking of messaging/content applications,** including plans to limit VoIP services as to be provided by licensed operators only. Some examples are: [5].

- **No Restriction of VoIP :** very few countries such as Tunisia, Bahrain.
- **Licensing VoIP** (with provisions/conditions*) : Qatar, Oman ,UAE (only DU and Etissalat), Bahrain, Algeria, Morocco (**).
- **Selective Blocking/Ban** :
    - **KSA** : VoIP considered as regulated service, OTT need to partner with licensed companies. Since 2014, CITC released a statement to ban a number of OTT players including Viber, Skype and Whatsapp, but also Facebook messenger.
    - **UAE** : OTTs blocked for legal interception issues. Viber banned in 2013, Whatsapp calling feature and some other OTT apps also.
    - **Egypt** : VoIP on mobile network is forbidden *(international calls have to go via the international gateway)*

  *Provisions and conditions such as emergency services and customer information.

Recently, **Jordan** authorities are reported by Samena [24] from *Jordantimes* to be in the process of evaluating the possibility of applying usage fee on users of VoIP services such as Whatsapp or Skype.

From telecom operators side, while almost all of them have had to "control" the traffic flow on their network, particularly for quality of service reasons, there have been many attempts, either to set-up partnerships with OTT players or to convince regulators to take level playing field measures.

In North Africa, several attempts of cooperation with OTTs have been tried by telcos, so far unsuccessfully.

Examples below of Tunisia and Morocco show how difficult it is to implement limitations in situations of high adoption and usage rate among the population.

In **Tunisia**, operators have tried in 2014 to initiate a "collective" action to stop "facebook", "skype" and other OTT services on mobile. The initiative was very strongly opposed by public and civil society that stopped its implementation. No specific regulation is applied so far.

(**) The case of Morocco shows particularly the complexity of the subject. During 2016, Morocco has restricted access to VoIP services on licensing grounds. These services have been banned for almost one year. The ban met fierce resistance from Moroccans living abroad when it was implemented in January and over ten thousand citizens signed a petition calling on Government to lift the blockage. They have been restored late 2016 after the National Regulation Agency (ANRT) sent letters to Maroc Telecom, Inwi and Meditel ordering them to allow Internet calling services to be functional again. The regulator is currently facing a lawsuit by a Moroccan citizen who claims the ban directly harmed him economically and personally.

4.4 Conclusion

In front of the challenge of OTTs, telecom operators have developed a set of techniques and solutions to implement either defensive, competitive or collaborative strategies. At the same time, they continue putting pressure on governmental decision makers to be allowed to use these options in facing what they consider as unfair competition and unbalanced environment.

Decision makers have been considering "**net neutrality**" as basic principles for the eco-system. Many of them are however introducing some **flexibility** for telecom operators but regulators are urged to keep implementation of operator's solutions under close scrutiny.

Partnerships and collaborative models between operators and OTTs have mostly been set-up and implemented in developed countries and particularly with powerful players, either in terms of market position and foot print or by the level of support of their home country.

Beyond economic considerations that are particularly underlying the OTT debate, **customer protection** and **security** aspects but also overall impact on social welfare are seriously considered by policy makers.

Almost all Arab countries have been concerned by the issue because of the disruption faced by their local operators due to OTTs. Specific measures have been implemented in many countries, in particular in GCC and, so far, no one is reported to have a complete framework regarding the OTT and on-line services provision.

5   Opportunities and Challenges in Arab Region

5.1 General

The existing and potential impact of OTTs bring the attention of policy makers and regulators on the full picture of transformation of the economy and society. The extent of his transformation, much visible today with OTT and on-line services, will have a deep and growing impact on national economies and citizen life.

For each of Arab countries, this transformation will bring much opportunities of development but also the big challenge of how to maximize benefit from this transformation to its national economy and citizen's social welfare.

It is a fact that the more the level of development is of a given country, the more the impact will be visible and fast on the economy and society. Countries having reached a high level of development of ICT need to address the subject urgently, others may gain in anticipating the preparation of appropriate environment.

