

Millennials and Over-the-Top-Services in the Context of Transformation of Telecommunication Business: Evidence from the Czech Republic

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ABSTRACT

The relationship between telecommunication companies and over-the-top (OTT) services such as WhatsApp, Facebook Messenger, iMessage has been receiving increasing attention over the past years. These services are especially popular among young consumers born between 1980 and 1996, also known as the Millennials. The goals of this article are to provide a comprehensive overview of the transformation of telecommunication business in the Czech Republic and to capture the habits and preferences of consumers in using OTT services on their mobile devices, as well as their satisfaction level with the current telco services that they possess. Using a survey among 289 young Czech consumers conducted at the beginning of 2016, we provide findings that can be used by telecommunication operators as well as OTT providers to adapt their business strategy to the habits and preferences of their current or potential customers.

Key words: Telecommunications; Telco; Over-the-top services; Czech Republic

JEL classification: M15, M30

Introduction

As technology advances, we are witnessing emergence of new forms of applications and services that create immense customer value but potentially undermine incumbent businesses. The past few years have been celebrating the success of messaging apps such as WhatsApp, Facebook Messenger, or iMessage that offer an alternative to costly SMS messages. Other Internet services like Skype, Viber, Apple's Facetime and many others with a similar concept enable consumers to make free voice calls to each other irrespective of their location. All these revolutionary services, referred to as over-the-top (or OTT), do not come from traditional providers but ride on top of the Internet connection and severely affect the telecommunication (telco) industry. As a result, analysts predict that by 2018, one third of mobile generated traffic would come from OTT applications (Analysys Mason, 2014). Thus, the booming power of OTT receives not only the attention of telecommunication companies which have to consider how to react, but also of academics.

At the same time, "Generation Y" or "Millennials", that represents the generation born between 1980 and 1996 (Howe and Strauss, 2000), plays a major role in adoption process of

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new apps and services and in transforming new services into daily lives of people, and is also crucial due to its future economic and social potential, as well as increasing incomes, wealth and, thus, purchasing power. According to the Czech Statistical Office (2017), the number of Czechs born between 1980-1996 reaches up to 2 171 300, which represents more than one fifth of the current Czech population. Hence, the focus on Millennials and the knowledge of their preferences becomes crucial for telecommunication operators.

There are two goals of this paper: to analyze and identify factors that have affected revenues of global and Czech telecommunication companies, and to capture the habits and preferences of Czech telecommunication consumers in using OTT services on their mobile devices, as well as their satisfaction level with the current telco services that they possess.

The remainder of this paper is organized as follows. First, we provide a comprehensive review of recent trends in telecommunication industry and over-the-top services. Then, we present the data and methods used. Subsequently, we present the results. Finally, concluding remarks are presented.

Theoretical Background

Detecon Consulting (2014a) defined OTT as “the distribution of voice, video, and data services via the public Internet without the controlling management of a mobile network, fixed network, or Internet service provider [...] These products offer telephony and messaging free of charge or at extremely low rates via the Internet protocol; the sole consequence for the providers is the increased demand for more bandwidth and reliable service quality”. The critical point in the OTT concept is that a traditional telecommunication company, which carries the distribution of OTT services in terms of provided network and connection pipes, does not profit from it. On the contrary, its profits are diminishing due to highly competitive nature of OTT to telco’s own services. The prominent examples of OTT content, services and apps are the following (York, 2012): YouTube, Netflix or Apple TV (video streaming), Skype, Facetime or Viber (voice/video calls), and WhatsApp or iMessage (messages on a mobile device). A common property of all these services is that they were set to disrupt traditional billing models from telecommunication or cable/satellite companies. Netflix is on its bold way to replacing a regular TV provider, WhatsApp has brought messaging to the next free level; Skype has substituted a long distance provider. These disruptions have led to a wide-ranging conflict between companies that offer similar or overlapping services.

Drivers Leading to the Mass Adoption of OTT

According to the report of Arthur D. Little (2011), smartphone penetration and enhanced functionality provided by OTT players are two key contributors to the OTT uptake, as well as innovative and smart services provided by OTT players. McKinsey (2012) identified technology readiness, cost incentives, social propensity to adopt OTT and the strength of the OTT alternatives as “the core drivers behind OTT tipping in the market”. Interrelated factors such as continuous improvements in availability and speed of fixed and mobile Internet infrastructure, penetration of affordable smartphones, tablets and other wireless devices, and innovation in service and apps’ sector, contributed to the development of free services with available shared content in Internet, influencing the usage habits of customers who now boost the demand for “freemium” services having shifted from traditional paid telco services.

Within the last decade, telecom technologies have significantly advanced. The radio access has moved from initial GSM and CDMA technology to third- and fourth generation technologies (Sujata et al., 2015). Depending on maturity of the market, 3G, Long Term Evolution (LTE) and other 4G networks provided the end-user with data rates that resulted in a prompt accessibility and high speed. This empowered the viability and massive launches of voice over Internet messages, video calls, media sharing, micro blogging, video downloading and streaming, etc. As a result, consumers are able to use great content and high speed demanding applications. However, the existence and active usage of the following services and functions demands constant improvements in the quality of Internet network connection.

Smartphones have caused a disruption in the technological world. Their convenience and inclusion of other functions such as camera, game console, watches and other led to an exponential increase in numbers of smartphones used at the global level. According to Ericsson's calculations, "smartphone subscriptions are expected to grow at an annual rate of 10 percent up to 2021" (Ericsson, 2015). This global adoption in addition to the omnipresent mobile broadband coverage enabled data streaming and shifted the focus of telecom networks to data centric networks (Tariq, 2015). Having created a solid base for innovative services in OTT, smartphones have also enhanced the consumer experience ever since (Sujata et al., 2015). Pressure-sensing screens know exactly where the user intends to click, advances in natural language processing and artificial intelligence – exemplified by Apple's Siri and other similar digital personal assistants – have made voice recognition a truly interactive experience (McKinsey & Company, 2012). Yet this is not the peak and markets evolve further, so consumers now own several mobile devices, apart from smartphones adopting also tablets, phablets or other mobile smart devices.

