

Impact of Over the Top (OTT) Services on Telecom Service Providers

Joshi Sujata^{1*}, Sarkar Sohag^{2,3}, Dewan Tanu¹, Dharmani Chintan¹, Purohit Shubham¹ and Gandhi Sumit¹

¹Symbiosis Institute of Telecom Management, Village Lavale, Pune - 412115, Maharashtra, India; sjoshi@sitm.ac.in

²Pacific Academy of Higher Education & Research University, Udaipur, Rajasthan, India

³KPMG Advisory Services, Mumbai, Maharashtra, India

Abstract

The telecom industry has been one that has had to deal with a continuously changing business and technology environment more than most other industries over the past half century. Traditionally the principal revenue streams for telecom operators have been voice and messaging (SMS) with data coming in at a far third till recently. But while telcos had been quick to react to previous game changing developments such as the internet explosion and the emergence of cellular mobile communications in the 1990s, they seem to have been caught napping in the face of the newest challenge to their revenues, Over The Top (OTT) service providers. The growing impact of OTT services on telcos' voice and messaging revenue is a widely accepted phenomenon. Their impact on mobile data traffic and telco data revenue is also areas that have been acknowledged as critical points for consideration. This study attempts to link these issues to shift in consumer preferences, identify the underlying factors there of and to understand the factors driving users towards OTT services.

Keywords: Net Neutrality, OTT, Telecom, TRAI, VoIP

1. Introduction

The global telecom industry, due to its dynamic nature has been witnessing a continuously changing business and technology environment over the past half century. Since its initiation with the telegraph and early voice telephony, the industry has come a long way. The telecom operators today strive to provide seamless and high quality voice, data and multimedia services in a multi-device, mobile environment. Traditionally the principal revenue streams for telecom operators have been voice and messaging (SMS) with data coming in at a far third till recently¹. But while telcos had been quick to react to previous game changing developments such as the internet explosion and the emergence of cellular mobile communications in the 1990s, they seem to have been caught napping in the

face of the newest challenge to their revenues, Over The Top (OTT) service providers.

The OTT service providers deliver audio, video and other media over the internet and bypass the traditional operator's network. Since, the OTT players do not require any business or technology affiliations with network operators for providing such services, they are often known by the term "Over-The-Top" (OTT) applications⁶.

These lean and nimble OTT players, enabled by technology advances such as smartphones, super-fast IP networks, open source platforms, innovative services, cutting edge functionalities and shift in consumer preferences towards their "freemium" based business models are seeing an ever increasing adoption rate.

Though they utilize the telecom operators' network and infrastructure, necessitating continuous capital invest-

*Author for correspondence

ment, they do not contribute directly to the telcos' revenue however OTT service usage require subscription of Data pack thus driving the data revenue. But what's most worrying for the telcos is the fact that these OTT players offer services that are close substitute to their own offerings and are beginning to pose a credible and measurable threat to their revenues. The wide variety of applications and services offered by OTT players is luring the customers away from the telcos restricted, relatively more expensive and severely limited array of services.

The growing impact of OTT services on telcos' voice and messaging revenue is a recognized reality. Their impact on mobile data traffic and telcos data revenue are also areas that have been acknowledged as critical points for consideration. This study attempts to link these issues to shift in consumer preferences and identify the underlying factors thereof because we believe that any attempt by telcos to respond to the changing scenario would have its roots in understanding what is primarily driving users towards OTT services.

2. Objective of the Paper

The objective of this paper is to propose a conceptual framework which attempts to analyze the trends affecting the consumer behavior towards communication services due to advent of OTT services. Also, it identifies factors such as cost, convenience, features, social propensity, content availability, smartphone and mobile internet penetration, user experience and net neutrality which are effectively leveraged by OTT players to offer better substitutes to telcos offerings. Furthermore, it studies the impact of these factors on operators' voice, messaging and data services. This study will help telcos in designing strategies to overcome the OTT threat and also in identifying changing consumer needs, thereby helping them design offerings to suit their needs.

In order to formulate the framework we have asked the following research questions

- What are the trends affecting telecom consumers' behavior with regards to communication services due to advent of OTT services?
- What are factors leading to adoption of OTT services?
- Analyze the impact of these factors on Telecom revenues across services (Voice, messaging, data and video)

2.1 Research Methodology

Qualitative research study was adopted wherein we have studied reports of various organizations, financial reports of telecom companies, whitepapers, newspaper excerpts and various other research reports in order to answer the research questions formulated above.

3. Literature Review

3.1 Impact of OTT Services on Telco Revenues

There are many organizations which have studied the impact of Over The Top (OTT) services on telecom operator. However, very few have shown how shift in consumer preferences & technology trends have led to this state. The impact of OTT services on operator's revenue has been fully apprehended by all the stakeholders in the telecommunication industry worldwide.

For example, according to Informa's World Cellular Revenue Forecasts 2018⁷, global annual SMS revenues will fall down from US\$120 billion in 2013 to US\$96.7 billion by 2018, due to increasing adoption and use of Over-The-Top (OTT) messaging applications.

Spirit DSP, in its report "The Future of Voice"⁸, has also studied the impact of OTT VoIP (Voice over Internet Protocol) applications on voice revenue. According to the report the overall global telco voice revenues (including fixed subscriptions) will decline from \$970.4 billion in 2012 to \$799.6 billion by 2020, at a CAGR of 2.4%. Also, as a result of VoIP by 2020 the telecom industry worldwide will see a loss of revenues approximately worth \$479 billion which accounts for 6.9% of the total revenue from voice.

Another report "Consumer OTT VoIP Outlook: 2013 to 2018"⁹ by Ovum, highlights that the OTT VoIP market is growing at a rate of 20 percent. Its application's usage will reach 1.7 trillion minutes by 2018, which translates to \$63 billion in lost revenue. According to this study, as a result of increasing demand of online applications for messaging, by the year 2016, telecom operators will stand to lose revenue worth \$54 billion in messaging services

3.2 Impact of OTT Players on Data Traffic

The impact of OTT players is not just limited to telcos voice and messaging services but has led to an exponential increase in their data traffic causing severe congestion

problems in their telecom network. A major contributor to the increased data traffic is the growing consumer appetite for more video.

According to “Cisco Visual Networking Index: Mobile Data and Internet Traffic, 2013–2018”¹⁰, in the years between 2013 and 2018, mobile data traffic is expected to rise at a compounded annual growth rate of 61 per cent. It is expected to grow from 1.5 exabytes to 15.9 exabytes per month by end of year 2018. Mobile video traffic will increase from 633 PB to 9103 PB per month with a CAGR of 70%. This exponential increase in data traffic will put a strain on the operators’ network as signaling traffic will outpace the growth in data traffic by 40%¹⁸. This will require telcos to invest in network capacity enhancement measures like spectrum, small cells, among others.

