

MARKET CONCENTRATION AND INDUSTRIAL CONCENTRATION MEASURES IN THE SERVICE OF EFFECTIVE COMPETITION WITH SPECIAL REFERENCE TO THE TELECOMMUNICATIONS MARKET IN BIH

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Abstract

The problem of mergers and market concentration, especially the emergence of cartels, is becoming increasingly widespread throughout the world, and the importance of antitrust authorities is also becoming greater. It is very important to define the concept of "market dominance", which is the ability of a company or group of companies to continuously maintain high prices, significantly above long-term average costs, without significantly reducing sales due to high prices. Industry is constantly developing and is affected by various influences that lead to an increase in market concentration, and based on this, the paper points out that it is necessary to constantly analyze and monitor the movement of concentration in the leading branches of an economy, with special attention to be paid to the basic elements of industrial concentration on the basis of which it is possible to easily understand numerous and complicated processes of the economy and business. Accordingly, the subject of research in this paper is market concentration and models for measuring industrial concentration in the service of effective competition. In order to investigate the problem and the subject of research, a hypothesis was set that the telecommunications market in Bosnia and Herzegovina is highly concentrated. The following methods and techniques of scientific research were used in the paper: comparative method, inductive and deductive method, standard statistical methods, concentration indices. Based on the achieved research results, it was concluded that the telecommunications market in Bosnia and Herzegovina is highly concentrated.

Keywords: industrial organization, market concentration, oligopoly, cartel, concentration indices

1. INTRODUCTION

The basic function of the market is to link production and consumption in an economic system in which the prevailing property relations lead to the emergence of decentralized decision-making. Historical development to date has confirmed that there is no economic, technological and social progress without a market that is not efficient in business and that is not efficient in the use of available resources. Namely, there are a large number of considerations that determine the degree of concentration that will be reached at a certain time in different industries and the degree of overall concentration in the entire economy. The multitude of these considerations determines the direction and level of change in concentration, or how it develops over time. The problem of mergers and market concentration, especially the appearance of cartels, is taking on ever greater proportions throughout the world, and the importance of competition commissions is also increasing. It is very important to define the concept of "market dominance", which is the ability of a company or group of companies to continuously maintain high prices, significantly above long-term average costs, without significantly reducing sales due to high prices. Terms such as mergers, takeovers, acquisitions, and integration describe a situation in which firms that are independently owned by each other

are combined into a single-owner firm. The term merger is used to refer to any type of combined ownership, regardless of whether the merger occurred at the initiative of both firms or whether one firm took over the other. Market concentration is a dynamic category that includes various forms of connecting entrepreneurs, and accordingly, an attempt is made to explain what is happening with it in the market. Measures of industrial concentration are important for business people, the government, and those involved in collecting and processing economic data and all scientific research. The paper points out that, among other things, it is necessary to constantly analyze and monitor the movement of concentration in individual industries, with special attention paid to the basic elements of industrial concentration on the basis of which it is possible to easily understand numerous and complicated concentration processes. The main goal of this paper and research is to point out that every company strives to have as much market power as possible, or market concentration, because it leads to greater profits, and the measure of market concentration is determined using market indicators. It is quite certain that there is a tendency for a number of companies in different industries to operate as efficiently as possible

by exploiting the economy with as large a volume of production and sales as possible, and to achieve a successful level of concentration in sales on this basis.

2. LITERATURE REVIEW

The market is a system of economic relations between people, companies and the state, which are established voluntarily, without coercion and on the basis of market laws and principles. It is a mechanism based on competition, and it manages the movement of supply and demand, whose interaction is expressed through the price system (Đerić and Rebić, 2015). The main function of the market is to connect production and consumption in an economic system in which the prevailing property relations lead to the emergence of decentralized decision-making (Labus, 1997).

Historical development to date has confirmed that there is no economic, technological and social progress without a market that is not efficient in doing business and which is not efficient in using available resources. In the market, buyers appear as carriers of demand, and sellers of goods as carriers of supply. According to the relationship between supply and demand for goods, their market price is formed. Market prices represent information on the basis of which all participants in economic activity make decisions aiming to maximize the satisfaction of their interests (Babić, S., and

The basic hypothesis is that the telecommunications market in Bosnia and Herzegovina is highly concentrated.