Business Strategy Development in the Telecommunication Industry

Telecom operators worldwide are struggling with a drastic form of market transformation – despite the exponential growth of mobile data traffic, there is a declining trend in mobile revenues. Only in 2014, there was a reported loss of total USD 31.9 billion in global mobile voice revenues, USD 22.2 billion in global fixed voice revenues and USD 49.1 billion in global SMS revenues (Ovum, 2014). Due to a forecasted decline of overall global telco voice revenues (Ovum, 2014), telco companies around the world were forced to implement severe transformation in their business strategy, especially in their pricing models, which turned to be mobile data-centric.

One of the first steps that have been incorporated were the introduction of tariff plans with unlimited SMS, a number of free calling minutes and a specific amount of mobile data that gradually increases with a more expensive tariff package. Since then, one of the main telco's concerns has become to encourage users in buying tariff plans that include bigger amount of data to trigger bigger pays to the telecom operators. These higher-end tariff plans now include additional services that do not carry extra high costs to telecom operators, but are there to justify the higher price of the tariff plan. Another transformational step in the pricing strategy includes online content that drives data traffic; hence, offers additional elements for cooperation with audio and video OTT service providers. These can be in form of "revenue sharing models, joint marketing campaigns either with or without separate branding, distribution partnerships, or differentiation related to QoS, to network technology, or to rate plans" (Detecon Consulting, 2014b). Analysts also recommend to telecom operators in developed markets to focus on "pricing innovation in order to take advantage of this opportunity. They must also encourage new service innovation, including strategic

partnerships and service bundling with non- traditional, non-telco, over-the-top (OTT) players and services” (Ovum, 2014).

There is also a push for constant improvements of infrastructure. Nowadays, consumers perform a vast majority of their daily activities via mobile. Analysys Mason (2014) predicts that data traffic in worldwide mobile networks will increase 17 times between 2012 and 2018 (Ovum, 2014). Therefore, operators’ telecom networks should expect severe congestion problems. Telecommunication companies need to satisfy consumer expectations in regards to convenience and customer experience and to keep improving the content distribution mechanisms (Sujata et al., 2015). This means investments in network capacity enhancement measures, a ramp up of the optical fiber and more advanced LTE networks in order to cope with the volume of data traffic on even more powerful smartphones, tablets and TVs (Roland Berger Strategy Consultants, 2012).

Bundled content subscriptions have risen in popularity and in numbers thanks to promotional benefits that they offer for both mobile operator and a content provider (Ovum, 2014). Triple- and quadruple-play bundles provide cost-effective solution for operators and capture a greater share of subscribers’ total communication and entertainment expenditures (Phillips, 2007). These bundles allow pay-TV operators to tie the subscriber into a long fixed-term contract. As defined by Phillips (2007), triple-play “represents a pre-integrated package combining IP based data services, usually High-Speed Internet Access (HSIA), voice & video telephony, broadcast TV, movies and messaging. This package of integrated services can be used over multiple devices, such as fixed line telephones, TV’s & PC’s”. Quad-play differentiates with mobility in the package by adding Fixed-Mobile Convergence (FMC) and enabling services to be accessed via a mobile phone (Phillips, 2007). Telco operators have revealed an extra source of revenues in the connected TV, also known as mobile TV or TV Everywhere, which is run through the operator’s Internet network and, thus, can be played on all mobile devices, Smart TV and laptops or PC.

Given the importance of stable Internet network and worldwide telco infrastructure, it can be concluded that OTT players need to cooperate with telco operators and vice versa. Stepping into OTT field and trying to compete with its dominant players results in major investments and requires long-term focus on content and construction of competitive API and application. For telcos this is a huge step out of their comfort zone, as well as their core business (if talking about content), which requires longer time horizon for implementation. In case of any dysfunctions, connection cuts or coding bugs, it is usually telco that get blamed the most rather than the web service providers, because in consumer’s mind the application or content is intimately linked to the network over which it rides (MacDonald, 2012). Therefore, it is mutually beneficial for both telcos and OTT players to team up and cooperate on offering superior products and services in terms of performance for their consumers.

Global Trends and Future Outlook

Telco operators are now highly focused on providing data and voice services that are of high quality, reliable, and affordable (Deloitte, 2016). Deloitte (2016) further reports that a “dramatic growth of data usage is expected to continue in the year ahead, particularly due to streaming services. Wi-fi usage will continue to be the key, especially as carriers look to offload more mobile traffic onto broadband networks [...] as well as considerations around other spectrum efficiency technologies and potentially unlicensed spectrum solutions [...] Voice over LTE (VoLTE) and Voice over Wi-Fi (VoWiFi) services will also be a key focus to help carriers rationalize networks and potentially offer improved and expanded services.”

Detecon Consulting (2014b) states that “the need for “seamless connectivity” across all infrastructures and the most highly diversified access technologies will force carriers to build an infrastructure which is increasingly finely meshed and truly integrated. Carriers with a granular fixed network of full-area coverage and a matching mobile network infrastructure will clearly be at an advantage in comparison with single-business mobile network companies”.

Massive data consumption will continue to grow with the expansion streaming of content, especially video. Deloitte (2016) anticipates further emergence of sponsored data services as providers look for ways to increase revenue in a market where consumers are less likely to invest in long-term ownership of content. In addition to that, the company expects “development of more services and capabilities that further leverage mobile devices, analytics and the mobile ecosystem to make everything more convenient and efficient for consumers, all while balancing and protecting privacy. A big upcoming wave of change for the telecommunications sector will be the emergence of fifth generation mobile networks (5G). While the technology is still several years away from achieving mass market coverage, what it promises - more speed, greater efficiency, and less latency - will be essential to supporting connected things in the future, especially self-driving cars” (Deloitte, 2016).