A report from Heavy Reading, “Internet TV, Over-the-Top Video, & the Future of IPTV Services”¹¹ highlights that operators perceive competition from Internet service and OTT video services as a significant threat. According to this report, the OTT players without making any heavy investment make use of the available IP networks. The operators are getting concerned over the fact that OTT video providers will take away the value proposition offered by their VoIP services and they would be relegated from broadband network operators to a dumb pipe.

However, according to Simon Landsheer, CEO of Silver street “The OTT operators benefit in a two fold manner; one due to increase in the traffic for Short Messaging Services (SMS) and other due to rise in the data traffic as a result of increasing number of people using smart phones for OTT services, not only from increasing SMS traffic but also from increased data traffic as more smart phone users embark to OTT services”.

The above argument is further corroborated by the fact that for China mobile in the year 2012, SMS revenue decreased but the data traffic during the same period increased at an extraordinary rate of 187% because of the large scale uptake of OTT services². The viral nature of OTT communication services dramatically increases the total data consumption of the consumer.

Impact of OTT is not just in theory but is getting reflected in operator’s financial statements as well. China Mobile, world’s largest operator, has shown drastic decline in its profit for the first quarter of 2014². Its profit fell by 9.4% to its lowest point in five years, blaming OTT services for the same². Increased usage of over the top services has reduced the growth rate in voice usage which grew by a meager 0.6% YoY, while messaging traffic declined to 153

bn from 192.7 bn messages². During this period, the only reason to rejoice for telecom operator was wireless data traffic which grew by 48.1% YoY, thereby offsetting the impact of OTT services².

Similar trend was seen on Indian turf when Bharti Airtel and Idea announced their financial results for QE Mar’14. Both the cellular service providers saw a decline in messaging & VAS revenue, Bharti Airtel saw decline of 5.6% in its messaging and VAS revenue while for Idea cellular it was around 6.4%³. Even though OTT apps offer free voice over IP services still there was no significant impact on voice revenue since India has the lowest voice tariffs in the world⁴. Favorably, presence of OTT players helped telcos to add data revenue in a significant manner as can be corroborated from the fact that the total data revenue for Idea cellular for 4th Quarter 2014 increased by 10.1% as compared to 9.5% previous quarter³.

It is clear that Over The Top (OTT) services have impacted the telecom operators resulting in the erosion of billions of dollars from the operator’s balance sheets worldwide⁵. If these OTT players are not dealt strategically, then in the medium to long term the telcos might just become a dumb pipe for OTT services.

Therefore, we believe that OTT services must be analyzed in great detail & the operators should take reference from the OTT players and fill the gaps in their services, which might even require transformation in their business model. Hence, this paper is an attempt towards analyzing and identifying factors that have created an impact on revenues of the telecom operators globally & to come up with a conceptual framework which will help telcos in designing strategies to overcome the OTT threat and also in identifying changing consumer needs, thereby helping them design offerings to suit their needs.

4. Conceptual Framework

The conceptual framework looks at various factors & trends which have led to dramatic adoption of OTT services leading to impact on telcos revenue.

Also, it identifies factors such as cost, convenience, features, content availability, smart phone and mobile internet penetration, user experience and net neutrality which are effectively leveraged by OTT players to offer better substitutes to telco offerings. Furthermore, it studies the impact of these factors on operators’ voice, messaging and data services. From the research we confer, that

Cost, Convenience, Communication (Social propensity), Content availability, Advancement in technology and in devices as well as telecom networks and Net Neutrality have led to adoption of OTT services.

This rapid uptake of OTT services had a huge impact on the telco revenue and services. Various factors and trends that have attributed to this impact are further illustrated in the conceptual framework shown below in Figure 1.

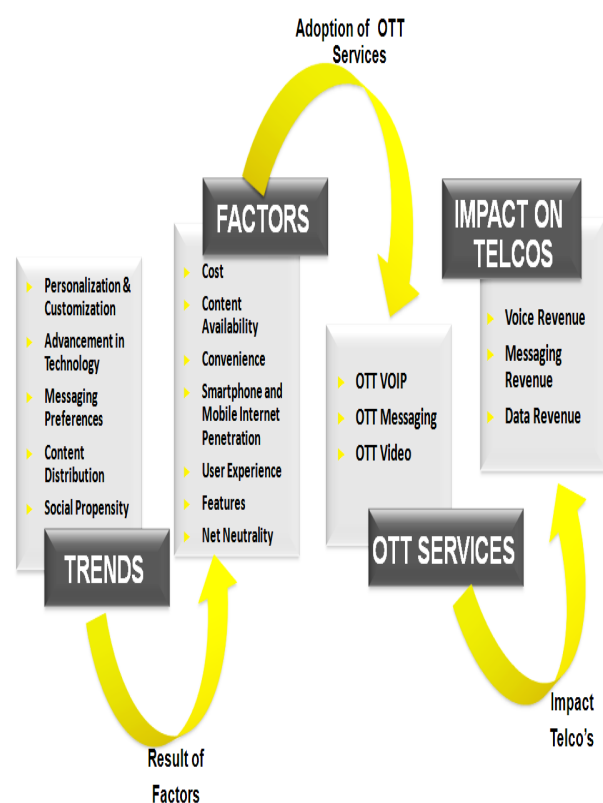


Figure 1. Conceptual framework.

An in-depth study of existing literature on the subject as well as inferences and insights derived from market indicators such as financial reports and industry studies have helped us identify various factors like cost, content availability, convenience, smartphone penetration user experience and net neutrality. These factors we believe are the prime forces for the rampant adoption of OTT services at the cost of telco offerings.

A parallel study of the trends observed in the market for telecom services and the shift in consumers' reaction to new developments has enabled us to map the above mention factors to the market trends they have

driven. Various market trends that we have identified are: Personalization & customization, advancement in technology messaging preferences, client distribution and social propensity. These trends and factors we believe have been and continue to be the primary reasons for the encroachment of OTT services i.e., voice and messaging on telecom operators' revenues. The following section delves into these trends and factors in greater detail.

5. Analysis and Findings

This study proposes a conceptual framework which is formed after analyzing the following research questions: RQ 1. Due to advent of OTT services what are the trends affecting telecom consumers' behavior with regards to communication services.

