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CONCENTRATION OF SUPPLY ON THE CHOSEN MARKETS OF SERBIAN ELECTRONIC COMMUNICATIONS SECTOR

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Abstract:
The electronic communications sector is very important sector of a national economy. It provides an opportunity for facilitating business activities and it is a good area for investment. A small number of operators and a large number of users operate in most markets of the electronic communications sector. The conditions under which electronic communications services are available to users in different countries diverge, among other things, due to the degree of liberalization of individual markets in these countries. The Republic of Serbia has significantly liberalized this sector of economic activity by adjusting it according to the regulations of the European Union. However, certain entry barriers have remained, primarily related to the licenses that operators need to obtain to operate in the Serbian market. The paper aims to investigate the level of concentration in selected markets of the electronic communications sector, namely: mobile telecommunication networks and services, broadband Internet services and media content distribution. The research showed a high level of concentration measured by the Herfindahl-Hirschman index in all three markets. A further increase in concentration is expected in all analyzed markets in the short term. These research results require more attention from regulatory bodies because they increase the possibility of some form of non-competitive behaviour by undertakings.

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INTRODUCTION

The electronic communications sector is an important segment of a national economy because it is a very propulsive industry. This sector development can represent the level of national economic development but it also provides an excellent support for its accelerated growth. One should not dismiss the fact that the electronic communications sector is intertwined with the other economic sectors and they cannot operate and give the expected results if they are not supported by an adequate telecommunications network.

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It turns out that this type of service provides support for the permanent development of other economic sectors. Also, wider adoption and more intensive diffusion of modern telecommunication technologies have high influence on the competition in other markets (Jerbashian & Kochanova, 2017, p. 650).

This sector is also attractive for investments due to its potential for long-term large profits. It is not surprising that the global telecom services market revenue was USD 1,516,909 million in 2019 and will reach USD 1,975,411 million in 2025. What is important to point out is that this sector is characterized by an oligopolistic market, namely a small number of undertakings of great market power operating. Western Balkans countries have entered the process of liberalization of the electronic services sector following the example of developed European countries due to the importance of this sector and their ambition to join the European Union. The liberalization process implies the introduction of free competition in this sector and free entry of new participants onto the market. The liberalization process of the electronic communications services market in the Republic of Serbia has begun with the adoption of the Law on Telecommunications in 2003, when the Republic Telecommunications Agency was established, which is now the Regulatory Agency for Electronic Communications and Postal Services (RATEL).

The paper aims to analyse the degree of concentration in individual markets of the electronic communications sector of the Republic of Serbia and to investigate the trends present in these markets. Additionally, the paper aims to provide recommendations for regulatory authorities as to which actions to perform to provide better conditions for achieving free competition in the analysed markets. In addition to the introduction and concluding remarks, the paper contains three interconnected parts according to the defined goal. The first part of the paper refers to the literature review and previous studies that analysed the level of concentration in certain markets of the electronic services sector. Furthermore, an overview of the situation on the global market of electronic services, mainly mobile telecommunication networks and services is presented in this part of the paper. The second part of the paper presents the research methodology and data sources, while the third part presents the research results of the current market and the level of concentration in the selected ones.

CONDITIONS IN THE GLOBAL ELECTRONIC COMMUNICATIONS MARKET

The electronic communications services markets are oligopolistic and are characterized by a small number of undertakings with high market power in most countries. The main characteristic of those markets is the supply of unified products and services by several operators whose business requires a license from the regulatory body. Obtaining the license is one of the most important entry barriers limiting the number of undertakings and keeping them at the low level. Based on this it can be concluded that this industry operates as a natural oligopoly.

The most important and dynamic part of the electronic communications sector is the market of mobile telecommunication networks and services. Mobile telecommunications are an important generator of innovation and represents one of the most significant sources of revenue in the electronic communications sector. Furthermore, mobile telecommunications offer higher quality services and thus overcome the inefficiency generated by fixed telephony services thanks to the existence of modern technological solutions (Wellenius, 1993). A large number of studies have dealt with the analysis of the competition in this market.

The first studies related to the mobile communications market focused on the analysis of competition, mainly in duopoly markets such as the ones in the USA, Great Britain and Sweden for many years. Parker and Roller (1997) investigated the U.S. mobile phone market in the period from 1984 to 1988 and concluded that prices were significantly above those where there was an oligopoly. As one of the reasons why prices are higher, these authors also state the fact that participants perform in more connected markets, which further strengthens their market position and enables them to set higher prices. In his research, Valletti (2003) defined a strategic interaction model between operators in the mobile communications industry. Furthermore, this author addressed the question of how the characteristics of mobile communications and customer preferences affect the nature of competition and found that, in most cases, the mobile telecommunication market takes on the characteristics of a natural oligopoly.

An analysis of the market share and market strength of undertakings in the mobile telephony markets in 49 European countries, including Serbia, showed that the most significant undertakings are those with the largest market share in most of the observed countries. Although the market share of undertakings can be determined in different ways, the dominant one is the one based on the number of users. The study showed that most mobile telecommunication markets are highly concentrated and that the two largest operators control more than half of the domestic mobile telecommunications markets (Whalley & Curwen, 2012). Sung (2014) examined the concentration of the mobile telecommunication markets in 24 OECD countries between 1998 and 2011 and recognized a positive relationship between market concentration, prices and profits, thus more concentrated markets provide higher prices and profit. This research is in accordance with the well-known SCP paradigm. This paradigm origins can be traced back to the middle of the twentieth century and it begins with the fact that the market structure, the level of its concentration and entry barriers have an impact on the behaviour of successful companies, namely the performance of those companies. Participants can be expected to behave in such a way as to increase the prices of their services and limit supply to make higher profits in markets characterized by high concentration and where significant entry barriers are.