A radical assumption was imposed by Roland Berger Strategy Consultants (2012) claiming that “telcos will stay in control of a large proportion of contracts for the time being. Around 80% of contracts today are sold directly to end customers. By 2020, the figure will still be 50%, compared to 30% for smaller telcos” (Roland Berger Strategy Consultants, 2012). The flip will be triggered by some OTTs and device manufacturers that are already discussing the possibility of opening their own distribution channels to ship phones and tablets with hardwired "e-SIM" cards (Roland Berger Strategy Consultants, 2012). Electronic SIM cards is a new standard which embeds SIM cards into devices, eliminating the need for consumers to physically switch out their SIM when they need to change devices, service providers or plans. Already in advanced stages of technical development, e-SIM will be compliant and rewriteable by all operators, which will result in cost savings for manufacturers and significantly simplify the process of making changes to a subscriber mobile service offering (Trapp, 2016). This presents an obstacle for telco operators. The ease of switching service providers with e-SIM intensifies the battle to maintain their customer base.

Telecommunication and Over-the-Top Services in the Czech Republic

The Czech Republic is considered to be the fourth-largest telecom services market in the Central and Eastern Europe after Russia, Poland and Romania (ResearchMoz, 2015). The Czech Republic’s telecom sector is considered as one of the most advanced and competitive in Eastern Europe (Euromonitor International, 2015). The market is dominated by three major mobile network operators (MNO): O2, T-Mobile and Vodafone. Together, they own 93.2% of the telecommunications market (CTO, 2016). Since 2013, the telecom market has gone through partial transformations with the inception and rapid increase in the number of alternative players such as MVNOs. Although the new players managed to capture only 6.8% of the market (CTO, 2016), they caused market transformations that included a higher variation of choices in telco services for consumers, positive impact on the level of retail prices, and introduction of new attractive flat rates (European Commission, 2014).

In August 2013, O2 and T-Mobile decided to share their 2G and 3G mobile networks as well as cost related to building the infrastructure for them. In spring 2014, they extended their agreement to LTE networks. This move definitely gives an advantage to both operators in the

long run; yet it was obviously considered as a breach of anti-monopoly law by the third operator, Vodafone, that was left out of this network-sharing agreement and had to build a standalone 4G network, covering all costs alone (Telecomist, 2014). The year 2015 was marked by active development of high-speed 4G LTE network by telco operators and the growing data consumption by end users. To date, the Czech Republic ranks in the leading places in terms of the LTE coverage (European Commission, 2015).

Mobile voice usage and revenues development in the Czech telecommunication market follows the global trends. Plummeting mobile voice revenues account the most for a serious decline in total telco revenues. Although the amount of call minutes grows in all categories, the total telco voice revenues keep going down. Voice revenues were set to decline due to drastic cuts in price per voice call minute caused by a major change in the pricing structure of telco operators, in addition to a of prices for international and roaming calls and services that were initiated and heavily supported by local and EU regulatory bodies. What contributed to the negative trend was also a lower volume of voice traffic generated in the fixed network and more minutes bundled in the monthly subscription charges (O2 Czech Republic, 2016).

The average price of mobile calling minute follows a long-term trend of price decline. Decreasing trend in prices of voice calls in the Czech Republic is especially driven by increased consumption of unlimited voice services offered as a part of the tariff plans for Czech consumers. The Czech Telecommunications Office (CTO) has calculated the average price for the actual calling minute based on the price for voice services. The steepest decline in prices of voice calls was recorded by T-Mobile in 2015 (CTO, 2016). Vodafone, out of three MNOs, had in average the lowest prices of the voice calls (CTO, 2016).

In 2015, the number of active SIM cards that use mobile Internet continued its rise, having increased to almost 6.6 million people (CTO, 2016). This growth is mainly attributable to expansion of LTE networks. A similar trend is captured in the number of subscribers of mobile Internet via data SIMS cards by using UMTS/LTE and CDMA connection. According to the current estimate of the CTO, there was a slight increase of 1% in comparison with 2014's results (CTO, 2016). This growth is mainly attributable to further expansion of LTE networks and tariffs especially for tablets and laptops.

In just last four years, the volume of data transferred via mobile networks quintupled as the use of data services has exploded (CTO, 2016). Mobile networks continue to widen and improve, increasing their capacity and data transfer speed. On the demand side, there are users fully operating an increasing representation of smartphones and applications through their mobile data connection. Smartphone penetration reached 48.5% in the Czech Republic by the end of 2015, up 8.7 percentage points year on year (O2 Czech Republic, 2016).

The average revenue per user (ARPU) utilizing the mobile Internet has experienced a long-term growth: just in the first half of 2015 increasing by 8.4% (CTO, 2016). The share of mobile Internet sales in the overall ARPU for mobile services without mobile internet is more than one third. The ARPU from mobile Internet coming through data SIM cards has significantly declined in the recent years. In mid-2015 it amounted to CZK 197.52/month (CTO, 2016).

The Czech fixed-line segment, consisting of three major parts – internet, voice services and TV, can be characterized by a strong competition operating on many different platforms. Overall, fixed wireless broadband in the Czech Republic remains strong, with one of the highest penetration in the EU (Telecom Market Research, 2016). This ensures a solid base for

the development of internet society with a wide specter of online services. In 2015, O2 improved its broadband internet service and introduced Internet Air service via the 4G LTE (O2 Czech Republic, 2016), which is not tied to a particular address, and can be transmitted while moving to a weekend house, which is a common case for Czech households. Capturing new global trends in fixed-line Internet calling, T-Mobile as the first operator in the Czech market launched Wi-Fi calling service for Czech consumers in March 2016 (T-Mobile CZ, 2016). As it is the only kind of service in the market so far, the similar moves might follow from other telco operators in the nearest future. Wi-Fi calling, based on the Voice over Wi-Fi (VoWi-Fi) technology, is pretty much a competitive service to OTT, since it enables voice calling and sending text and multimedia messages over a Wi-Fi network. All that users need is their mobile phone number, a handset that supports such feature and they are set to use it free of charge. Calls and messages are billed according to the customer's tariff plan.