5.1 Trends

5.1.1 Personalization and Customization

Consumers of communication services have increasingly put a premium on a more personalized customer experience and more customizable access to services of their choice. The availability of a wide variety and huge quantity of content has led to the consumer insisting on the right and relevant information and content being made available to him at all times. The consumers' demand for convenience has made it necessary for service providers to track the preferences of individual consumers and deliver the information and content accordingly. Rising smartphone and mobile internet penetration has put the equivalent of a sophisticated and powerful yet personal communication system in the pocket of every consumer. Since the consumers spend a major amount of their time interacting with their smartphones, they want their experience to be unique and one-of-a-kind.

5.1.2 Advancements in Technology

With time the telecom technologies especially radio access have advanced. It has moved from initial GSM and CDMA technology to Third Generation (WCDMA, TD-SCDMA, CDMA2000) and to more advanced Fourth Generation technologies (TD-LTE, FD-LTE, LTE-A). These technology advancements have provided the end user with data rates, which were unthinkable a decade ago. The enhanced data rate can be very closely linked to the adoption of the bandwidth hungry OTT services like video calls and multimedia services like Video on

demand. This can be seen from the fact that video OTT players like Netflix are more widely used in developed countries, where the radio access technologies are more advanced and supports higher data rate. Handset technology advancement is another factor which has enabled the OTT services delivery to the end user. Migration of mobile from feature-phone to technologically advanced smartphone has allowed data streaming, which is one of the most prominent enabler for any OTT. Smartphone also enhanced the consumer experience which in turn lead to more innovative OTT services.

5.1.3 Messaging Preferences

Driven primarily by cost, smartphone and mobile broadband penetration, availability of advanced features and net neutrality, the consumers' messaging preferences have rapidly and possibly irreversibly shifted from telcos' SMS and MMS services to OTT messaging services. Most of the OTT services employ a 'freemium' based business model, where they provide unlimited messaging to consumers for a meagre fixed subscription fee or charge consumers only for certain premium features. Hence, a consumer in effect needs to pay only for the mobile data usage. Consumers have been increasingly choosing this option over the telcos' pay-per-message models.

Adoption of OTT messaging is very closely linked to smartphone and mobile broadband penetration. While in matured markets growth in smartphone and mobile broadband penetration has been a key driver for increased OTT messaging adoption, in many developing markets this penetration itself has been fuelled to an extent by the consumers' desire to use OTT messaging services such as WhatsApp. This close relationship has in fact resulted in many telcos collaborating with such OTT messaging service providers to incentivize mobile broadband usage by consumers.

Fast IP networks and advances in technology have also enabled OTT messaging service providers to offer a bouquet of innovative services and features to the consumers such as voice messages, media sharing, microblogging, Stickers etc. Telco messaging services on the other hand have practically remained unchanged and lackluster since their inception.

The principle of net neutrality has also worked in favor of the OTT services, as telcos are forced to remain neutral in providing customers access to any service, whether its own, a partner's or a competitor's.

5.1.4 Content Distribution

As the consumers' demand for content has accelerated, service providers have been trying to match the supply of content to the demand. At the same time they had to develop capabilities to deliver this content to consumers distributed across geographies, technologies, platforms and devices. This has led to rapid advances in content distribution capabilities. Nowadays, content be it audio or video is readily available on different platforms such as YouTube & Netflix which contributes approximately half of the internet traffic. While availability of content and rising penetration of smartphones and mobile internet were the major contributing factors towards the focus on content distribution, the need to satisfy consumer expectations in regards to convenience and customer experience have forced service providers to maintain this focus and keep improving their content distribution mechanisms.

5.1.5 Social Propensity

With the seemingly boundless means available for communication and remote social interaction, the modern consumer feels the need to share every small or big emotion, thought and experience instantly with everyone. And consumers don't just want to share information, they have increasingly been sharing exponentially rising quantities of pictures, videos and audios. Explosion of user generated multimedia content also has led to increased sharing & communication among social groups. Since OTT services have drastically reduced the cost to consumer for sharing information and content, cost is no longer a deterrent in this regard. With easy, convenient and instant access to advanced communication technologies, the consumer would only want to share more. This can be seen by the emergence of OTT applications like Instagram, Snapchat, Vine, WeChat etc. which allow users to share multimedia content with their friends.

RQ 2. What are factors leading to adoption of OTT services

Key trends and factors affecting increase in adoption of OTT services.

According to the studies mentioned below, it can be asserted that the growth in usage of OTT services is driven by a number of factors such as improvements in the availability as well as speed of the mobile networks, the expanding power as well as affordability of wireless devices such as smartphones and tablets, and continued dominance of social communication over the Internet.

According to a report published in Business today, the revenues of telecom operators are on a rise as a result of increased data usage facilitated by video downloading. According to the report, the total data consumption for the Indian telecom operator Airtel in year 2012 increased almost by 81% with the technological advancement and increase in speed i.e. when the operator moved from 2G to 3G services.

The market is changing at a rapid pace. There has been a significant shift in both the demographic as well as the psychographic indicators. Although these changes are not apparent to a larger audience, the marketers are aware of how these factors have contributed in changing the business landscape and helped in development of OTT industry.

Arthur D. Little in his report “Disruptive threat and Innovative opportunity”¹² has identified few key trends in these changing scenario that has influenced the adoption of mobile voice OTT. According to the report smartphone penetration and enhanced functionality provided by OTT players are two most prominent contributors to the OTT growth. Innovative and smart services provided by OTT players are other factors contributing to the OTT growth¹².

Factors influencing the adoption of video services were studied by Motorola in its paper “Opportunity and impact of video on LTE Networks”¹³ emphasizing notable consumer trends such as personalization, content availability, social features, device technology etc.

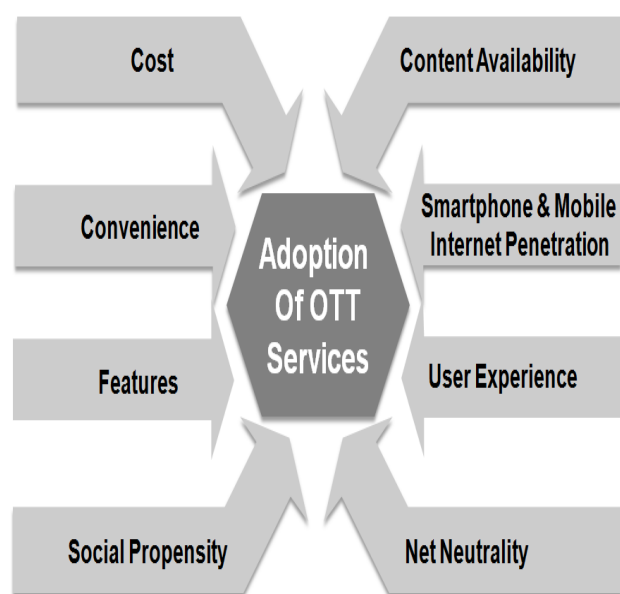


Figure 2. Factors leading to adoption of OTT services.