Valaskova *et al.* (2019) determined the existence of an oligopolistic market structure and a high degree of concentration in the Slovenian telecommunications market in the period from 2013 to 2017 using Concentration ratio, Herfindahl-Hirschman index, Gini coefficient and Lorentz curve. Furthermore, Madleňáková *et al.* (2018) in their study investigated the issue of determining the degree of concentration in the electronic communications sector using the Herfindahl-Hirschman index. Pejić Bach *et al.* (2013) analysed the degree of concentration in the telecommunications market in Croatia using Concentration ratio, Herfindahl-Hirschman index and Gini coefficient from 2003 to 2008. The study concluded that the concentration changes differently in diverse segments of the telecommunications market and that the degree of concentration in this market is heavily influenced by entry barriers.

Krstić *et al.* (2016) measured the level of concentration in the mobile services market in the Republic of Serbia by sales revenue from 2009 to 2014 using some concentration indicators (Concentration ratio, Herfindahl-Hirschman index, Lorentz curve, Gini coefficient, Entropy coefficient, etc.). They concluded that there is a high level of market concentration in the mobile telecommunication networks and services and an oligopolistic market structure characterized by the change of two companies in a leading position. Also, there is a declining trend in the level of concentration. Kostić *et al.* (2016) also measured the level of concentration in the mobile telecommunications market in the Republic of Serbia using various concentration indicators such as Herfindahl-Hirschman index, Lorentz curve and Gini coefficient from 2008 to 2013.

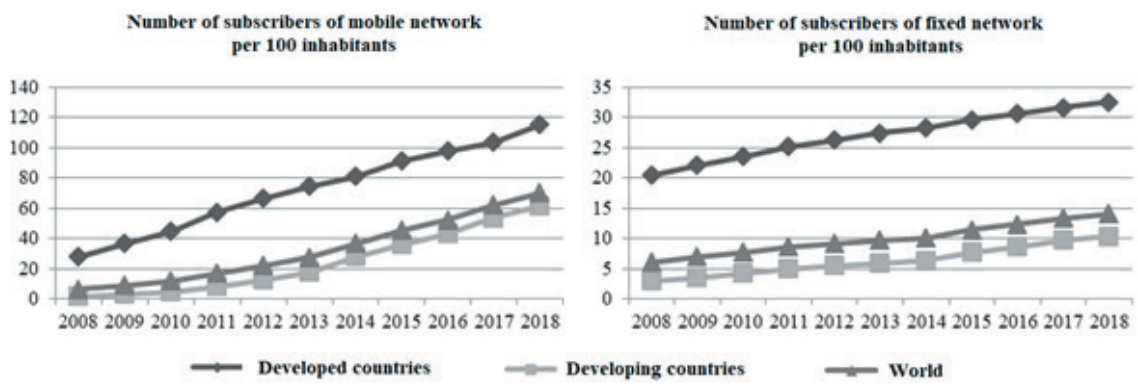
The results have shown that there is a high degree of concentration in this market and the dominance of few undertakings. The correlation and regression analysis results confirmed a positive relationship between concentration and market performance of undertakings. Furthermore, a high level of market concentration was determined in the media content distribution market of the Republic of Serbia from 2007 to 2009 using Concentration ratio, Herfindahl-Hirschman index, Lorentz curve, Entropy coefficient and Horvat concentration index (Maksimović *et al.*, 2011).

Trifunović and Mitrović (2016) studied the externalities of the market of electronic services in Serbia from 2003 to 2014 and noted the high market concentration and relatively low prices. The conclusion is that regulatory policy should not be based solely on the degree of market concentration. More detailed information is needed, like the behaviour of undertakings and switching costs consideration, as well as entry barriers and potential price discrimination by economic entities. Particular attention should be given to the company's partnership in R&D, which is fairly common in the high-tech industry. Although such cooperation reduces risks and pressures due to high-risk investments, there is a risk of the horizontally integrated companies turning into market cartelization (Stojanović el al., 2019, 149).

To assess future responses competition policy, Stojanović and Kostić (2018) analysed the level of concentration in selected markets of electronic communications services of the Republic of Serbia using the Herfindahl-Hirschman Index from 2007 to 2016. They concluded that the concentration level is extremely high but with a declining trend.

The analysis of market concentration in the electronic communications sector has gained importance in recent years due to the accelerated growth of this sector globally, especially the part related to mobile telecommunications. It is a very dynamic industry, which is constantly evolving thanks to new technologies and infrastructure. When observing current trends, it is interesting to note that in 2020 there were approximately 7.7 billion active mobile subscribers in the world, which is an increase of 3.3 billion in the last five years. When it comes to fixed telephony, where there are over 1.1 billion subscribers and which has grown by about 830 million subscribers in the last five years, we can say that communications are rapidly moving from fixed to mobile telephony.

Graph 1. The number of mobile and fixed telephone subscribers from 2008 to 2018.



Source: Authors based on data ITU https://www.itu.int/en/ITU-D/Statistics/Pages/stat/default.aspx accessed on December 15, 2019.

Graph 1 shows trends in the number of subscribers of fixed and mobile networks globally, especially in developed countries and developing countries. There is a higher growth rate of mobile subscribers compared to fixed telephony subscribers, especially in developed countries. At the beginning of the observation period, there were about 30 subscribers per 100 inhabitants in mobile telephony in developed countries. At the end of the period, we see that this number reaches 115 per 100 inhabitants. The number of mobile subscribers per 100 inhabitants in 2018 is 61 in developing countries. It was an increase compared to the beginning of the period when that number was less than 10 subscribers. It is noticeable that the number of subscribers in developing countries is far below that which exists in developed countries at both the beginning and end of the period.

METHODOLOGY AND DATA SOURCES

In accordance with the goal set for this paper, the conducted research relates to the level of concentration and dynamics of changes in selected markets of the electronic communications sector of the Republic of Serbia. The most promising markets of this sector were examined, which also have the largest share in the total revenue of the sector. The paper examines the following markets: mobile telecommunication networks and services, broadband Internet services and media content distribution.