Another fixed sector - a digital pay-TV - projects firm results in the Czech Republic. Based on the Euromonitor's data, 23.5% of the Czech households owned cable TV in 2014, while 28.5% of the households had satellite TV (Euromonitor International, 2015). As this sector has a potential of adding extra revenues to shrinking telco budgets, major Czech telco players have already projected their interest in tapping on its potential. In 2015 the Czech telecommunications market stood out with innovations in a digital pay TV-Everywhere service. Following the launch of O2 TV in 2014, T-Mobile and Vodafone also brought in their mobile TV products to the market. The telco players made their TV and video services accessible from a variety of devices, such as mobile, tablets and smart TVs; thus, recognizing the importance of delivering a multi-screen experience. In the absence of competing international OTT providers such as Netflix, these large regional groups have used OTT to consolidate their market dominance and acquire licensing rights on some popular TV shows, series and sports events. In April 2016 T-Mobile launched its own IPTV service named "T-Mobile TV" (T-Mobile CZ, 2016). The service basically copies the ones offered by the competitors, including such features as time shifting for up to 48 hours after the broadcast, recording of up to 120 hours of program, watching TV on 4 different devices and a 30-day satisfaction guarantee.

The Millennial Perspective

"Generation Y" or "Millennials" is the generation that was born between 1980 and 1996 (Howe and Strauss, 2000). This specific group plays a major role in adoption process of new apps and services and in transforming new services into daily lives of people. This group is also crucial due to its future economic and social potential, as well as increasing incomes, wealth and, thus, purchasing power. Within the time span of five to seven years, when bigger part of Generation Y is going to reach a peak in their careers, telcos have time to complete their current transformation, to acquire this group and to make them stick to the mobile operators. At the same time, according to Giere (2008), Millennials view telecommunication services as commoditized means to an end and brand loyalty is barely a consideration for them. According to the authors, "future business success will depend on a service provider's ability to address the Millennials' lifestyle needs by delivering content, communication and applications anywhere, at any time, on any device".

Research Questions

Given the above-mentioned facts, several research questions emerge that are worthy of investigation and that could help telecommunication companies in adapting their strategy to

the increasing importance of OTT services especially with regard to the growing importance of the generation of Millennials.

- What operators do Czech Millennials prefer and is mobile internet data the key reason?
- What are the main attributes of their tariff plans?
- How are they satisfied with the amount of free services in mobile tariff plans?
- Is mobile internet data receiving increasing importance among the young consumers, especially when compared to voice calls and SMS?
- Why and how do they use instant messaging apps?
- What are the most important forms of messaging, calling and using audio and video services?

Data and Methods

To answer the research questions, we employed a quantitative approach in the form of a survey to examine the current Czech telco market situation. The survey was conducted at the beginning of 2016. The research targets Millennials that are 18 to 30 years old (mean age = 23.57 years). The sample consists of students, fresh graduates or entry-level employees from Prague. The sample is almost equally represented by both genders: males account for 47% and females for 53% of the sample. Students and fresh graduates were a major target for this survey sample. More than one-third of the sample, specifically 36%, achieved Master's or MBA equivalent degree and 64% were still on the undergraduate level.

It should be noted that the survey sample does not reflect opinions of the entire Czech youth; for this reason, the survey findings cannot be implied to the whole Czech society. On the other hand, this group is very homogenous and it is possible to make implications from sample to consumers with similar traits or criteria. This specific group of young telco consumers living in the big city tends to set consumer trends by adopting new services and apps in their daily life such as OTT. This group relevancy will also grow in the future together, so while telco companies are adapting their strategy to the changes in the market, part of this target group will turn into a lucrative segment with increasing purchasing power. Other groups are not that relevant; thus, are not prioritized compared to the Generation Y. Besides, there is also a pragmatic reason for tackling younger consumers for the survey, since they are active users of various types of OTT services and, therefore, possess more concrete preferences and habits with regards to the topic.

The survey was conducted online via professional marketing research tool Qualtrics. The survey was distributed online via social networks, targeting groups of different universities and study programs that tend to accumulate the biggest number of people. Data was accumulated in digital form and average time to finish the survey was about 15 minutes.

The data set was analyzed in IBM SPSS software in order to apply not only basic descriptive statistics but also inferential statistics.

Results and Discussion

To investigate the first research question, respondents have been asked to state their mobile operators and to specify the main reason why they had selected them. The vast majority of the survey's respondents have tariff plans from the top MNOs in the Czech Republic: 46% use tariff plans from Vodafone, 23% from T-Mobile, 22% from O2. Only 9% of the sample uses telco services from other providers (see Table 1). It should be noted that since this question was not mandatory to answer in the questionnaire, two respondents left it blank for unknown reasons.

Table 1: Mobile operators used by the respondents

Operator	Frequency	Percentage
O2	62	21.5
T-Mobile	66	22.8
Vodafone	133	46.0
MVNO (Tesco Mobile, etc.)	2	0.7
Other	26	9.0
Total	289	100.0

Respondents were also asked to specify the main reason why they had selected their mobile operator. The most common response was that consumer's friends or family were using that telco operator, which is a factor that can't be much influenced by telecommunication firms. Another common answer was, obviously, price and other factors. Only 9% of the sample was driven by the mobile Internet data aspect (Table 2). It might be assumed that after selecting the telco operator for various reasons, most of the consumers tend to adjust their tariffs according to their needs and do not switch the operators that easily. Mobile internet data is still not the key decision factor. Consistently with Giere (2008), brand loyalty seems to be a negligible decision factor among Czech Millennials.