RQ 3. Analyze the impact of these factors on Telecom revenues across services (Voice, messaging, data and video).

The following factors have been identified earlier in the literature review section as instrumental in the increased adoption of OTT services. Cost, Content availability, Convenience, Smartphone and mobile internet penetration, User experience, Features, Net neutrality. A measure of their impact on telcos can be better understood by answering the following questions.

6. Cost Advantage

Is the cost advantage offered by OTT players driving the use of OTT Services thereby leading to decline in usage of telecom core services?

6.1 Voice

Voice calling charges have traditionally reflected wide variations depending on factors such as originating country, terminating country, on-net/off-net calls and usage based or subscription based charging. These variations make it difficult to have a standard comparison matrix for voice call charges.

While usage of OTT services such as Skype and Line for local or national calling has begun to see increased adoption only recently driven by technology advances driving higher data bandwidth and service quality, these and similar services have had a far greater impact on the Telco revenues from international calls. Especially in a market like India where the cost advantage for local and national calls is minimal considering the relatively low calling rates offered by the telcos and data networks are limited in their capacity to offer comparable service quality, the real impact of the cost factor is best observed by comparing international call charges.

The following Table 1 compares call charges offered by various telcos and OTT services for international calls from India to the USA. On-net charges reflect the greatest cost benefit since on the one hand telcos do not offer any special on-net discounts for international calls, OTT services offer calls to other users of the same service absolutely free of cost. OTT players also offer additional services free of cost for on-net calls such as video calling (Skype, Fring, Line), media sharing (Skype, Nimbuzz, Line) among others. On-net charges though might not be the best perspective to compare voice call costs for tel-

cos and OTTs since an on-net call over an OTT service requires both the caller and the receiver to be on the same OTT network and have the application installed on their devices.

a major contributor to them. The principal reason for this rapid adoption is the cost savings offered by these services. One look at the following table 2 makes these cost savings evident. While telcos continue to demand

Table 1. Comparison of telecom operator and OTT players cost incurred Source: Operator’s & OTT players’ Website¹⁴

| ISD Calls to USA from India | Off-net (Per min charges) in INR | Off-net (Unlimited) | On-net |
|-----------------------------|----------------------------------|---------------------|----------------|
| Airtel | 8 | Not Available | Not Applicable |
| Vodafone | 8 | Not Available | Not Applicable |
| Idea | 8 | Not Available | Not Applicable |
| Skype | 1.39* | \$6.99/month | free |
| Nimbuzz | 0.48* | | free |
| Viber | 1.14* | | free |
| Fring | 0.72* | | free |
| Line | 1.20* | | free |

Comparing the off-net call charges in the table, the usage based charges that telcos offer users are much higher than what consumers would pay for calls made from the OTT services to mobile or landline numbers. While consumers can avail discounted calling rates through subscription based calling plans which both, telcos as well as OTT services (Skype, NimbuzzOut, Fring, Line) offer, these subscriptions typically have a Fair User Policy cap on usage. Some OTT services such as Skype even offer unlimited usage (unlimited minutes of calling) for a fixed monthly charge.

The cost economies offered by OTT players are also showing their impact on the telcos’ enterprise VoIP revenues. The SME sector businesses in particular find the trade-off between the service quality and cost savings offered by OTT services acceptable and prefer using these services over the telcos’ managed VoIP offerings.

These cost benefits and flexibilities offered by the OTT players have led to consumers increasingly preferring using them for international calls over the telcos.

6.2 Messaging

Messaging (SMS and MMS) revenues are probably where OTT players have hit telcos the hardest. Adoption of OTT messaging services has been so fast and widespread that it is no more just a product of mobile data and smartphone penetration but has for all intents and purposes become

considerably high per message charges inspite of the fact that they utilize much of the same and already in place network infrastructure, OTT messaging services offer basic messaging services either free of charge or for a very subsidized subscription fee. Considering the fact that the amount of mobile data used for basic OTT messaging is very low and the number of messages is not limited, the cost per message to consumer is negligible.

These cost savings were the major reason that catapulted OTT messaging services to the level of mass adoption that they enjoy now and continue to diminish the use of telco messaging services.

Table 2. Comparison of cost to consumer for TSPs and OTT players Source: Operator’s & OTT players’ Website

| | | Local | National | International |
|-------------|------------|---|----------|---------------|
| Operators | Airtel | 1 | 1.5 | 5 |
| | Vodafone | 1 | 1.5 | 5 |
| | Idea | 1 | 1.5 | 5 |
| OTT Players | Whatsapp | Free for 1st year, \$0.99 yearly thereafter | | |
| | Line | Free, paid content | | |
| | Wechat | Free, paid content | | |
| | Kakao Talk | Free, paid content | | |
| | ChatON | Free, paid content | | |
| | Viber | Free | | |
| | BBM | Free | | |

7. Content Availability & Development of Content Delivery Networks (CDN)

Has explosion of content availability over internet & development of Content Delivery Networks (CDN) led to increased adoption of video OTT applications that led to increase in data traffic but also requires telcos to invest heavily in their networks?

The growth of smartphones and the development in technology have created some data-hogging phone habits in consumers like streaming videos or posting them on social networking sites. Since video has much higher bit rates as compared to other content, the increase in video traffic puts a great deal of demand on networks. According to Cisco Visual Networking Index-2014, IP video represents 66 percent of the total data traffic, which is expected to surge due to increasing content availability and development of content delivery networks.

Apart from smartphone and technology advancement, another major factor which is shaping this consumer trend is the huge availability of content through OTT providers such as YouTube, Netflix, Amazon Instant Video etc. This can be corroborated from the fact that the number of videos uploaded on You Tube are approximately 100 hours each minute. [You Tube Statistics, 2014]. Also, the availability of content in local languages further drives

the adoption of OTT services by the consumers. These OTT service providers offer large amount of content at very low cost to its customers and allows them to watch movies and TV programs as per their convenience and preference. While OTT players are the front end for the consumer, Content Delivery Network (CDN) are the essential backend responsible for delivering this content. CDNs are proxy web servers that deliver content to the end consumer based on the proximity to the end user. Since, the content is distributed depending upon the proximity to the end user, these CDN servers are located in different geographical regions.

Thus, CDN hosting system allows OTT players to transmit the content to the end users as quickly and as efficiently as possible, which in turn helps in enhancing the consumer experience. OTT players are not just providing the streaming services but are also producing their own original content. The ability to stream this content on multiple internet connected devices like smartphone, PCs, laptop and smart TV is an added facility provided by the OTTs.