Market concentration indicators are very important for analysing competition conditions (Oliveira, & Oliveira 2018; p. 166). There are many market concentration indicators. The researchers opted for the Herfindahl-Hirschman index (HHI) as the most comprehensive and understandable index from the analytical point of view. The OECD recommendation is to use the Concentration Ratio (CR) and the Herfindahl-Hirschman index to determine the level of market concentration (OECD, 1993, p. 24–25). The Concentration (CRn) ratio is the sum of the market shares from several leading undertakings (the number can vary from 3 to 10 and usually ranges between 3 and 5 undertakings). Having in mind that this index represents the sum of individual market shares of the largest companies and does not take into account the dispersion of shares between them, it can be stated that its analytical significance is insufficient. The Herfindahl-Hirschman index (HHI) is taken as an alternative. The Herfindahl-Hirschman index is calculated by squaring the market shares of all undertakings (Dafny, et. al., 2012, p. 1162). The HHI takes account of the differences in the sizes of market participants (undertakings), as well as their number (Thembalethu, *et al.*, 2019, p. 354). It gives particular importance to companies with a high market share while including in the calculation all companies in the market (Chiang-Ming *et al.*, 2014, p. 147; Kostić, *et al.*, 2016, p. 339; Ivanova *et al.*, p. 2018, 35; Grosche *et al.*, 2020, p. 79, Kruger, *et al.*, 2021, p. 2). The Herfindahl-Hirschman index (HHI) is calculated as follows (Yeong-seok Ha & Jung-soo Seo, 2013, p. 261; Lieshout, *et al.*, 2016, p. 72; Chih-Wen, 2016, p. 292; Lipczynski *et al.*, 2017, p. 271, Barra & Zotti, 2019, p. 109; Kastratović, *et al.*, 2019, 219; Nguyen, *et al.* 2020, p. 4):

$$HHI = \sum_{i=1}^{n} Si^2 \tag{1}$$

namely: *Si* market share of i company and n total number of companies on the market.

Value of the HHI ranges between 0 and 10,000 (alternatively 0 and 1). In the case of an atomized supply, where there is a large number of undertakings and the supply tends to equal 0, the index value also tends to equal 0. In the case of a monopoly, the HH index is 10,000 (or 1) (Yuan, *et al.*, 2019, 476; Bakhtiari, 2021, p. 59).

Table 1 provides reference values for this indicator, which are presented in Horizontal Merger Guidelines by the Department of Justice, and the U.S. Department of Justice and the U.S. Federal Trade Commission in 2010 (Yeong-seok Ha & Jung-soo Seo, 2013, p. 261; Brown, *et al.*, 2020, p. 2).

Table 1. HH index reference values

HH index	**Supply concentration levels**
HHI < 1,500	Unconcentrated market
1,500 ≤ HHI ≤ 2,500	Moderately concentrated market
HHI > 2,500	Highly concentrated market

Source: U.S. Department of Justice and Federal Trade Commission, (2010), HorizontalMerger Guidelines, p. 18

In addition, the Horizontal Merger Guidelines set out the rules for interpreting the change in the value of HHI, as follows: (1) any change in HHI below 100 index points is considered a slight change, which does not affect competition and does not require further analysis; (2) if it is an unconcentrated market (index value below 1,500 points), any integration, regardless of the change in the value of the index, does not require further analysis, because it is unlikely to have adverse competitive effects; (3) in moderately concentrated markets (index value between 1,500 and 2,500 points), any increase in the value of HHI above 100 index points is a matter of concern and requires analysis; and (4) in highly concentrated markets (index values above 2,500) any increase in HHI between 100 and 200 index points raises considerable concerns regarding restrictions of competition and requires detailed supervision by regulatory bodies. Otherwise, in the situation of a highly concentrated market, any increase in the index above 200 points, which occurs as a consequence of the integration of undertakings, indicates a significant increase in market power of related undertakings and is subject to restriction by the regulatory body.

Due to the simplicity of calculation and interpretation, the Herfindahl-Hirschman index is widely accepted by most developed market economies and regulatory bodies dealing with competition policy. In markets where there is a small number of undertakings with a high market share and a large number of undertakings with a negligible market share, which is difficult to identify, we use a modification of the HHI in the following form (Kostić, 2018, p. 165):

$$HHI = \sum_{i=1}^{n} Si^2 + m\left(\frac{100 - \sum_{i=1}^{n} Si^2}{m}\right)^2 \qquad (2)$$

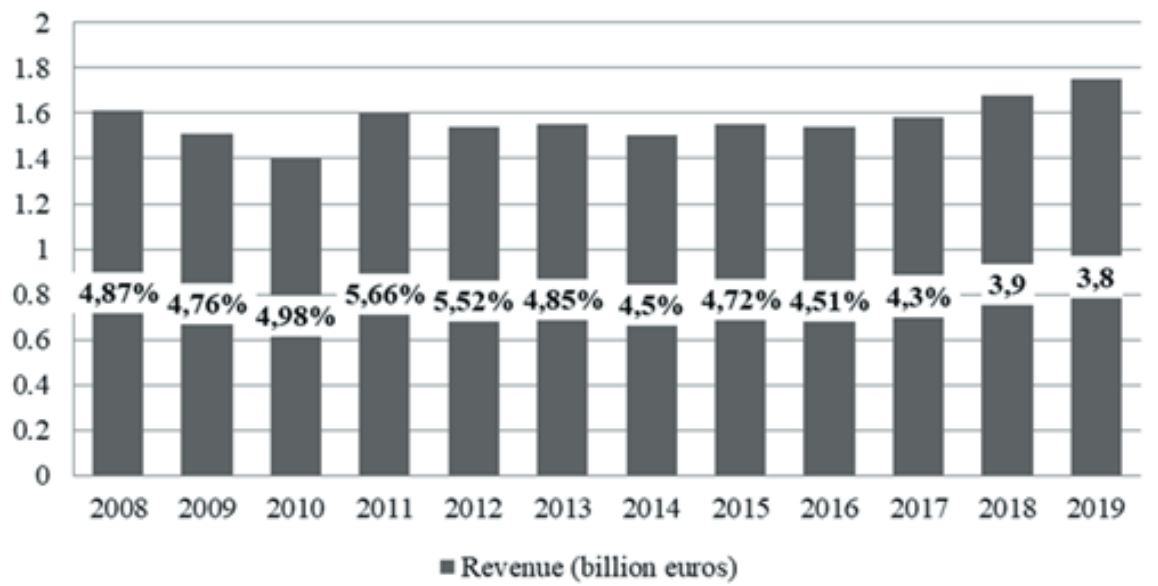
namely: *n* number of undertakings with identified market share, *m* number of undertakings with unidentified market share, *Si* market share of identified i undertaking.