Table 2: Main reasons for choosing current mobile operator

Reason	Frequency	Percentage
Price	95	33.0
Family/friends use its services	105	36.5
Network quality & coverage for voice calls	8	2.8
Network quality & coverage for Internet	7	2.4
Speed of mobile Internet (3G/4G/LTE, etc.)	8	2.8
Amount of free Internet data offered	12	4.2
Other	49	17.0
Branding of a mobile operator	4	1.4
Total	288	100.0

Prices and Attributes of Tariff Plans

On average, the surveyed consumers pay above CZK 480 per month (Table 3). Respondents that use O2 services pay in average the least among MNO users – around CZK 405 per month; while T-Mobile and Vodafone surveyed consumers pay CZK 505 and CZK 527 respectively (Table 3). Nonetheless, the most affordable tariff plans that are represented in the sample are offered by smaller competitive players - MVNOs and other types of telco

service providers. According to the one-way ANOVA test, the differences are statistically significant, and we clearly reject the hypothesis on equality of mean tariff prices across operators.

Table 3: Price of a tariff plan paid by the sample (in CZK)

Operator	N	Mean (CZK)	F statistics
O2	45	404.73	156.996***
T-Mobile	60	504.68	
Vodafone	120	527.29	
MVNO	2	250.00	
Other	21	367.62	
Total	248	483.83	

Note: *** - significant at the 0.01 level.

It was surprising to reveal quite an extensive price difference between two genders in the sample. Male surveyed consumers tend to pay in average CZK 124 less than female consumers, which constitute almost a 23% difference in price paid. The difference is significant at the 0.01 level ($t = -2.97$), which suggests that females pay significantly more for the tariff plans. While the reasons are unknown and can't be revealed using the methodology used, this finding can be interesting for telecommunication companies, since women seem to be willing and able to pay more for their services.

According to the data, 36% of the respondents have unlimited packages of call minutes and 50% of them have unlimited amount of SMS in their tariff plans. In order to calculate the average amount of call minutes and SMS in limited tariff plans of the respondents, the unlimited packages were excluded from the analysis run. As a result, of those who use a limited number of call minutes and SMS, the mean of call minutes amounts to 145.68 free call minutes, whereas the mean for SMS equals to 74 minutes.

In general, the consumers represented in the survey tend to have around 1.3 GB of mobile data in their tariff plans (mean 1294.35, median 1200). This corresponds to the global average findings of Deloitte (2014). At the same time, there are still above 16% of respondents who do not have any mobile Internet allowance, so this group placed in the 25th percentile of the sample. A lack of mobile Internet data on the phone might be explained by the fact that young surveyed consumers rely on the Wi-Fi connection at home, school or work. In between these places, consumers tend to use telco services such as mobile calling and SMS.

The distribution by telecommunication operators in Table 4 shows that O2 consumers tend to have data plans with 1.25 GB of mobile Internet data on average. Vodafone consumers from the sample have in average 1.3 GB of mobile Internet data, and T-Mobile users who responded to the survey possess in average 1.4 GB of mobile. Clearly, the amounts are operator-dependent (significant at 0.01).

Table 4: Amount of free mobile Internet data in a tariff plans by operators

Operator	N	Mean (MB)	F statistics
O2	62	1250.32	25.360***
T-Mobile	65	1403.20	
Vodafone	133	1295.86	
MVNO	2	500.00	

Other	23	1147.83	
Total	285	1292.91	

Note: *** - significant at the 0.01 level.

Satisfaction with Telecommunication Services

The data analysis revealed that surveyed young consumers are generally satisfied with the number of call minutes and SMS in their tariff plans (as ranked using a 5-degree Likert scale). 64% of the sample ranked their satisfaction with the amount of call minutes at the maximum 5 points; another 10% rated it at 4 points. 66% of the respondents are satisfied with the number of SMS they have in the package. The same trend cannot be observed in the respondents' satisfaction with the amount of mobile data. Only 40% of the sample ranked their satisfaction with the current amount of mobile data that they possess with higher points (4-5). The rest of the sample admitted their struggle with the current amount of mobile data that they have in the tariff plan. Hence, average ratings tend to mainly spread around 3 points, which represents average satisfaction level. Vodafone users in the sample rated their satisfaction with the amount of mobile data at 3.3 points, T-Mobile users' satisfaction is almost at the same level, while O2 consumers' satisfaction ratings are lacking several decimal points behind (Table 5). The differences across operators are statistically significant at the 0.01 level.

Table 5: Satisfaction with free services in a mobile tariff plan by operators

Satisfaction (scale 1-5)	Operator	N	Mean	F statistics
Free call minutes	O2	58	4.36	624.611***
	T-Mobile	66	4.27	
	Vodafone	131	4.31	
	MVNO	2	5.00	
	Other	26	2.88	
	Total	283	4.18	
Free SMS	O2	56	4.33	584.865***
	T-Mobile	64	4.31	
	Vodafone	125	4.08	
	MVNO	2	5.00	
	Other	26	2.73	
	Total	273	4.06	
Free mobile Internet data	O2	60	3.15	34.657***
	T-Mobile	66	3.28	
	Vodafone	133	3.30	
	MVNO	2	2.00	
	Other	26	3.34	
	Total	287	3.26	

Note: *** - significant at the 0.01 level.