The Arab region has different levels of ICT development and potential as described in the rest of this chapter. Some of them have potentially the maturity to set-up the appropriate framework.

The Region have seen the emergence of regional global operators who are present all-over the Region and beyond and who are expected to play a major role in the digital transformation of the Region.

5.2 ICT environment and development level

Arab Region is a Market of more than 400 Million people and 240 Million subscribers in 2016 with a high potential of growth in the coming decade due to the high rate of youth among the population.

Most of people leaving in these countries use the same 'native' language and have very close culture and social models. However, when it comes to level of development, education and skills, there are quite large differences between some countries and within the countries themselves.

This is also reflected in the level of development of ICT infrastructure over the Arab region, as reported by some reports from international organisations such as ITU [1][2] and GSMA[3] for example.

Recent reports from World Bank, WDR2016 World Development Report 2016 [6] and ITU – Measuring the information society - DIGITAL SOCIETY Index 2016 [2] give good indications and analysis of ICT environment and level of development worldwide including in the Arab Region.

ITU focuses its Digital Index [2] measure on three major themes:

- **Access** : Readiness of Infrastructure for access to communication services
- **Use** : Intensity and usage indicators
- **Skills** : level of education, school enrolment, etc..

With the following resulting indexes for Arab region countires.
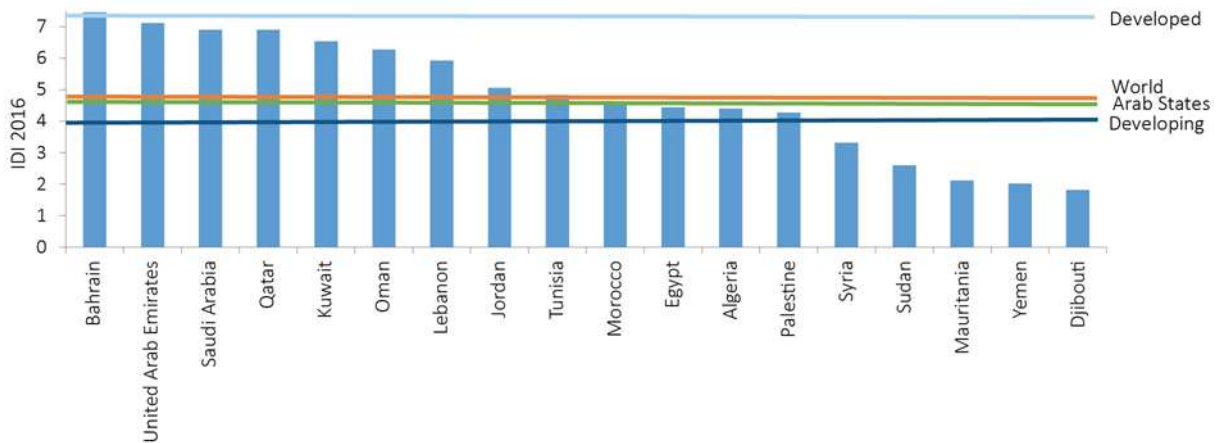
Fig 5.1 IDI Values, Arab Region States, 2016 (source: ITU [2])

The World Bank report [6] includes a classification of countries considering two factors showing the level of digital transformation:

- **Technology :** particularly level of Digital Infrastructure
- **Complement** : Index of quality of Institutions, Skills and Regulation (i.e ICT global environment)

And classifies each country over three categories or phases of development :

1. **Emerging** : Barriers, Basic Skills, Basic Services
2. **Transitioning** : Competition/Regulation, Carriers, e-gov/citizens
3. **Transforming** : Platform competition, Policy Making (...), Lifely learning

We can see that there are in fact common factors assessing the Digital development by the two institutions, that can be presented as:

- Level of Infrastructure allowing access to digital services
- Level of Legislation and Regulation fostering and sustaining usage of digital services
- Level of Skills and education of the population allowing benefits and value from these digital services

The key findings from these two reports for the Arab Region are that while for some countries the challenge is to catch up quickly with acceptable level of technology and infrastructure, others have the opportunity to succeed in the transformation to the digital economy :

1. GCC countries are globally very well positioned in terms of technology/infrastructure and have reached a level of infrastructure similar to Europe. Very few are in the "**transforming**" phase.
2. Most of LDCs are still in the "**emerging**" phase
3. Most of other Arab countries are in the "**transitioning**" phase while the global access level remains far under the average in Europe for example.