Content owners have also played a very important role in driving the adoption of OTT services by reducing the time it takes a film to go from theatrical release to availability for purchase on Electronic-Sell-Through (EST). Movies on an average are getting released within 3 months after theatrical release on the internet platforms

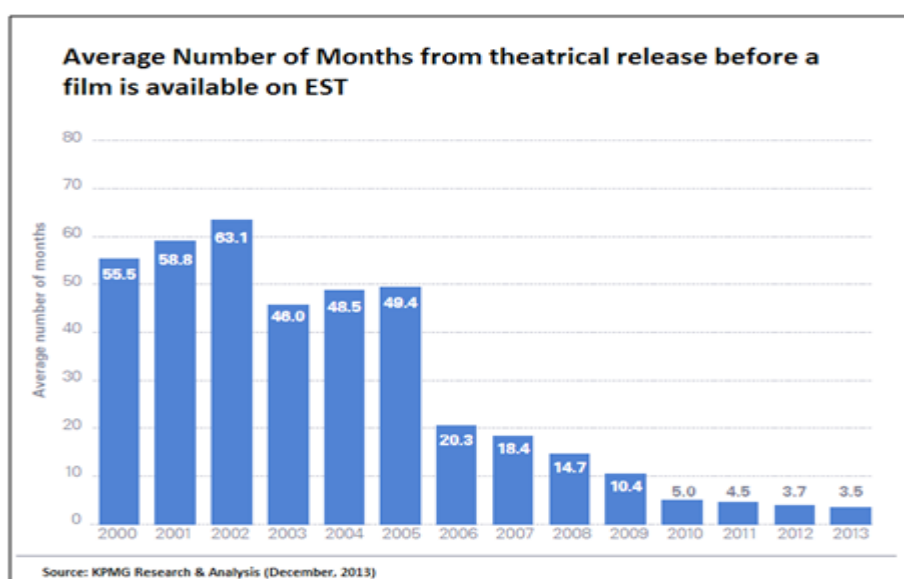


Figure 3. Average No of months from theatrical release before a film is available on EST¹⁵.

which brings additional revenues for producers and increases demand for Movie on Demand (MoD).

This increased video traffic has put a lot of pressure on the telecom network which has led to network congestion, degradation in Quality of service and hence poor customer experience. In order to tackle these issues operators will have to invest significantly in acquiring more spectrum and upgrading their existing infrastructure. According to GSMA intelligence, operators will have to increase CAPEX in their networks with a CAGR of 4.7% between 2013-2020 in order to meet consumer demand for bandwidth mainly driven by video traffic.

8. Better Features

8.1 Convenience

Do OTT Players offer better features & greater convenience leading to better user experience in comparison to Telecom operators' services (comparative analysis of services)?

8.1.1 Voice

Most OTT services that offer voice calling facilities using VoIP have also either included the features offered by OTT messaging services in their list of offerings or had started off as a messaging service in the first place. Players like Skype and Google Hangouts make it possible for users to

As mentioned earlier when we were discussing the cost benefits of OTT voice services, even enterprise customers in large numbers are beginning to prefer services like Skype over enterprise telcos offerings. One reason for this is the extent to which such services make collaborative work possible. With OTT players offering premium services to businesses with features like zero advertising, live chat customer support, group screen sharing and group video chatting, many organizations are choosing them over the considerably higher priced solutions that telcos offer for similar communication needs. In a recent survey conducted by Skype of 250 of its enterprise customers, as many as 80% respondents said using Skype had increased employee productivity

8.1.2 Messaging

Telco operators have not only remained rigid with SMS and MMS pricing but they have also not really tried to innovate with the features of these services. SMS has stayed limited to a 160 character limited text messaging services while MMS to a one to one multimedia messaging service that is much more expensive compared to even the SMS. Compared to this, OTT messaging services offer consumers a feature rich experience combining capabilities like exchanging multimedia like pictures, videos and audio in addition to text, group chats, voice messages, location sharing, etc (Table 3).

Table 3. Comparison of cost to consumer for TSPs and OTT players Source: Operator's & OTT players' Website

| | Group calling | International calling without prior permission | Group video call | Video message | Location sharing | Multimedia sharing | Screen sharing | 911 emergency calls |
|-----------|---------------|--|------------------|---------------|------------------|--------------------|----------------|---------------------|
| OTT | yes | yes | yes | Yes | yes | yes | yes | no |
| Operators | yes | no | yes | No | no | no | no | yes |

Source: Operator's and OTT players' Website

have their phone, social and OTT service contacts integrated flawlessly in one place and let users communicate with these contacts over voice or text, share content and handle communications over multiple devices.

There are no limits attached to the size of text messages and the ones on multimedia content are sufficient for most purposes. The table 4 shown above presents a comparative analysis between the features offered by SMS

Table 4. Feature comparison matrix for various messaging service provider

| | SMS | WhatsApp | Line | WeChat | Kakao Talk | Chat ON | Viber | BBM |
|--------------------|-----|----------|-------------|--------|----------------|------------------------------------|--------|-------------|
| Text | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Characters | 160 | None | None | None | None | None | None | None |
| Group Chat | × | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Emoticons | × | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Stickers | × | × | ✓ | ✓ | ✓ | ✓ | × | × |
| Photos | × | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Videos | × | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Audio | × | ✓ | ✓ | ✓ | ✓ | ✓ | × | ✓ |
| Location | × | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | × |
| Contact | × | ✓ | ✓ | ✓ | ✓ | ✓ | × | ✓ |
| Walkie-Talkie | × | ✓ | ✓ | ✓ | ✓ | × | × | × |
| Voice & Video Call | × | × | ✓ | × | × | × | ✓ | × |
| Others | | | Line Camera | | Poll, Schedule | Animessage, File, Calendar, S Note | Doodle | Appointment |

and various OTT messaging services. To put it simply, OTT messaging services have succeeded in offering much more value to the consumers than telcos' SMS and MMS services ever did. In addition to offering a better experience through the various additional features mentioned, OTT services have unlocked the potential of an attribute today's consumers are increasingly demanding - convenience. Through features like auto-sync with the user's entire contact list including phone contacts as well as those on social networks and other OTT services, sorting messages into conversations and eliminating the need to send multiple messages due to character limits these OTT messaging services have made it convenient for users to communicate with other in any way they want to.

9. Mobile and Smartphone Penetration

Has Mobile and smartphone penetration led to the adoption of OTT services leading to loss of revenues to Telecom operators throughout the world?