Growing Importance of Mobile Data

In order to explore the importance of mobile data for the Czech telco users, a set of specifying questions was included in the survey. For instance, the survey respondents were asked whether they had increased the amount of mobile data in their mobile data plans in the past year. 55% of the respondents confirmed that they had increased the upper limit of their

mobile data plan. The Table 6 below displays the distribution by telco operators. Values in this table range from 1 to 2, where “1” represents the answer “Yes” and “2” – “No” to the asked question “Have you increased mobile Internet data in your tariff plan over the past year?” Based on the data, it can be derived that the respondents using T-Mobile’s services were more prone to increasing their mobile data limits. Much less respondents using services from O2 increased their mobile Internet data limit within the past year.

Table 6: Mobile data increase over the past year by the respondents by operators

Operator	N	Mean	F statistics
O2	60	1.57	425.579***
T-Mobile	66	1.21	
Vodafone	131	1.48	
MVNO	2	2.00	
Other	26	1.54	
Total	285	1.45	

Note: *** - significant at the 0.01 level.

It was confirmed that those respondents who increased their mobile data plan in the past year tend to be more satisfied with their mobile data. The Pearson coefficient here is -0.175 (significant at 0.01); the negative correlation between two statements is caused by technical coding of the survey’s answers to the question “Have you increased your mobile Internet data plan in the past year?” The answers were coded as follows: “Yes” equals to “1” and “No” equals to “2”. For this reason, the more a respondent agrees, the lower is the number. This insight is critical given the importance that current young consumers attribute to mobile Internet data. Respondents in the sample value mobile data and consider its importance to be worth 55% of the whole tariff package. Such consumer perception makes the mobile data the most crucial part of the package and a decisive one while selecting a package.

Within the data analysis, selected pairs of acquired responses were correlated between each other. It is noteworthy that those consumers who chose their mobile tariff plan due to the amount of free mobile data were revealed to be the most satisfied. Table 7 below displays means for satisfaction with mobile data ranging from 1 to 5. The ones who were driven by the branding of a telco operator might be less rational and more impulsive, resulting in the least satisfied state with the amount of mobile Internet data they got.

Table 7: Cross-tabulation of respondents’ satisfaction level with the possessed mobile data and the main reason for choosing current mobile operator

Reason	N	Mean (scale 1-5)	F statistics
Price	93	3.13	153.162***
Family/friends use its services	105	3.01	
Network quality & coverage for voice calls	8	2.75	
Network quality & coverage for Internet	7	3.57	
Speed of mobile Internet	8	3.75	
Amount of free Internet data offered	12	4.33	
Other	49	3.81	
Branding of a mobile operator	4	2.00	
Total	286	3.26	

Note: *** - significant at the 0.01 level.

After crosschecking the respondents' key reason of selecting their mobile tariff plan with the price paid for this tariff plan, it was observed that the least is paid by those consumers who selected the tariff plan based on the amount of free Internet data. These telco consumers pay in average CZK 333 per month, as shown in the Table 8. The second group in the sample that pays the least for their tariff plan is, obviously, the one that was driven by the price. This group pays in average CZK 379 per month. The most is spent by those telco consumers who selected their tariff plan based on branding of the telco operator or network quality for voice calls. The table below displays prices paid by various groups of consumers based on the main reason why they selected their current mobile operator.

Table 8: Average prices paid by various group of consumers based on the key reason for choosing their current mobile operator

Reason	N	Mean (CZK)	F statistics
Price	88	378.88	179.225***
Family/friends use its services	87	522.51	
Network quality & coverage for voice calls	8	655.88	
Network quality & coverage for Internet	7	535.71	
Speed of mobile Internet	8	472.50	
Amount of free Internet data offered	9	333.33	
Other	34	634.26	
Branding of a mobile operator	4	774.50	
Total	245	486.69	

Note: *** - significant at the 0.01 level.

Voice Calls and SMS vs. Mobile Data

Respondents were also checked on their preferences in terms of mainly using voice calls and SMS or mobile data on their smartphones. In a model situation they were asked to choose between two imaginary free packages of unlimited messages-and-SMS-only and a data-only package. 82% of the respondents stated that they would prefer to switch to mobile data-only tariff plan if they had to choose. In order to verify whether they really mean this, the respondents were given another model situation where they needed to decide whether they would be willing to exchange free mobile data for free voice calling minutes or vice versa. Respondents were asked to imagine that they owned 120 free calling minutes (+ unlimited SMS) to any operator in the Czech Republic and 500 MB of free mobile data. To get extra 500 MB of data, the respondents stated that they were willing to sacrifice in average half of the possessed free calling minutes' allowance, which equaled to 60 call minutes. In the opposite situation, when the respondents were asked whether they were willing to sacrifice any amount of their imaginary 500 MB of data in order to double the number of their free calling minutes to sum them up to 240, almost 75% of the respondents declined to sacrifice any. Both of these situations proved the fact that young consumers feel more comfortable when they have at least 1 GB of data in their mobile tariff plan and are not willing to exchange them for other telco services.

Another correlation analysis suggests that there is a positive relationship between the choice of unlimited mobile data-only package and the respondents' willingness to exchange minutes for extra megabytes of data. Those who stated their interest in unlimited mobile data-only package were willing to exchange bigger number of calling minutes for extra megabytes

of mobile data. The Pearson coefficient is 0.377 which suggest a moderate correlation (significant at 0.01).

Likewise, there is a positive correlation between the importance of mobile Internet data for the respondents and their willingness to exchange free calling minutes for extra megabyte of mobile data. Higher importance of mobile data in the tariff plan for the respondent is positively related to their willingness to exchange calling minutes for additional megabyte of data. The Pearson coefficient of 0.522 is considered as milder correlation, yet with a strong statistical significance (at 0.01).

Those respondents who pay more for their mobile plan tend to be less willing to exchange calling minutes for additional megabyte of mobile data (correlation coefficient is of -0.228, significant at 0.01). This inversed relation can be explained by the fact that more expansive tariff plans tend to include bigger amount of mobile data, which results in higher satisfaction of the consumer; thus, diminishing the need to get extra mobile data.