In the research, we use the data by Regulatory Agency for Electronic Communications and Postal Services (RATEL) presented in the publication of An Overview of the Telecom and Postal Services Market in the Republic of Serbia at the following link https://www.ratel.rs/cyr/page/cyr-godisnji-pregledi-trzista. The study covers the period from 2008 to 2019.

RESEARCH RESULTS

The electronic communications sector revenue ranged from 1.4 to 1.75 billion euros in Serbia during the observed period (2008-2019). The lowest revenue was recorded in 2010, while the highest revenue was achieved in 2019 - 1.75 billion euros, which is 4.1% more than in 2018 (RATEL, 2020, p. 6). Regarding the share of the electronic communications sector in GDP, it was 4.87% at the beginning of the period, and 3.8% in the end (2019). The data showed a decline in the share of this sector's revenue in GDP, although the revenue was measured in absolute terms at a relatively similar level throughout the observed period (Graph 2).

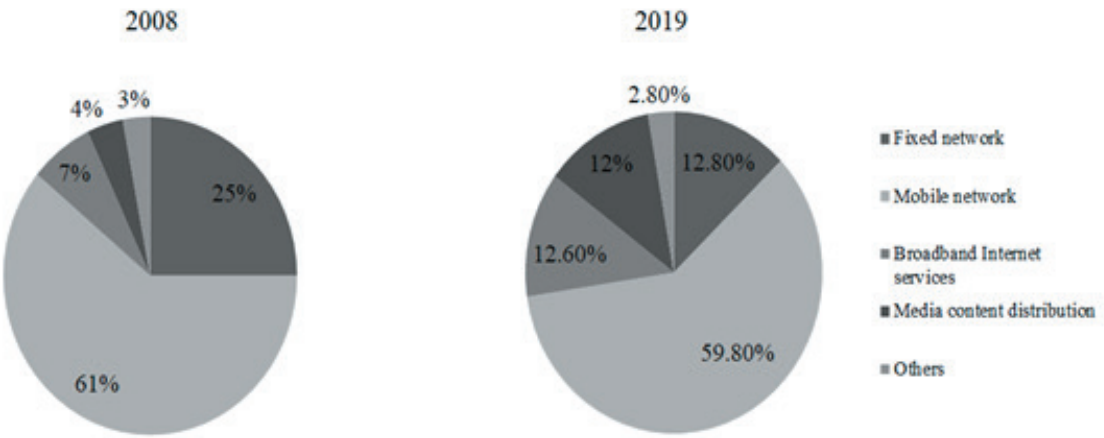
Graph 2. The electronic communications sector revenue and share in the GDP of the Republic of Serbia from 2008 to 2019



Source: Authors based on RATEL data

During 2019, the largest share of total revenues in the electronic communications sector was generated from mobile telecommunications services. This market earns 59.8% of the electronic communications sector total revenue. If compared to the share in total revenues in 2008, it is clear that the share remained at a similar level. The most extensive change occurred in the fixed telephony market, where the share significantly decreased. The spillover was realized in favour of broadband Internet services and media content distribution. The share of those markets of the electronic communications sector total revenue in 2019 was 12.6% and 12%, whereas it was 7% and 4%, in 2008, respectively (Graph 3). It can be concluded that these two markets have the highest revenue growth rate in the electronic communications sector.

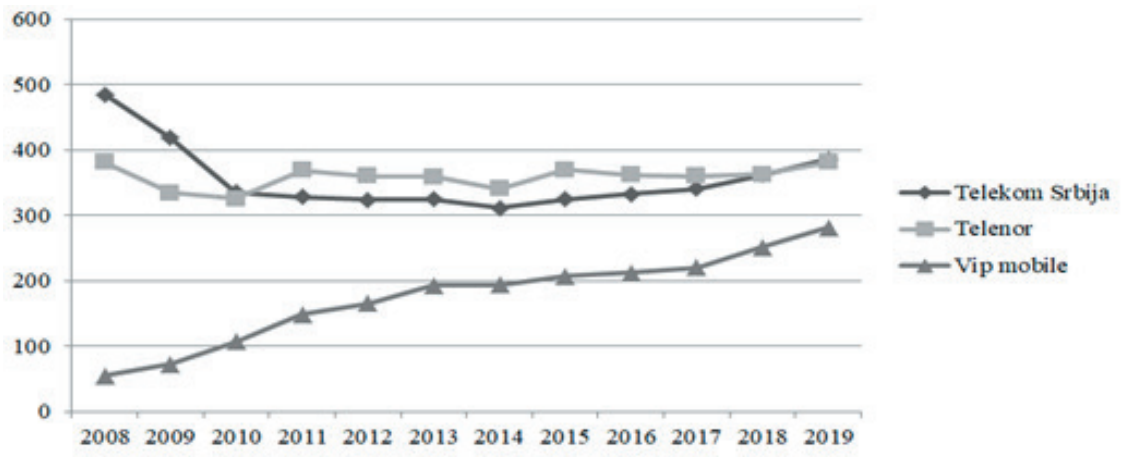
Graph 3. The revenue structure of the electronic communications sector of the Republic of Serbia in 2008 and 2019