Milovanović M., 2001). Profit maximization is achieved through various combinations of price and production quantity, and they are largely influenced by the market structure. The most important characteristics of market structure are the number of producers, the existence of entry barriers, and product differentiation (Lipczynski, Wilson, and Goddard, 2017).

If we focus only on the number of market participants, at first glance this criterion may lead us to a large number of possible combinations, because each side of the market, whether on the supply or demand side, can have a large number of economic units. In theory, it has been shown that all these structures can be combined into three typical categories that cover all situations: where one side of the market consists of only one economic participant, it is a monopoly, where it consists of a few economic units – oligopoly, and where there are a very large number of economic units, then there is perfect competition (Stackelberg, 2011). Both sides of the market, supply and demand, can be found in each of these three categories. The table provides an overview of the standard types of market structure.

Table 1: Types of market structure

	Number of producer	Entry barriers	Product differentiation
Perfect competition	Many	Free entry	Identical product
Imperfect market:			
<i>Monopolistic competition</i>	Many	Free entry	Partial differentiation
<i>Oligopoly</i>	Few	Existence of entry barriers	Partial differentiation
<i>Monopoly</i>	One	No entry	Complete differentiation

Source: Lipczynski, Wilson, ^ Goddard (2017)

In the early twentieth century, classical microeconomic analysis focused on models of perfect competition and pure monopoly. It soon became apparent that these two models were unable to explain many aspects of business behavior in the world, such as: product differentiation, advertising, price wars, parallel pricing, and collusion. A new theory was needed to cover the vast area that lies between the two polar cases of perfect competition and monopoly. This middle area can be divided into two parts: monopolistic competition, which is closest to perfect competition; and oligopoly, which occupies much of the remaining spectrum. Oligopoly theory is based on emphasizing the importance of the number of

firms in an industry and the nature of the product. In all oligopolistic markets, a few sellers account for a significant percentage of total sales. The small number of firms is a basic characteristic of oligopolies. As a result of the small number of firms in a clearly defined industry, producing a similar product or service, the main problem of oligopolies focuses on recognizing the interdependence of firms. Interdependence means that a firm is aware that its actions affect the actions of its rivals and vice versa. It is sometimes suggested that the solution to the oligopoly problem lies in one of two extremes: pure independent action or collusion. Under pure independent action, each firm makes a unilateral

decision about a course of action, without any prior contact with its competitors. Under collusion, two or more competitors recognize their interdependence and create the opportunity for negotiation to create a plan of joint action (Lipczynski, Wilson, & Goddard, 2017).

Oligopolies are afraid of a price war, which is why many forms of regulation of oligopoly markets by their participants, i.e. the behavior of one of them, have arisen. Thus, various institutions have emerged that are established to promote and organize cooperation between producers, some of which are: cartels, trade associations, joint ventures, semi-secret agreements, and state-sponsored agreements. One way to avoid the uncertainty of oligopolistic interdependence is to enter into secret agreements. If mutual agreement is possible, firms are better off choosing the output that maximizes the total profits of the industry and then dividing the profits among themselves. When firms come together

and try to set prices and production volumes in order to maximize the total profits of the industry, they are called a cartel. Cartels are direct (albeit secret) agreements between competing oligopolists with the aim of reducing the uncertainty that arises from their mutual interdependence (Koutsoyiannis, 1996).

A cartel is simply a group of companies that have agreed to behave as individual monopolists and maximize the sum of their profits (Varijan, 2013). Based on the above definitions, cartels can be most simply defined as associations of entrepreneurs with monopolistic goals, as defined by the German economist Robert Liefmann. The term cartel comes from the German word "Kartelle" which means producer association, and the root of the word is found in the Latin word "charta" which means letter or paper. In the literature, cartels are often called trusts (Colander, 1998).