However in almost all Arab Countries, **skills** and **Legislation/Regulation** environment indicators are yet to reach the "*Transforming*" level. This aspect is of high importance because, while plans of infrastructure and access development are common in the Region, the development of "complements" remain a challenge of most of the countries.

This is reflected in the following map from World Development Report 2016 [6] gives positions of most Arab Countries in terms of technology and "complements" indexes.
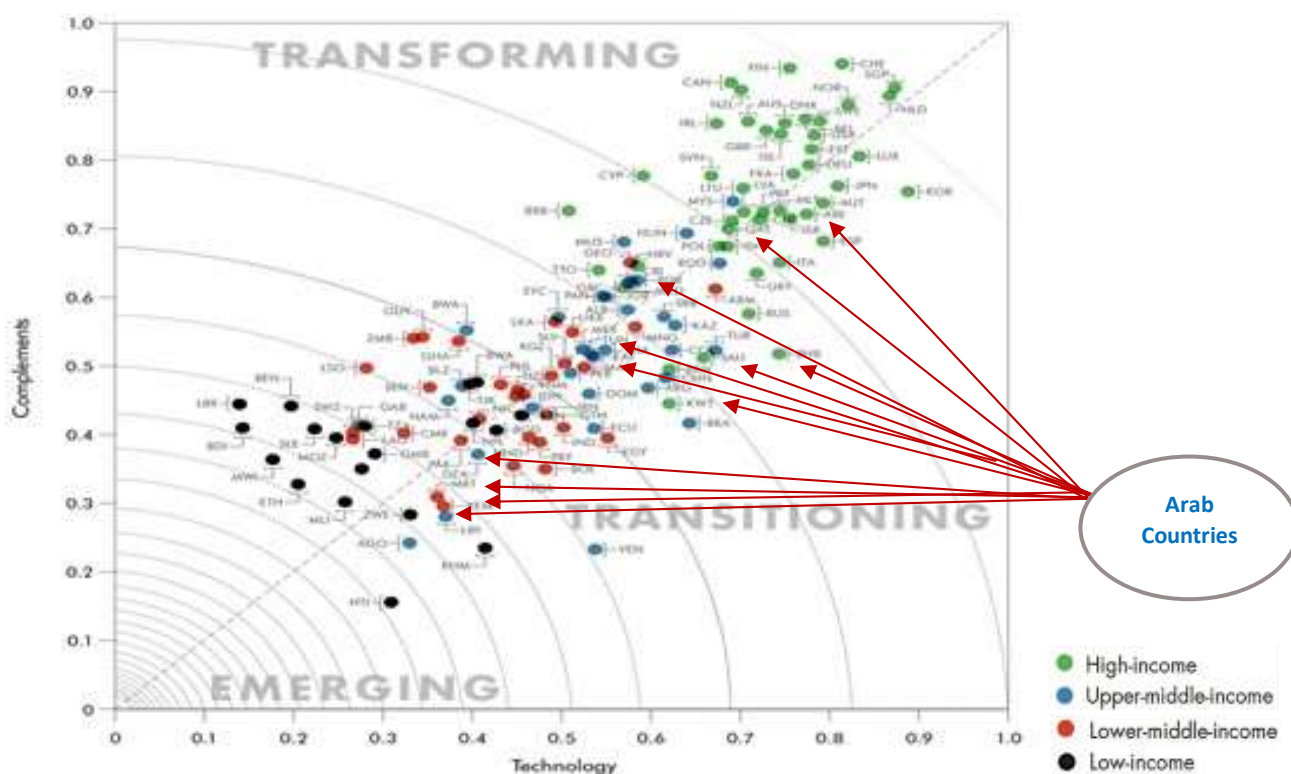
Complements: Index of quality of institutions, skills and regulations.
Technology: Index of quality of access to internet and related technologies.