Source: Authors based on RATEL data

When it comes to mobile telephony, as the most significant part of the telecommunications sector in terms of revenue in Serbia, it is a market that has all the features of an oligopolistic market structure. In 2019 there were three operators in the mobile communications market of the Republic of Serbia, namely Telekom Srbija a.d., Telenor d.o.o., and Vip mobile d.o.o. There have been two virtual operators in Serbia since 2016 (Mundio Mobile d.o.o. and Globaltel d.o.o.). In 2019 only Globaltel d.o.o. was represented on the market with a modest market share. As Figure 4 represents, Telenor has been taking the leading position by revenues since 2010, although the market leader was Telekom Srbija at the beginning of the observed period. The individual market share of the two leading operators has ranged from 36% to 43% since 2011. Telenor has the advantage regardless of the downward trend. Vip mobile is the youngest network operator, which has been operating in Serbia since 2006. What distinguishes Vip mobile from other operators is the multiannual accelerated revenue growth, thus managing to multiply its revenues from 2008 to 2019.

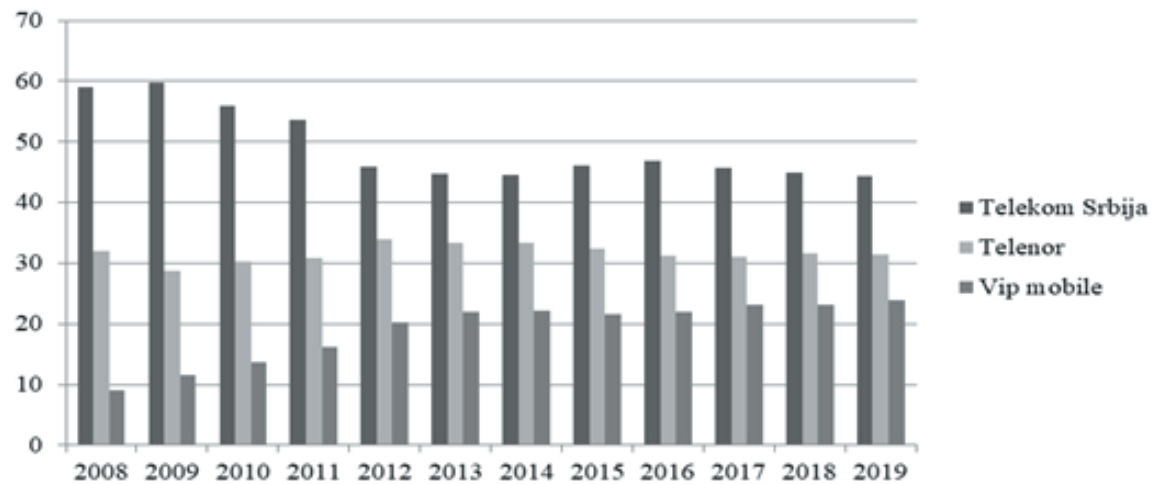
Graph 4. Mobile operators' revenues in the Republic of Serbia from 2008 to 2019



* Revenues in millions of euros
Source: Authors based on RATEL data

Graph 4 shows slight differences in revenues between Telekom Srbija and Telenor and indicates that Telenor is the market leader during the most part of the observed period. The situation is somewhat different if we analyse the operators market share based on the number of subscribers. Telekom Srbija is the leader by the number of subscribers in the mobile telecommunication market. According to the number of subscribers, Telekom Srbija has had a market share exceeding 40% during the entire observed period. In 2009 it was even 59.7%. The second-largest market share company is Telenor, with average market share of approximately 30%. Vip mobile has the lowest market share by the number of subscribers, but there is a constant growth in the number of users, as well as in revenues. Regarding the number of subscribers in 2019, Telekom Srbija market share was 44.3%, Telenor 31.4%, and Vip mobile 24%. (Globaltel market share was 0.03) in 2019. Graph 5 shows the market share movement in the mobile telecommunication market measured by the number of subscribers.

Graph 5. Mobile telecommunications operators market share by the number of subscribers in the Republic of Serbia from 2008 to 2019



Source: Authors based on RATEL data

The difference between the market share by revenue and the market share by the number of subscribers is that Telenor is primarily focused on legal entities, while Telekom is oriented towards the individuals. Table 2 shows the obvious difference in operators market share by total revenues and by the number of subscribers.

Table 2. Operators market share by total revenues and number of users from 2008 to 2019

Year	Telekom Srbija		Telenor		Vip mobile		Globaltel	
	Total revenue	Users	Total revenue	Users	Total revenue	Users	Total revenue	Users
2008	52.15	58.93	41.83	31.94	6.02	9.13	-	-
2009	50.70	59.70	40.50	28.70	8.80	11.60	-	-
2010	43.70	56.00	42.40	30.30	13.90	13.70	-	-
2011	38.84	53.70	43.58	30.20	17.58	16.10	-	-
2012	38.10	45.80	42.40	33.90	19.50	20.30	-	-
2013	37.00	44.80	41.00	33.30	22.00	21.90	-	-
2014	36.81	44.56	40.29	33.27	22.90	22.17	-	-
2015	36.00	46.10	41.00	32.30	23.00	21.60	-	-
2016	36.70	46.80	39.90	31.20	23.40	22.00	-	-
2017	37.00	45.70	39.10	31.10	23.90	23.20	0.00	0.00
2018	37.10	45.00	37.20	31.60	25.68	23.20	0.02	0.02
2019	36.81	44.30	36.33	31.40	26.81	24.00	0.05	0.03

Source: Authors' calculation based on RATEL data

Table 3 shows the calculation of HHI in the mobile telecommunication networks using the market share based on the number of users in the Republic of Serbia from 2008 to 2019.