Mobile and smartphone penetration over the past two decades has been driven by two major evolutions - first the greenfield technological evolutions that made mobile

telephony and smartphones possible and then the incremental advancements that these devices affordable and accessible to the masses. These advancements and the resulting pace of device penetration has spawned new business models that have disrupted the communications industry.

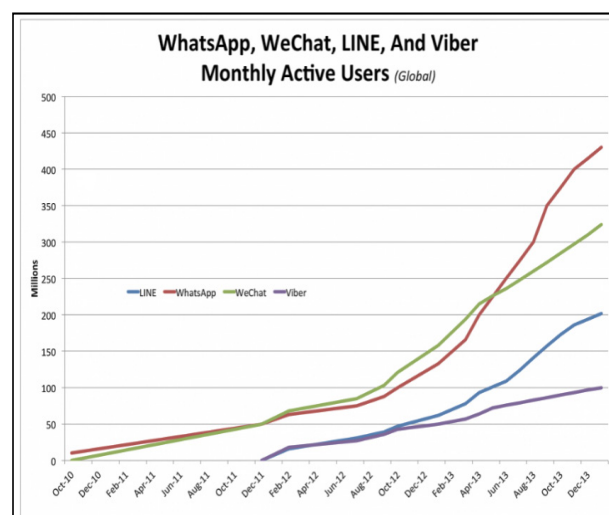


Figure 4. No. of users of OTT players (LINE, WhatsApp, WeChat, Viber). source B.I. intelligence.

Speaking of numbers, in 2013 there were approximately 1.4 billion people that owned and used smartphones [ABI Research].

The devices themselves and how people use them are both evolving rapidly. Over 45% of smartphone users also use at least one Instant Messaging or OTT messaging app according to a new Analysys Mason report. The report also finds that 20% of smartphone users also use a VoIP application and 20% of these use it more often than traditional voice services offered by their telecom operator. [Smartphone usage - voice and messaging trends: Stephen Sale, Lead Analyst, Analysys Mason Viewpoint, October 08, 2012].

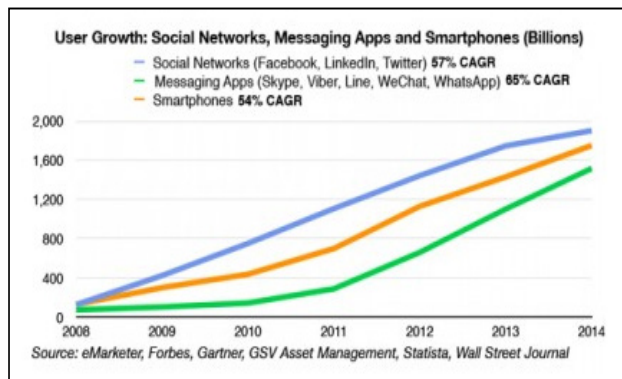


Figure 5. User growth: Social networks, messaging apps and smartphones(billions).

There is little doubt that increased mobile and smart-phone penetration has been a dominant factor in rapid OTT adoption. Figure 1 and 2 show the rise in global smartphone shipments and number of users of some OTT services respectively over the past few years. Figure 5 gives a combined view of the rise in smartphone shipments, users of popular OTT messaging services and users of popular Social Networks. Global smartphone shipments almost doubled year-on-year in 2010. This is the year when major OTT services like WhatsApp and WeChat began to gain popularity. Social networks like Facebook, LinkedIn and Twitter were already seeing a healthy growth in their number of users for a couple of years. By 2011, existing OTT services began to see a sharp rise in their number of users and players that were just entering the market also found considerable adopters for what they had to offer.

The effects of these changes also began to reflect in the amount of data traffic beginning to move over mobile networks worldwide. In 2010, for the first time ever, the total amount of data traffic on global mobile networks was more than the total voice traffic. By 2011, the data traffic was more than twice the amount of voice traffic. People were beginning to use mobile phones and networks primarily to access data and not to make phone calls. Not only that, people were beginning to consume most of this data through OTT service providers, giving

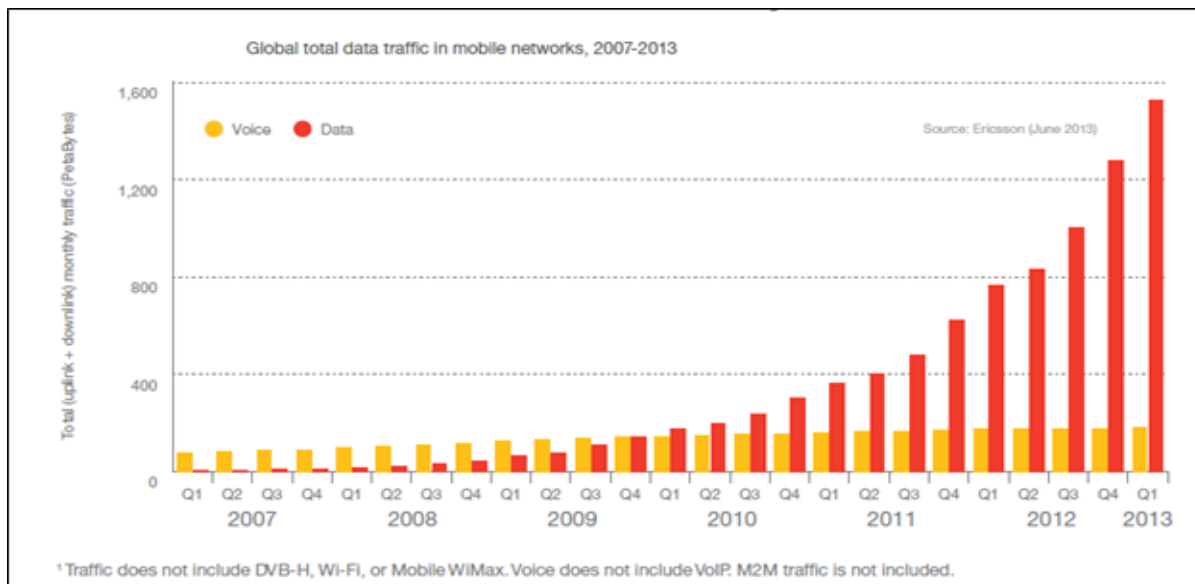


Figure 6. Global total data traffic in mobile networks, 2007-2013.

Source: Ericsson Mobility Report¹⁷.

telcos no piece of the pie other than the increase in their data revenue.

Thus we can conclude that increased mobile and smartphone penetration has been a dominant factor in rapid OTT adoption.

10. Lack of Regulation and Net Neutrality

Is lack of regulation driving the adoption of OTT services, and how is it impacting Net neutrality?