Fig 5.2 Arab Countries Digital Classification
(source : World Development Report 2016 [6]) *The quality of complement and technology rises with incomes)*

5.2.1 Access Penetration level

In 2016, according to ITU[1] and GSMA[3], the **subscription penetration levels** in the Arab region is as follows:

GCC Countries, representing 42 Million subscribers (around 20% of total Region):

- The penetration rate is at **77% in 2015 and expected to stay almost at the same level in 2020**. Bahrain, Kuwait and the UAE have a subscriber penetration rate of over 90%, placing them among the most penetrated mobile countries in the world.
- The adoption of smartphones (i.e. data and internet capabilities) will grow from 64% in 2015 to 78% in 2020.

Other Arab countries:

- form 56% in 2015 to 61% in 2020 of subscription penetration. Egypt, Irak, Algeria, Morocco and Sudan will be the major contributors to subscribers growth until 2020. Comoros, Djibouti and Somalia have however penetration rates below 30%.
- Smartphone adoption is expected to evolve from 27% in 2015 to 61% in 2020**.**

The access rate to broadband, particularly via mobile, is around 70% in 2016 and is increasing rapidly.

Regarding the usage of internet, ITU [2] reports that in 2015, **only 38% of individuals are using internet** in the Arab Countries and this is below the world average, even though some countries such as Jordan are reported to have a much higher rate.

This indicates that, even though these markets are close to saturation in terms of number of connected subscribers, the data and internet usage and hence OTT and on-line services have a potential growth over the next decade. In GCC countries, the rate of usage of smartphones for internet access is reported to be nearly double the one in Europe for example.

In the following paragraphs, few indications are given on the level of usage of particular OTT and on-line services as reported to be mostly accessed and used by customers in the Arab Region.

5.2.2   Application and services usage

As mentioned above, the use of internet is around 40% of total individuals in the Region and is expected to grow rapidly in the coming years, particularly in countries with lowest levels.

As for the main OTT applications, platforms and on-line services used in Arab region, communications services and social networks are among the highest usage rate.

Region is reported to be one of the most consumer of **VoIP and messaging services**. According to GSMA [3], IP messaging exceeded 80% in many GCC countries and reaches an average of 55% of total messaging services in North Africa sub region.
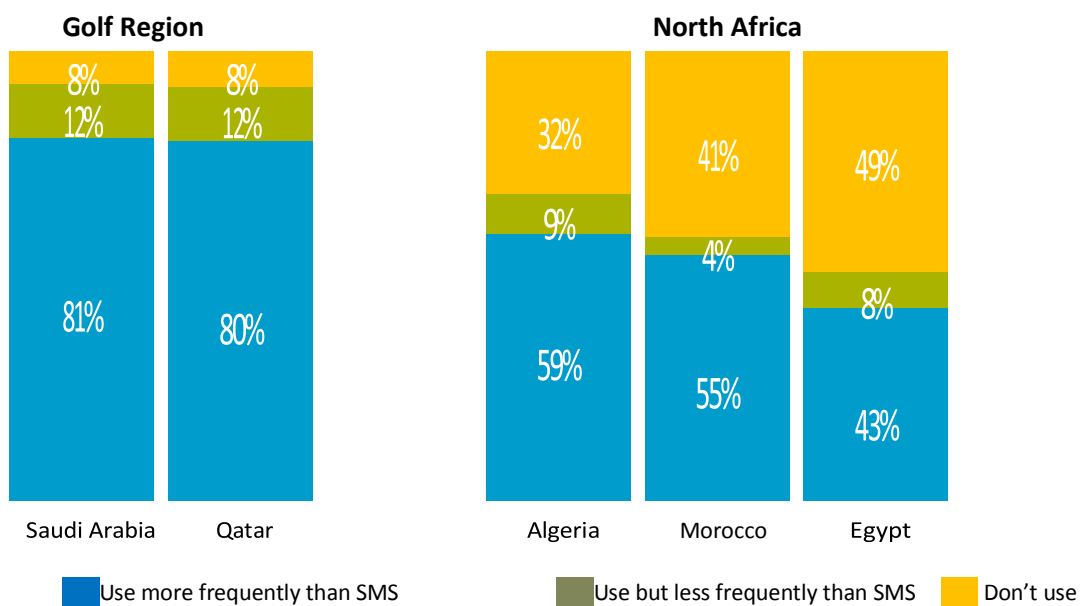
Fig 5.3 IP Messaging in Arab Region (source GSMA [3])