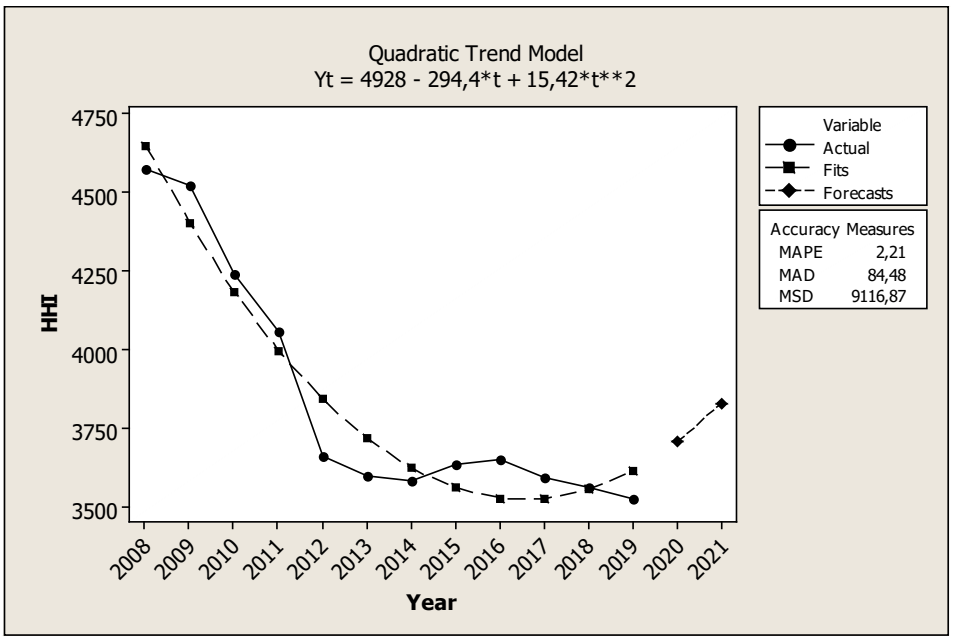
Table 3. Herfindal-Hirschman index on the mobile telecommunication market of the Republic of Serbia from 2008 to 2019

Year	HHI
2008	4,576.26
2009	4,522.34
2010	4,241.78
2011	4,054.94
2012	3,658.94
2013	3,595.54
2014	3,583.99
2015	3,635.06
2016	3,647.68
2017	3,593.94
2018	3,561.84
2019	3,524.54

Source: Authors' calculation based on RATEL data

Based on the data from Table 3, we can conclude that there is a very high supply concentration in the mobile telecommunication market of the Republic of Serbia. HHI values were high during the whole observed period; namely, when the value of HHI exceeds 2,500, the market is considered to be highly concentrated, which is the case here. Nevertheless, regardless of the extremely high values of the HHI, the encouraging fact is that the value of the HHI index is declining year by year. The trend extrapolation of the HHI index value (Graph 6) represents the trend curve corresponding to the presented data and one can see that HHI value is gradually reversing. A slight increase in the value of HHI can be expected in 2020 and 2021 (Graph 6).

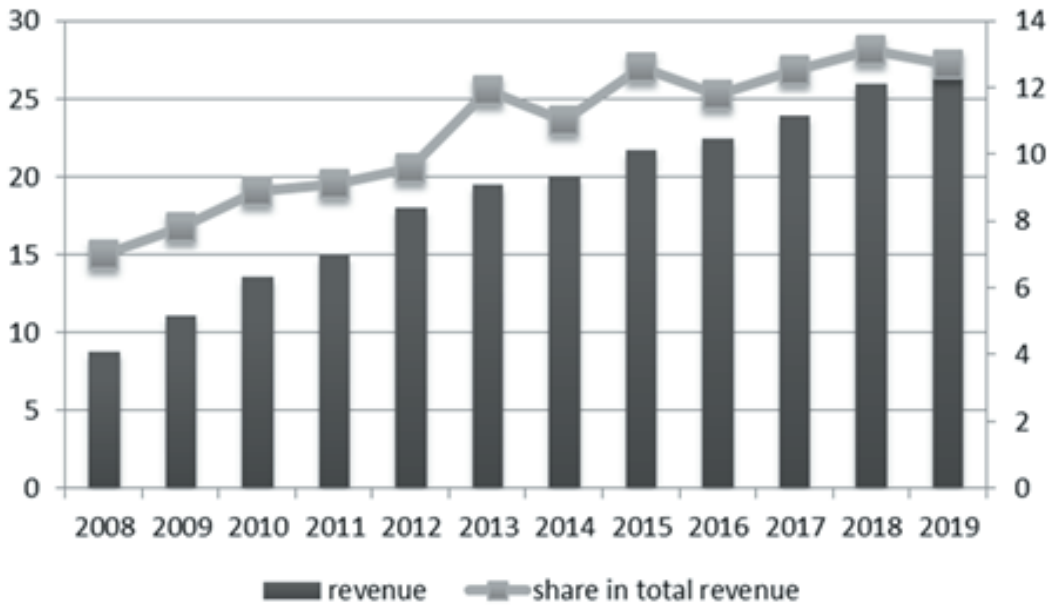
Graph 6. The HHI value trend on the mobile telecommunication market with the forecast for 2020 and 2021



Source: Authors' calculation based on RATEL data

The next significant electronic communications market is the market for broadband Internet services, which has rapidly grown in recent years. A large number of households have constant access to the Internet, while the business is literally unimaginable without the use of information technology and the Internet. It can be said that its use has become an integral part of business life over the world and in Serbia respectively (Đorđević Boljanović *et al.*, 2014, p. 17). Revenues from Internet services amounted to 8.76 million dinars at the beginning of the observed period, and they reached the amount of 26.20 billion dinars in the end of the period. The share of revenues from these services in the electronic communications total revenues was 7% in 2008, while it was between 12 and 13% in 2019 (Graph 7).