Various OTT providers like Netflix, Skype, Viber, WhatsApp among others are creating huge data traffic consequently congesting the mobile and cable operators' network. These operators are hence under tremendous pressure to upgrade their existing infrastructure.

These OTT players have two advantages over mobile and cable network operators: they can use the telecom infrastructure without paying for it, and they're not subject to the regulatory regimes that apply to operators such as Idea, Airtel & Vodafone.

Table 5 gives a comparative analysis of regulatory environment for OTT players and Telecom operators. Unlike OTT players, telecom infrastructure providers must obtain spectrum, telecom license (CMTS, UASL, UL, ILD, NLD, ISP etc.) and various other permissions from the government in the form of Right of Way to provide services. Besides, they have to comply to roll out and QoS obligations. It is also mandatory for telcos to provide customer care services and have a complaint redressal mechanism in place to address customers' concerns.

The telecom service providers also bear the additional burden of various tax provisions by local, regional and national authorities. In a number of countries like India, the taxes applied to telecommunication services are discriminatory as in addition to the corporate taxes they are also liable to pay Spectrum Usage Charge (SUC), License Fee (LF) and Universal Service Obligation Fund (USOF) on their Adjusted Gross Revenue (AGR).

Network providers are also subject to requirements such as local sourcing obligations, data protection rules, lawful interception laws, and non-discrimination pacts. Furthermore, the operators are also constrained by the geographical boundaries of their networks they are serving in. However, OTT players are not constrained to any geographical region and can practically serve consumers

Table 5. Comparison of operators & OTT players with respect to taxation & regulation

| Parameters | Telecom Operators | OTT players |
|---|-------------------|---------------------------------|
| License cost (UL) | 15 Cr | 0 |
| Spectrum cost (5Mhz in 1800 MHz band Pan India) | Rs. 8,825 cr* | 0 |
| Revenue share | 8% of AGR | Not applicable |
| USOF | 5% of AGR | 0 |
| Corporate tax | 33.99% | depends on local tax structure* |
| Customer care | Mandatory | Not mandatory |
| Local Municipalities permissions (towers, RoW) | Required | Not required |
| QoS parameters | Stringent | Not Applicable |
| SUC | 5% of AGR | Not Applicable |
| Security(LIG) | Mandatory | Not mandatory |
| Rollout obligations | Stringent | Not Applicable |
| Cross platform | Can be done | Not Possible* |

throughout the world. They are also not governed by any regulatory body globally as well regionally.

This lack of regulations allow OTT players to adopt innovative, flexible and agile business model which are far more optimized. While Operators are liable to pay taxes in every country they are operating in, such an obligation is not applicable to OTT players as they are required to pay taxes to the country where their HQ is located.

These OTTs take advantage of different tax regimes by establishing themselves in low tax countries and serving to users in high tax countries. OTTs like Skype and Facebook have their offices in Luxembourg and Ireland respectively, each of which is considered to be a tax-haven country. Since OTT players do not have to comply with

telecom Regulations they are able to provide inexpensive/free of cost services to their customers and are thus able to realize an exponential growth in their consumer base.

The telecom industry globally and especially in India is a highly regulated sector, primarily because of two reasons. One, they use Radio Frequency spectrum, which is a limited national resource. Two, in the communications age development of telecommunications is critical to the development and welfare of any society or nation. This heavy regulatory oversight often proves to be a limiting and expensive constraint for telcos. It limits the way telcos can do business and earn revenues while at the same time adding expenses in the form of compulsory conformances such as roll-out obligations, services to rural, low density areas and so on. Compared to this, OTT players face minimal regulatory constraints. The limits put on their business usually exist only to the extent of addressing the security and privacy concerns associated with user data. And even these regulations are not well defined in most nations till date. As far as service obligations go, they are practically non-existent for OTT players beyond what they promise their users. Hence OTT players have essentially been able to build creative, flexible business models which they continue to adapt to the market's requirements.

Under telecom laws in India, calls originating in the country can't be "terminated on mobiles or landlines anywhere in the world without a license. However, an OTT player can still launch "a full-fledged VoIP service" by tying-up with someone who has a license. Nimbuzz has tied up with Spectranet for providing VOIP services which allows Indian users to make international calls. For an OTT player, the cost of providing VOIP service will cost a fraction as compared to the cost beared by a telecom operator. However these regulations apply only to Indian companies. Viber has recently launched Viber out service in which it lets its user call landlines and mobiles without having any license.

Net neutrality, one of the core philosophies in place since the origins of the Internet as we know it today, is the idea that Internet Service Providers (ISPs) should provide their subscribers equal access to all information on the internet with no prejudice against the source of the information. This principle, though not explicitly enforced by regulations in most countries, has been adhered to across the major part of the free world. What it means for telcos is that as ISPs, they are forced to provide their subscribers with unhindered and unprejudiced access to OTT

services. Even though the OTT services that are eroding their revenues depend entirely on the operators' communication networks, the operator can neither limit the resources it provides to these services nor can it compel the services to pay for the resources they use.

11. Managerial Implications and Recommendations Based on Use Cases

Although telecom operators are in a reactionary mode to the challenge smooted by OTT service providers, they are well-placed to confront them. OTT services can only flourish in the telecom ecosystem by way of telecom operators offering affordable data packages to ensure an open & neutral internet experience for their customers. This menace is interface that is not only captivating and intuitive, but has altered the experience between the phone and user explicitly. Consequently, OTT service providers are providing services directly to customers that are challenging the telecom operators' leadership in the mobile industry. Telecom operators can benefit not only from analyzing consumer trends but also from the factors that are leading to adoption of OTT services. This can help them in service development, marketing strategies etc. Based on the study of solutions adopted by telecom operators against OTT players in various countries throughout the world we have come up with the following recommendations:

11.1 Blocking OTT

Operators can adopt a short term strategy wherein they can decide to deny users the access to the OTT services. If applied, it would halt SMS substitution. However, it is a short term strategy and has a high dependency on net neutrality policies in a given country, moreover it is detrimental to the business as it will ultimately limit the revenue-generation possibilities for the operator through increased data usage. It should be noted that such a will only work if all the operators adopts same strategy simultaneously.

Examples:

In South Korea, after being pressurized by CSPs KT, SK Telecom and LG U +-, the national regulator sanctioned the blocking of Kakao Talk Service. Telecom companies in many countries have either blocked Skype

or slowed down the speed of skype traffic however users can get access to the blocked content using VPNs.

In UAE, Etisalat (incumbent operator) has outrightly blocked the Skype and other VoIP services for using their network and cannibalizing revenue, such blocking of voice OTT blocking has been possible only because of the fact that UAE is a highly regulated market and Etisalat has the support of telecom regulator.