In North Africa sub-region, Skype, Whatsapp and Viber are immensely popular VoIP services and are adopted and used by millions of customers. In **Jordan**, according to experts as reported by Samena its January 2017 "trends" report [24], more than 3 million people use Whatsapp.

Regarding **social networks** and according to a study by Northwestern University in Qatar [14], **82% of internet users in the Middle East** use Facebook. North African subscribers are also among the most frequent users of social networks such as Facebook.

Regarding **video** in Arab Region, the demand is essentially important in the GCC countries. In Qatar, OTT Video penetration reported by AT Kearney [17] (based on Analysys Mason study) is around 40% out of a total TV subscription of 80% (Pay TV and OTT TV). For UAE, the rate is 28% OTT Video out of a total of 60% and Saudi Arabia with 10% out of 30% total TV subscriptions.

In North Africa region, penetration of Video is much lower with Morocco for example registering less than 5% TV subscription.

Regarding the expected evolution of video demand and according to AT Kearney report [17], OTT TV and video market in Middle East and Africa is expected to grow at a high pace and reach a total of 1,8 BUSD in 2021 with around 70% by SVDO, far much than advertising, rental and DTO revenues.

E-commerce is still at startup phase in the Middle East and Africa region, representing around 2,5% of total worldwide e-commerce, compared to more than 30% for Asia Pacific and 60% for US and Europe. That promises a large growth potential of regional e-commerce in the future.

A particular focus is put on the development of **IOT and smart cities** and particularly in some leading countries in the Region, driving IOT and smart cities development plans (advances in utilities, fleet management, integrated cities and citizen engagement , etc…).

While the most famous project is the Smart Dubai, the Dubai's smart city initiative launched in March 2016, other initiatives are on-going in Saudi Arabia with six greenfield economic cities planned, in Qatar with three smart cities projects and in UAE with an additional project in Abu Dhabi.

Operators such as Oreedo, Etissalat and Zain have promising plans to develop smart solutions throughout the region (Bahrain, Saudi Arabia, Qatar, Iraq, Jordan, Kuwait, Egypt, Lebanon).

Finally, regarding **financial services** as well as education and health services, they are globally still of low usage in the region (with however a good development of financial services in GCC), either for trust reasons – for financial- or the lack of effective and sustainable business and operation models.

To summarize, we can consider that the Region has a promising potential of growth of digital services and that a large part of it will be in the service demand side. OTT and on-line services will continue transforming the sector and the economy and to be the major value creators.

The challenge for the regional and national players is then to capture a big part of this value. The challenge of policy makers and regulators is to create the appropriate environment and framework to make it possible.

5.3 Challenge for ICT Players: Capture the Value

Almost all Arab countries have introduced private competition in the sector since more than a decade. Initially many international tier-1 telecom operators, mostly European have been granted licences in the Region (mainly Vodafone and Orange).

Very quickly however, regional champions emerged and developed their coverage to the region and beyond particularly in Africa : Orascom Telecom, Wataniya, Maroc Telecom, but also Investcom, Qtel, ...

A second phase in the late 2000's saw some consolidation and acquisition in the Region, where new champions emerged such as Etissalat, Oreedoo, Zain, Sudatel, who have reshaped the Arab region map with a very strong presence of Tier-2 Operators from the Region in almost all Arab countries.