Graph 7. Broadband Internet services revenue in billions of dinars and the share of this segment the electronic communications total revenue of the Republic of Serbia from 2008 to 2019



Source: Authors based on RATEL data

The broadband Internet services market is characterized by two large and many small undertakings. Telekom Srbija is the dominant operator in Internet services with a significant market share. The emergence of SBB and its expansion in recent years has led to Telekom gaining a significant competitor. SBB's market share is increasing, but we cannot say that Telekom market share is decreasing. Telekom has taken over some of the Serbian broadband Internet operators with a smaller market share, such as Copernicus Technology and Radius Vector, in the end of 2018. This action prevented the decline in market share. In addition to Telekom and SBB, other operators have significantly lower market shares (Table 4).

Table 4. Operators market share in the broadband Internet market based on the number of subscribers from 2015 to 2019

Year	Telekom Srbija	SBB	Other operators
2015	46.00	21.00	33.00
2016	47.50	26.30	26.20
2017	44.17	32.28	23.55
2018	46.00*	33.00	21.00
2019	48.00*	35.00	17.00

Source: Authors' calculation based on RATEL data

The Herfindahl-Hirschman index was applied for a more detailed concentration level examination in broadband Internet services. It can be noticed that HHI is continuously above the value of 2,500 points within the four-year period (available data). It implies a high market concentration with a tendency for further increase (Table 5).

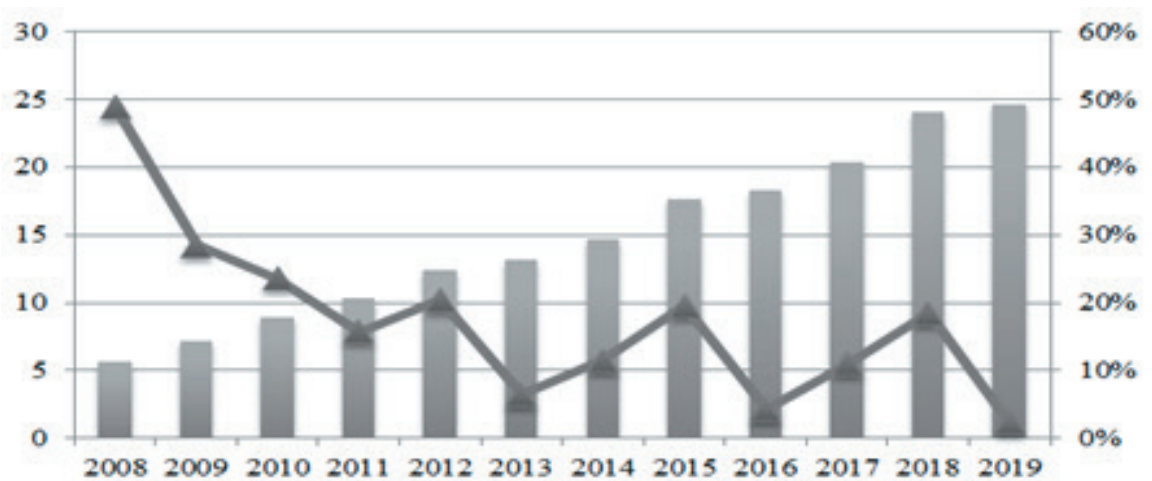
Table 5. Herfindal-Hirschman index on the Serbian broadband Internet services market from 2015 to 2019

Year	HHI
2015	2,746.00
2016	3,074.38
2017	3,101.31
2018	3,314.00
2019	3,624.00

Source: Authors' calculation based on RATEL data

Media content distribution is another important market of the Serbian electronic communications sector regarding the number of subscribers and the realized revenue. This market has shown significant development dynamics in the last few years. The number of subscribers has grown significantly in the last few years, so the number of subscribers was 922,000 at the beginning of the observed period in 2008, while there were 2 million subscribers a decade later. Most subscribers use the media content distribution service within the service package, along with the broadband Internet service, which sufficiently makes the market analysis of this electronic communications services segment difficult. Graph 8 shows media content distribution revenues are constantly growing. There was a significant increase in revenue in the observed period, so revenue increased fivefold in 2019 compared to 2008. Revenue growth rates in certain years were extremely high; in 2008 the growth rate was 50%.

Graph 8. Revenues in billions of dinars and the revenue growth rate from media content distribution from 2008 to 2019



Source: Authors based on RATEL data

There are about 80 undertakings in the media content distribution market in the Republic of Serbia. There were 81 in 2019. However, two undertakings with a high market share stand out, namely SBB and Telekom. SBB has about 50% of the market share during the entire observed period, and Telekom, with all related participants, such as Supernova, Copernicus technology, Radius Vector, etc., has about 38% market share. If Telekom is added to PTT Serbia's market share as another state-owned distributor, market share exceeds 40%. Around 10% of the market share belongs to operators that operate outside the system of SBB (United Group) and Telekom and PTT Serbia, which are in ownership of the Republic of Serbia. Table 6 shows the change in HHI values from 2008 to 2019. HHI index value is above 2,500 points throughout the period, indicating a high market concentration level. It is even higher if we regard all state-owned operators as one market participant (index value, in that case, would be 3,895.82 instead of 3,667.28 in 2019).