3. INDUSTRIAL CONCENTRATION MEASUREMENT INSTRUMENTS

According to the Competition Act, a concentration is considered to be:

- merger or acquisition of independent economic entities or parts of economic entities;
- acquisition of control or dominant influence by one or more economic entities over another or over several other economic entities or part of another economic entity or parts of other economic entities, by acquiring the majority of shares or shares of the share capital, by acquiring the majority of voting rights or in another manner, in accordance with the provisions of the law regulating the establishment of economic entities and their management;
- joint investment on a long-term basis, of two or more independent economic entities, which act as an independent economic entity.
- For the purposes of analyzing a company's competitive environment, it is necessary to identify the key elements of the industrial structure. The most important elements and characteristics of the industrial structure are:
 - number and size of enterprises,
 - existence and strength of barriers to entry and exit into the industry, and
 - degree of product differentiation.

Firm concentration refers to the first of these elements and includes: the distribution and number of firms and the size of the firms. In empirical studies of industrial

organization, firm concentration is the most commonly used indicator of industrial structure. Each particular measure of firm concentration aims to reflect the implications of the number and size of firms in an industry, using a relatively simple numerical indicator. Both the number of firms and their size (in other words, the degree of inequality in firm sizes) are important. For example, the nature of competition in an industry containing ten firms of equal size may differ greatly from the nature of competition in an industry consisting of one dominant firm and nine smaller firms. A measure of market concentration should be able to capture the implications of both the number of firms and their relative size. The most common measures of industrial concentration used to satisfy this criterion are:

- the sales volume ratio of the "big 4 firms" (C4),
- the HHI (Herfindahl-Hirschman) index,
- the Lerner index⁸ and the Lorenz curve,
- the Gini coefficient.

There are two reasons why such precise measures of market concentration are needed. The first is to enable comparisons of concentration across industries in the same or different countries. The industries being compared need not have anything in common, but an appropriate measure of concentration must allow for comparisons of concentration despite the fact that different industries have different numbers of firms and different distributions of their market shares. Second, in cases where regulators want to intervene and prevent

⁸ The Lerner index is equal to the negative reciprocal of the elasticity of demand at the monopoly equilibrium point.

changes in concentration within an industry, the regulator itself must determine a general measure by which to decide whether an industry is concentrated.

4. METHODOLOGY

During the research, all available professional literature was used and studied, the Internet as a modern method of data search, relevant journals and other sources in order to obtain necessary and important information related to the subject of research. For the purpose of research, and taking into account the specificity of the subject studied, various methods were used in the work in order to meet basic methodological requirements such as objectivity, reliability, generality and systematicity. The work used existing literature in the field of market and market structure, market concentration, mergers, available examples from these areas, then statistical data, as well as data on the work of specific companies: Telecom Srpske - Mtel, BH Telecom and HT Mostar, and various concentration indices were used to define, research and explain their work. Of the methods and techniques of scientific research work, the following were used: comparative methods of analysis, inductive and deductive methods, standard statistical methods. For the purposes of this research, the sales volume coefficient of the four largest companies and the Herfindahl-Hirschman index were used.

3.1. Sales volume ratio of the four largest companies

From 1968 to 1982, the sales volume ratio of the four largest firms was used as a measure of concentration as a guide for mergers. This index is also often referred to in the literature as the N-firm concentration index. It represents the sum of the shares of the four largest firms in the industry. The formula for calculating the sales volume ratio of the four largest firms (C_4) is derived from the n-firm concentration index. The n-firm ratio index is denoted by CR_n and is used as a measure of the market shares of the n largest firms in a market:

$$CR_n = \sum_{i=1}^n S_i / S_t$$

where S_i represents individual sales of large firms, while S_t is total sales. Based on this, the sales volume index of the four large firms is defined as:

$$I_4 = \sum_{i=1}^4 S_i$$

$$C_4 = \frac{S_1 + S_2 + S_3 + S_4}{S_t}$$

These measures can be used in the legal system where arbitration is carried out in merger conflicts between companies and regulators (Šaj, 2005).

S_1, S_2, S_3 i S_4 are the individual sales of the Big Four, and S_t – represents total sales. The coefficient of sales volume of the four large companies expressed in this way shows how much of the production in the industry is accounted for by the four largest companies, i.e. the sum of the shares of the four largest companies in the industry. The concentration level in CR_4 can range from 0 to 100 (Šaj, 2005, p. 171). When the concentration level is 0%, then it is an extremely competitive market, and when it is 100%, then there is a concentrated oligopoly or even a monopoly on the market (if one company achieves 100% concentration).