However, even those people, who consider the voice calls as a highly significant part of their tariff plan, are still not willing to sacrifice the data they possess in order to get extra calling minutes. No statistically significant correlation has been found (correlation 0.037).

Messaging and Voice Calling

We also asked the respondents to attribute the relative importance of single telecom services in their tariff plans today and ten years ago. Table 9 presents the results.

Table 9: Importance of single telecom services in respondents’ tariff plans 10 years ago and now

Telecom service	Ten years ago	Today
Importance of mobile data	4.1%	55.4%
Importance of voice calls	42.5%	27.2%
Importance of SMS	50.5%	14.7%
Importance of Other services	2.9%	2.7%

Keeping in mind that a certain “retrospective bias” can occur, the answers provide a clear change in consumers’ preferences. Ten years ago, SMS were much more popular among young consumers – due to expensive calling minutes’ rates, youngsters were texting much more. The sample of young telco consumers used to attribute about 51% of importance to SMS, 42% to voice call minutes, and less than 5% to mobile data. Hence, telecommunication operators that offered bigger number of text messages were prioritized. Nowadays, a huge decrease in user preferences is observed – young surveyed consumers attribute less than 15% of importance out of their tariff plan to SMS. 88% of the respondents reported more pronounced increase in their usage of instant messaging apps compared to the past. Table 10 lists the most common reasons for using instant messaging apps: 67% of the respondents marked that they use a specific app more often because of friends/family that are using it too. Another two common answers were that it is more convenient to communicate with people that live abroad and that it is easier to send photos and videos over messaging apps.

Table 10: Respondents' most common reasons for using instant messaging apps

Reason	Ticked
Friends/family are using it	66.70%
Convenient to communicate with people living abroad	57.70%
Easier to send photos & videos than via MMS	56.00%
Cheaper than SMS	46.40%
Group functionality can be used	37.50%
Can see who is online/available	31.30%
Can see when messages are read	28.50%
Easier to use than SMS	22.30%
Can send stickers & emoticons	18.20%
Other	0.70%

Consumers tend to use different messaging and voice calling apps with different social groups. For instance, for communication with family members consumers tend to mainly use Skype (23%), Facebook Messenger (17%) and WhatsApp (14%), then spreading between iMessage (11%), Viber (10%) and Other (10%). For communication with friends consumers tend to predominantly use Facebook Messenger (68%) and WhatsApp (22%). With colleagues respondents tend to communicate either via Facebook Messenger (29%), LinkedIn (11%) or other non-app services. An educated guess here would be e-mails, phone calling and possibly SMS. With regards to communication with random acquaintances, respondents have been more unified – specifying either Facebook Messenger (51%), iMessage (6%), LinkedIn (5%), Other (7%) or non-app services (19%).

The first thing that half of the respondents access on their mobiles in the morning is any type of instant messaging app, such as Whatsapp, Facebook Messenger and others (Table 11). Another two most popular choices are social media and emails. It is noticeable that all of these services that people check first thing in the morning on mobile are provided over Internet, which supports the rising importance of Internet.

Table 11: The first activity of respondents on their smartphone every day

Application	Frequency	Percentage
Instant messaging apps	143	49.1%
Social networks	61	21.0%
E-mail	47	16.2%
Web browsing / News	21	7.2%
Other	9	3.1%
SMS	7	2.4%
Online music streaming app	3	1.0%
Total	291	100.0%

Even though there is an obvious preference in usage of OTT messaging and calling apps, 71% of young telco consumers admit that reliability of telco calls is unbeatable. Thus, if needed to make an urgent call to someone, 90% of respondents would mainly call via their mobile operator (Table 12). Moreover, in the model situations when a consumer has no unlimited minutes, no Wi-Fi, but is connected to 4G/LTE via a mobile device, 45% of the respondents stated their preference for the call via a mobile operator even if this call is supposed to last longer than 10 minutes.

Table 12: A calling option chosen by the sample for reaching out to someone urgently

Option	Frequency	Percentage
Calling via your mobile operator	263	90.4%
WhatsApp	9	3.1%
Facebook Messenger	8	2.7%
SMS	6	2.1%
iMessage	3	1.0%
FaceTime	2	0.7%
Total	291	100.0%

Czech telco consumers represented in the sample were proven to actively send text and photo messages (Table 13). Sending voice messages is still not much common; less than 15% of the respondents marked their usage. Video messages still make an exception (less than 1%).

Table 13: Two main forms of messaging used by the respondents

Messaging	Yes	Percentage
Text messages	286	98.3%
Photo messages	167	57.4%
Voice messages	42	14.4%
Video messages	2	0.7%

Usage of Audio and Video OTT Services

It is notable that despite the global popularity of audio streaming services and app (i.e. via Spotify, iMusic, etc.) on a mobile, slightly more than half of young telco consumers represented by the sample use them. Almost 30% of the respondents stream audio only via Wi-Fi, and a mere quarter of the sample does it while on 4G/LTE (Table 14). Usage of audio streaming services on mobile implies to dependence on stable internet connection; thus, relatively low usage of such service by the sample might evoke some questions in this respect.

Table 14: Respondents' streaming of online audio content

Streaming of audio content	Frequency	Percentage
Yes, but only when connected to Wi-Fi	86	29.6%
Yes, also when connected to 3G/4G/LTE, etc.	68	23.4%
No	137	47.1%
Total	291	100.0%

The survey respondents were then asked to name audio streaming service that they use. The respondents could name several options; for this reason, the total number of answers is bigger than the size of the sample (291). The Table 15 below lists only the top 5 audio streaming apps preferred by the respondents. Among all, the clear favorite is Spotify with 34.7% compared to 2-3% of user for each of the other audio streaming apps. Such an extreme distribution might be affected by the sample size; thus, the author suggests to concentrate mainly on the clear winner – Spotify, and also to high number of the respondents (more than 45%), who do not use any audio streaming services at all.