As a result, there are today very few global players (Tier 1) in the Region (Orange, Vodafone) operating in five countries (Egypt, Jordan, Lebanon, Tunisia and Morocco). Almost all others are either incumbents or region originating players, with the exception of MTN in Irak and Sudan and OTA in Algeria.

Regarding OTT players, even though all big ones have an important footprint in the regional market, no major OTT players are known so far to have strategic partnership in the Region. Some initiatives are however

reported with some internet players such as a partnership since late 2015 of Uber with Zain in Bahrain, Jordan and Saudi Arabia markets.

At regional level, very few companies have emerged as OTT from the Region. We can mention Icflix for video and proximity service companies such as Careem, Aiwa Gulf and some other start-ups in the early developing phases. They are yet to reach the appropriate scale to compete in their native market and be able potentially to take a sustainable market position at regional and international level.

As a conclusion, we can consider that while regional champions have emerged and are capturing part of the value as international operators across the Region and beyond, the players in OTT, applications and services are still at the start-up phase, in a context of global competition and barriers to market entry and scale, even though much of the content (music, videos, TV podcasts, etc..) and services (proximity services, …) are available from the Region itself.

Regional operators could potentially play a role in the emergence and development of adapted on-line service offer to capture the growing demand for local/regional content and proximity services. They are expecting policy makers to foster such emergence in line with strategic interests and needs of the Region.

5.4 Challenge for Policy Makers: Appropriate Framework

As mentioned in the previous paragraphs, the Arab Region is promising in term of market potential and particularly thanks to the increase of demand and usage of digital and on-line services.

This trend will certainly contribute to the overall development of the national economy and social welfare of countries of the Region through improvement of efficiency and productivity gains in almost all sectors of the economy.

At national level, as far as economy is concerned, an important aspect is the overall **c**outcome of ICT to national economy and social welfare, particularly in terms of:

1. Efficiency (productivity of the economy)
2. Added Value (i.e benefit of value transformation, value creation vs destruction)
3. Employment
4. Investment

GSMA reported [3] that while in the digital ecosystem, mainly driven by mobile, the direct added value to the GDP by the mobile digital ecosystem in the MENA region is estimated at 1,4% in 2015 (out of 4% of direct and indirect contribution) with the major part of 1,2% is generated by telecom operators and **only 0,02% is created by content, applications and other services.**

This is to mean that the value generated by the eco-system and kept in the Region is globally limited to the "communication" part generated by telcos for the transportation and delivery of data. This is expected to go under 20% of total value generated by the whole chain (advertising, service subscriptions, e-commerce commissions, … but also data valuation, storage, ..).

In the near future, evolution of on-line services and particularly e-commerce platforms and servicesas well as IOT applications will further increase the part of digital commerce and services in the global economy and it will be challenging to keep as much value as possible locally or regionally, so as to allow investment and employment and maintain appropriate balances in national economies.

As mentioned in the previous chapter, the challenge of the regional and national ICT players is to maximize their part of the value created. The challenge for policy makers is then to set-up an appropriate environment

fostering innovation and value creation while sustaining local investment and viability of national models and players.

Beyond the economic challenge, customer protection and rights are to be considered in this framework. This refers to topics that are out of the scope of this report such as privacy, data protection, freedom of choice, etc... . Among others, European policy makers are considering closely this aspect and preparing appropriate directive on it early 2017.

6   Key findings and Recommendations

At global level, the digital ecosystem boosted by technology evolution, innovative services and business models of OTT and on-line services and broadband infrastructure investments, have seen its contribution to GDP increasing to reach 5% worldwide. In the MENA Region, the contribution is at 4% in 2015 with 2,4% from productivity gain and 1,18% from telecom services.

OTT and on-line services have made a break-out of the consumption of data at a pace that disturbed traffic plans of telecom networks and created additional concerns on quality of service, while at the same time they generated increase in demand of subscription and data usage.

This boost of demand and usage, but also the associated OTT models, have had an immediate impact on traditional telecom business, particularly voice and messaging services, either with direct competition or by the extra load of networks that haven't been properly valuated.