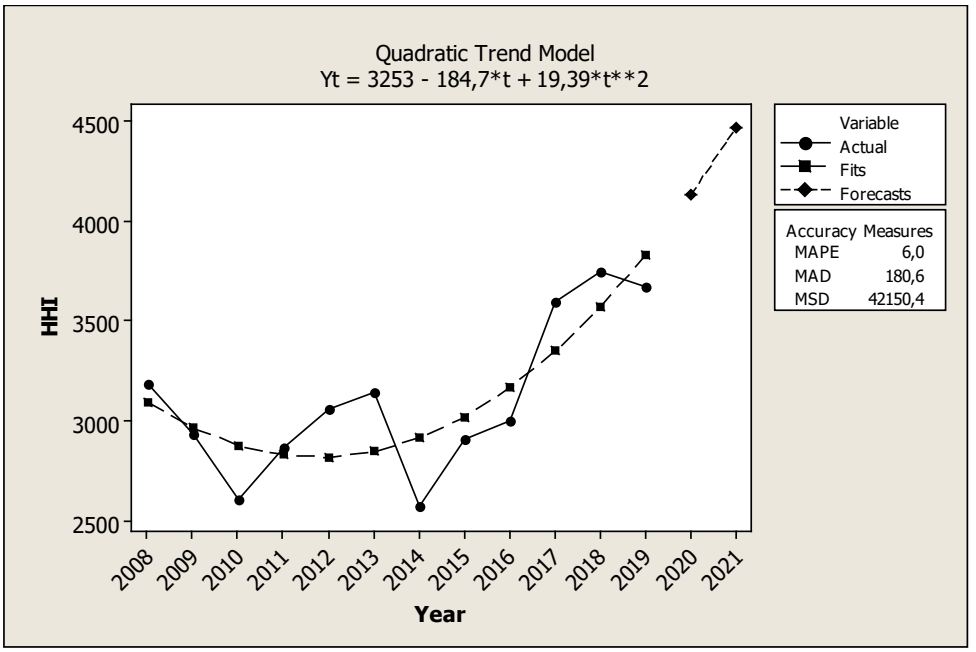
Table 6. HHI values on the media content distribution market from 2008 to 2019

Year	HHI
2008	3,177.32
2009	2,931.74
2010	2,603.58
2011	2,857.92
2012	3,051.74
2013	3,141.64
2014	2,564.86
2015	2,905.21
2016	2,993.21
2017	3,588.83
2018	3,746.08
2019	3,667.28

Source: Authors' calculation based on RATEL data

It should be emphasized here that we can expect a further increase in the market concentration and HHI value in the following period, and that may become serious issue. Graph 9 shows the HHI value trend, and the estimates for 2020 and 2021 based on the trend line that best corresponds to the presented data.

Graph 9. The HHI value trend in the media content distribution market with forecasts for 2020 and 2021



Source: Authors' calculation based on RATEL data

The trend curve indicates that a significant jump in the HHI value is expected in the following period (Graph 9). It requires additional caution from regulatory bodies and focusing on regular and detailed market conditions analysis.

CONCLUSION

This study estimates the market concentration of individual electronic communications services markets in Republic of Serbia: mobile telecommunication networks and services, broadband Internet services and media content distribution. The research findings, obtained by calculating the values of Herfindahl-Hirschman index, indicate that a high market concentration exists in all analysed electronic communications services in Serbia. It is an oligopolistic market structure with a high market concentration level where there are two or three leading undertakings. This conclusion is in line with the results of previous research (Maksimović *et al.*, 2011; Whalley & Curwen, 2012; Krstić *et al.*, 2016; Kostić *et al.*, 2016; Valaskova *et al.*, 2019).

As for the individual markets, mobile telecommunication networks and services have the best opportunity for some kind of concentration reduction. Although the trend line changes, based on data of the HHI value, it indicates a slight increase in market concentration in the following period. It is realistic to expect a continuation of the third mobile operator (Vip mobile) growth, as well as the operators of the new generation (virtual operators). This fact can reduce market concentration. A short-term market concentration increase is possible in this market, while we can expect a decrease in concentration in the long run. We can expect both short and long-term concentration increase in Serbian broadband Internet services and media content distribution.

The main characteristic of these two overlapping markets is two undertakings that dominate the market, whereas one is in the property of the United group, and the other two (Telekom and PTT Serbia) are the property of Republic of Serbia (these two can be considered as one participant, due to clear ownership structure). In the last few years, there has been intense rivalry between these two market participants, both trying to achieve market dominance. It is of particular concern that the activities against competitors involve deals prohibited by the competition law, like "predatory" pricing policy. It is necessary to regularly use sectoral analysis (such as this one) to prevent any form of competition distortion. It is an open warning for the regulators to pay more attention to these markets, especially regarding concentration increase and deteriorating competitive conditions.

The study contributes to a better understanding of competition conditions in electronic communications services in Serbia. Findings provide novel insights into the literature and have implications for competition authorities, also. The concentration of these markets is high and more attention should be paid to the actions of undertakings, especially in case of mergers. Special problem is that undertakings participate in several markets, so their market power is even greater. For more detailed consideration of the competition intensity between undertakings on these markets further research can include this problem in research model.

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KONCENTRACIJA PONUDE NA ODABRANIM TRŽIŠTIMA SEKTORA ELEKTRONSKIH KOMUNIKACIJA SRBIJE

Rezime:

Sektor elektronskih komunikacija je veoma značajan za funkcionisanje nacionalnih ekonomija. On pruža mogućnost za lakše odvijanje poslovnih aktivnosti i predstavlja dobro područje za investiranje. Na većini tržišta sektora elektronskih komunikacija funkcioniše mali broj operatora i veliki broj korisnika. Uslovi pod kojima su dostupne usluge elektronskih komunikacija razlikuju se između ostalog i zbog stepena liberalizacije pojedinačnih tržišta u konkretnim državama. Republika Srbija je značajno liberalizovala ovaj sektor ekonomske aktivnosti usklađujući ga sa regulativom Evropske unije. Ipak ostale su izvesne ulazne barijere vezane, pre svega, za licence koje operateri treba da pribave kako bi poslovali na tržištu Srbije. Rad ima za cilj da istraži nivo koncentracije na odbranim tržištima sektora elektronskih komunikacija i to: mobilne telefonije, širokopojasnog pristupa Internetu i distribucije medijskog sadržaja. Istraživanje je pokazalo visok nivo koncentracije meren Herfindal-Hiršmanovim indeksom na sva tri tržišta. Na svim analiziranim tržišta se očekuje dalje povećanje koncentracije u kratkom roku. Ovakvi rezultati istraživanja zahtevaju veću pozornost regulatornih tela jer povećavaju verovatnoću nekog oblika nekonkurentnog ponašanja učesnika na tržištu.

Ključne reči:

sektor elektronskih komunikacija,
tržišna koncentracija,
narušavanje konkurencije,
politika zaštite konkurencije.