11.2 Bundling with OTT

Bundling of services is another strategy which can be followed. Many operators are resorting to this strategy wherein they are bundling offers in such a way that the lure of financial saving by using OTT services becomes less enticing. For example in case of SMS services, they are trying to extract a base revenue from users in the form of a fixed free for the SMS package and then charging data based on actual usage. Thus by bundling data or voice package with SMS plan, at an affordable price operators can maximize their revenues and at the same time reduce the threat of OTT services. However, this would only help the operator retain some level of customer loyalty for a short time period. Content bundling is another innovative way of operator to bundle the data intensive OTTs like Video apps (Netflix) with their normal voice subscription plans to encourage the customer for using these apps thus driving the increased data usage. This also enhances the customer experience as the time bound monthly limit instead of per Mb charging eliminates the fear factor for customers when signing up to a value added service.

Examples:

After a failed attempt to block Skype, TeliaSonera, now offers Skype with select data plans. Many Indian telcos such as Tata Docomo, RCom, Airtel among others have plans specifically for whatsapp, Facebook, saavn services.

Vodafone in the UK has begun to incorporate a choice of one of Spotify Premium, Sky Sports or Netflix access free for 6 months, as part of their Vodafone 4G Red plans. This gives Vodafone a nice headline message which encourages customers to sign up to a higher tier and increases mobile data usage.

11.3 Partnering with OTT

There is a saying that if you cannot beat them, join them. So partnering with the opponent can be a god strategy when it is difficult to beat them at their game. Many telecom operators are already resorting to this strategy

wherein they are partnering with the OTT players and benefit from their traffic. Some of the examples are as follows:

- Viber's partnership with Axis in Indonesia: Axis, an Indonesian telecom operator has entered into a partnership with Viber wherein Axis lets its customers buy a Viber data service rather than a full data plan, as a migration strategy that educates customers about buying data bundles from their mobile provider and allows them to become comfortable doing so¹⁶.
- DiGi telecommunications, a Malaysian mobile service provider, has partnered with WhatsApp provider as a result of which the DiGi customers can get unlimited access to WhatsApp service for a fixed fee. Same strategy has also been adopted by 3 Hong Kong, a mobile network operator and broadband service provider in Hong Kong and by reliance Communications in India.
- Aircel partnered with Nimbuzz and promoted their partnership, in the state of Jammu and Kashmir wherein the Aircel via SMS informed and encouraged its subscribers to download Nimbuzz application whereby 40 MB of data usage would be transferred for free to those subscribers who would download and activate the application within a time span of 24 hours.

These strategies have enabled the operators to keep the traffic and gain a share of the revenues. However, the operator has limited or almost no control on the direction as well as quality of the services offered through these partnership deals. This may adversely affect their relationship with their customers. Moreover they can reap benefits of the partnership only as long as their partner brand is in demand. It would also diminish the MNOs' role. They would be relegated to a transport mechanism for "off deck" applications and would pressure MNOs to reduce OPEX and CAPEX costs on their network.

11.4 Developing their Own Services

Another long term strategy which can be adopted by telecom operators would be to introduce its own OTT service. This will enable them to have full control over the service and also enable them to interact with other such initiatives within the telecom fraternity. The operator can develop the necessary expertise in-house or acquire a company with relevant skills and know-how. Although it is not the fastest route to market but it enables the CSP to

own the consumer relationship and expand into adjacent market and reach a much broader customer base. They can also leverage their core assets (control over the network, customer insight, customer care and distribution channel) to differentiate their OTT services from other offerings in the market.

However, the investment required for such an approach is quite high and the approach is risky for CSPs as they do not have the necessary skills to launch such services.

Example:

T-Mobile USA has launched Bobsled, Telefonica Digital has introduced Tu Me service both of which offer free voice and texts. Orange have also launched their own branded OTT communication services namely Libon. Similarly, Comcast has started providing web access to its films and TV shows in order to compete with Netflix.

The GSM Association (GSMA) is actively promoting Joyn, its IP-based communications specification and brand. Member companies are encouraged to use it as the standard approach to develop and introduce new services such as chat, image sharing and file transfer that can compete with 3rd party OTT services. What might just make this endeavor work is that the GSMA is a community that spans all Joyn enabled operators, similar to what current SMS and telephony technologies do. This would make services originating from Joyn ubiquitous across communication providers.

Joyn however is not without its own challenges, many of which are out under individual operators' control. The long development and time-to-market cycles mean that commitment from device manufacturers to the technology is critical to its success. Until Joyn manages to effectively address these issues, in its current form it remains an urgent necessity but an incomplete solution.

12. Conclusion

The traditional sources of income for telecom operators, based predominantly on subscriptions and metered services, are showing signs of becoming obsolete. On the other hand, the business models that are gaining dominance, such as OTT services like WhatsApp, Skype and Netflix, neither contribute to the direct income of access providers nor to the government's tax revenues. They do however use the communication networks and necessitate additional network investments. OTT services do

lead to higher data usage and additional revenues for the telecom operators thereby offsetting the loss due to decline in messaging and voice revenues to some extent.

Furthermore, OTT players like Viber, Snapchat and WeChat among others take advantage of new possibilities to obtain income by exploiting the "two-sided" aspect of their markets and earn their revenues mainly from advertising, in-app purchases and subscription charges. In this regard, telecom operators are finding it difficult to adapt to this model where they don't have experience. They are trying to identify the reasons so they can devise strategies accordingly. At the same time, their market power is being eroded due to higher competition and is shifting towards content providers, especially in case of music and video streaming services such as Netflix, YouTube, among others. One of the objectives of this study was to analyze the consumer trends which have led to the adoption of OTT services. Also, it identifies factors such as cost, convenience, features, social propensity, content availability, smartphone and mobile internet penetration, user experience and net neutrality which are effectively leveraged by OTT players to offer better substitutes to telcos offerings. Furthermore, it studies the impact of these factors on operators' voice, messaging and data services. This study will help telcos in designing strategies to overcome the OTT threat and also in identifying changing consumer needs, thereby helping them design offerings to suit their needs.

The most determining factor of the growth of OTT services will be the government and regulatory stance towards them. In our opinion, it is important to keep in mind at all times that high speed Internet access, the opportunities it offers for the development of new business models such as OTTs and their implications for telecom operators essentially foretell a technological revolution. Throughout history, technological revolutions have had "winners" and "losers", but finally what should be considered is the ultimate aggregate effect on the welfare of society at large. Therefore, governments should facilitate this process and should not implement measures that could hinder it.

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