Most of Telecom Operators, after two-three years of decrease of their revenues and frequent complaints about what they consider as unfair competition, have adapted they strategies and plans to cope with the issue, either in cooperating or competing with OTT players, or better managing the traffic on their networks as well as their data and service offers and pricing.

They continue however claiming the need of balanced regulatory environment and appropriate level playing field, but so far, very few regulators worldwide have considered or succeeded in this regard.

For policy makers, even though they admit this imbalance and its impact on local operator's business, they have been considering global economic and social consequences of any legislation or regulation on the subject. Many countries in the developed world have already defined frameworks for the sector, particularly based on "net neutrality" principles, even though during the last period, some of them are "accepting" to consider "reasonable "traffic management " by telecom operators.

At strategic level, many countries in both developed and developing world, are assessing the increasing pace of digital ecosystem contribution to national economy with a focus on the potential added value to be captured locally that need to counterbalance potential loss of value in other sectors. Beyond the economic aspects of this evolution, policy makers are also addressing carefully security and citizen protection and rights aspects.

The Arab Region is at the heart of this subject as many of Arab countries are either in or entering **"the Digital Transition phase"** and have the potential of rapid **"transformation"** of their economy. The challenge of policy makers is then to manage appropriately this transition to maximise economic and social benefit to their citizens and economic actors.

The Region have succeeded in developing regional tier-2 and potential Tier-1 telecom operators during the last decade. Those operators have the **opportunity to capture a maximum value** of the eco-system and be the backbone of the "digital Era" in the Region, should they be able to "transform" and should the national/regional environment foster it. This is the key challenge of ICT stakeholders.

The key success factor in the challenge would be to ensure a continuous balance between the three following pillars:

- Market openness and fair competition
- Innovation and global contribution to national economy
- Citizen protection (security, privacy, etc……)

Appropriate strategies may be with proactive and voluntary digital plans, advanced and dynamic regulatory framework fostering partnerships and resources mutualisation and a comprehensive legal environment fostering local innovation and investment and citizen protection. Some of the keywords that could make sense in this regard are:

Keywords for Regulatory Framework :

- *Fair Competition : Level Playing Field, SMP*
- *Net Neutrality (n*o unreasonable discrimination)
- *Transparency (on service models, offers, partnerships, deals …)*
- *Data migration plans (Portability of services)*
- *Universal Service Contributions (USO) for broadband and services*

Keywords for Legal Environment :

- Incentive to Investment in Innovation, local content and Proximity services such as, education and health programs, smart cities, financial inclusion etc…
- Incentive to partnerships allowing access to market, reach of critical scale, emergence of local/regional champions, etc..
- Foster partnerships and resources mutualization (Infrastructure share, ..)
- Involve national stakeholders in preparation and implementation of National Digital plans
- Address the global aspects of Digital Transformation
- Harmonise as possible legal framework and plans across the Region or sub-regions.
- And Security, privacy and customer protection

Recommendations for Methods / Approaches :

- National Consultations and enquiries
- Collection, measure and share of consistent data on OTT impact and ecosystem evolution
- Public debates and forums (national/regional) Involving stakeholders, Civil Society and customers associations.
- Contribution and interaction in international or regional works on the subject

A cooperative work on these policy and regulatory frameworks at Regional or international level such as Arab league, AREGNET, ITU, AICTO or others may be appropriate as it will add efficiency to implementation of such policy and regulation at national levels. It should be considered, at least in homogeneous sub-regions in terms of resources and socio-economic organization.

Finally, the following statement from a Group CTO of incumbent operator in MENA reported by ADL [5] reflects a quite appropriate view on the challenge faced by the sector regional players in Arab Region.

"Local OTT start-ups will face a big challenge, as a purely local content-based business model *will not reach* the scale, *as although the greater MENA landscape is unified by a common language, there are specificities of political and regulatory nature in each market."*

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Disclaimer: *the present Report contains data and information from some of the following documents. It contains also some adaptations from the original content of some of these documents. Views and opinions expressed in the present Report are the sole responsibility of the author and are not endorsed by Organizations or the authors of the original documents.*

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