Table 15: Top 5 online audio streaming apps used by the sample

Streaming application	Frequency	Percentage
None	144	45.43%
Spotify	110	34.70%
Soundcloud	12	3.79%
Google Play Music	8	2.52%
iMusic	8	2.52%
Youtube	7	2.21%

The survey revealed that only 18% of the respondents use premium audio content of the mentioned audio services. This group of the sample tends to pay in average CZK 192.44 per service (median 162.5); the maximum amount paid is CZK 600. It follows that a high number (237) of respondents do not pay for premium or any audio content services, since they only use free version of the service.

The desire of the Czech operators to run mobile TV and compete on the content base might lack effectiveness if targeting young consumers. According to the research outputs there is a clear trend that vast majority of youngsters represented in the sample tend to watch user-generated content and music videos on their mobile devices. As much as 96% of the respondents do not watch mobile TV, which should raise concerns in current Czech telco operators that offer this service. Even though this finding cannot be attributed to all young Czech consumers, it should still ring a bell to mobile TV teams, working on creation of alluring content and service offerings for young telco consumers.

Besides that, 40% of the respondents watch music videos on their mobile devices (Table 16). Almost the same number watches user-generated content (videos created by individual users, which are then uploaded to the Internet). Consumers watch them through various apps such as YouTube, Instagram, Snapchat and many others. Rarely do the survey respondents watch movies, TV series or sports programs on their mobile devices. It is quite notable that 20% of the respondents do not intentionally stream video content on their mobile devices.

Table 16: Top 5 types of video content streamed via mobile devices

Video content	Yes
Music videos	117
User-generated content (videos created by users on YouTube, etc.)	115
None	59
TV series	43
Sports	31

Young telco users represented in the survey marked three factors as decisive for starting to use mobile TV. Listed in Table 17, these are: engaging content (15%), ability to watch it over several devices (11%) and ability to time shift video content (13%). Yet 65% of the sample still stated that there is nothing that can attract them to using mobile TV.

Table 17: Respondents' possible triggers for starting to use mobile TV

Trigger	Frequency
None	188
Content	44
Ability to time shift TV content (after the live broadcast, e.g. after 2 days)	39

Accessibility on more devices	33
Video on Demand	18
Price	17
Other	4

TV, in general, is not appealing to the respondents. They are satisfied with a wide pool of options that they have for choosing whatever they want to watch in whatever time they can. At the same time, they are more allured by videos, which they can relate to: either through their friends, friends of friends, celebrities, etc. Short, concise and straight to the point – these are what modern youth demands from video services.

Table 18: Services used by the respondents to broadcast their own live videos

Service	Frequency	Percentage
Facebook Live	5	1.7%
Periscope	23	7.9%
Other	20	6.9%
None	243	83.5%
Total	291	100.0%

Referring to the appearing trend of user-generated live broadcasting videos, the survey tested the respondents on whether they are using live video broadcasting services. The most prominent live broadcasting service so far is Periscope with 8% of respondents using it. However, only 16% of the respondents are using these services (Table 18). It can be concluded that they are still in their infancy stage among the Millennials.

Conclusion

The theoretical overview provided in this paper reveals the importance of over-the-top services in the modern world of telecommunications, includes predispositions that are accountable for their emergence and success, accompanied with the aspects of OTT services that have reshaped telco business the most. We also introduced an outlook of new pricing structures or partnership models for telco operators in this dynamic industry transformation. The empirical part revealed several findings and managerial implications that should be taken into account by telecommunication operators.

- Young women seem to be willing and able to pay more for mobile services.
- Brand loyalty seems to be a negligible decision factor among Czech Millennials. Price is much more important.
- There is still a group of young consumers who do not have any mobile Internet allowance; they rely on the Wi-Fi connection at home, school or work, and in between these places, they use standard services such as mobile calling and SMS.
- Millennials are generally satisfied with the number of call minutes and SMS in their tariff plans, but not with the amount of mobile data. They attribute an important value to mobile Internet data and this makes it the crucial part of the package and one of the decisive factors.

- Generally, young consumers feel more comfortable when they have at least 1 GB of data in their mobile tariff plan and are not willing to exchange them for other telco services. At the same time, those consumers who selected the tariff plan based on the amount of free Internet data pay the least.
- The first thing that most Millennials access on their mobiles in the morning is any type of instant messaging app, such as WhatsApp, Facebook Messenger and others. This supports the increasing importance of OTT services.
- Reliability of classical voice calls is unbeatable; if needed to make an urgent call to someone, the vast majority of Millennials would mainly call via their mobile operator.
- Sending voice messages is still much less common than sending text and photo messages. Video messages are very rarely used.
- The vast majority of youngsters does not watch mobile TV and do not intend so. Rarely do they watch movies, TV series or sports programs on their mobile devices. Modern youth demands short, concise and straight video services.

The findings can potentially serve as a proxy for businesses to find out whether specific consumer with corresponding traits and characteristics will be open to possible changes in their tariff plans and if so, then to what extent.

It is important to note that the limitation of this paper is the application of the survey results to the broader group of consumers represented by the respondents in the sample. The quantitative survey findings cannot be applied to overall Czech society or whole Czech youth. The structure and the size of the sample combined with the methods used to distribute the survey (online questionnaire) might have affected the results to certain extent. Nonetheless, the survey collected responses from 291 respondents and revealed valuable insights based on this specific group.

Future research should be oriented towards the evolution of video over-the-top services and video strategies of telecommunication operators in converging young consumers. Besides that, there are other areas worthy of further research with important managerial implications:

- Since there is a potentially profitable segment of Millennials who don't have any data allowance in their tariff plans, telecommunication operators could be interested in how to convince these people to start using paid data services.
- Telecommunication operators could also be interested in how to cooperate with OTT service providers to increase the usage of these services.

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