3.2. Herfindahl-Hirschman (HH) index

Working independently, Hirschman (1945) and Herfindahl (1950) attempted to avoid the problem of measuring concentration using the sales volume ratio of the four largest firms and recommended a different measurement method, which they called the Herfindahl-Hirschman index. This index proposes that a measure of concentration be calculated based on the sum of the individual squares of the market shares of all firms in an industry. Using this index, it takes into account the existence of differences in the size of market shares between competitors and includes all firms in the calculation. The Herfindahl-Hirschman (HH) index is calculated as follows:

$$I_{HH} = \sum_{i=1}^N (S_i)^2$$

where S_i is the market share of firm i , and N is the total number of firms in the specified industry.

For an industry consisting of a single monopoly producer $I_{HH} = 1$, the monopolist has a market share $S_1 = 1$. Based on this, $S_1^2 = 1$, so the HH index $I_{HH} = 1$. The value 1, for an industry with N firms, is the highest possible value of the Herfindahl-Hirschman index, and the lowest possible value is $I_{HH} = \frac{1}{N}$. Achieving the maximum value of 1 indicates the existence of a monopoly by only one firm, or in the case when there are multiple firms, then one dominant firm has a market share that is only partially less than 1, and small firms have a market share that is slightly greater than zero. The minimum value $I_{HH} = \frac{1}{N}$ occurs when the industry consists of N firms of equal size. In this case, each firm has a market share $S_i = \frac{1}{N}$ (Lipczynski, Wilson, & Goddard, 2017).

This method of measuring market concentration allows the index to be calculated regardless of how many elements the sample contains and provides the possibility of comparing even different industries. Industries can have only a few companies, but also several thousand companies. The value of the HH index ranges from 0 to 10,000, where a value of zero is achieved in perfect competition, and a value of 10,000 in the case of a monopoly. The importance of calculating market concentration in this way can be seen in the fact that the HH index takes into account the individual market shares of all companies in the industry, but still reacts to the presence of companies with a large market share, because the value of the index increases significantly.

The importance of this index is also demonstrated by the fact that the US Department of Justice routinely uses it to determine whether an industry is competitive enough to allow a merger between two large firms in the industry. If the HH index is less than 1,000, the Department of Justice assumes that the manufacturer is competitive enough and does not look closely at the merger, as it is considered a low-concentration market. In the case where the index ranges between 1,000 and 1,800, it is interpreted as a medium-concentration market, while values above 1,800 indicate high market concentration, and in such cases, a takeover or merger of another company will not be permitted (Colander, 1998).

Table 2: HH index values and market types

VALUE HH INDEX	DEGREE OF SUPPLY CONCENTRATION
$HH_i < 1000$	Low concentrated supply
$1000 \leq HH_i < 1800$	Medium concentrated supply
$1800 \leq HH_i < 2600$	Highly concentrated supply
$2600 \leq HH_i < 10000$	Very highly concentrated supply
$HH_i = 10000$	Monopolistically concentrated supply

Source: Begović, Mijatović (2002)

Although it is accepted as a measure that makes it easier to calculate market concentration compared to some other ways of measuring market concentration, this way of measuring market concentration is not perfect and without difficulties. In the practical use of the HH index, there is a need for accurate data for each individual company in a single industry, which is sometimes not possible. In contrast, the CR_n requires only individual

data on the leading n companies and data on the entire sector. However, although data for extremely small companies is sometimes not available, the calculated value of the I_{HH} index does not deviate much from the actual value, because it takes into account the very small influence of small companies and their negligible market share.

5. CONCENTRATION ON THE MARKET OF MOBILE OPERATORS IN BIH

Three licensed mobile operators currently operate as users of licenses for the provision of GSM/UMTS/LTE services in Bosnia and Herzegovina, namely:

- JP BH Telecom DD, Sarajevo (BH Telecom);

- Telecommunications RS AD, Banja Luka (Telekom Srpske) and
- JP Hrvatske telekomunikacije DD, Mostar (HT Mostar).

Table 3: Statistical data of the market of mobile operators in Bosnia and Herzegovina

MOBILE OPERATORS	31.12.2021.
Total number of active mobile network subscriptions	3.728.775
Number of pre-paid subscriptions	2.793.701
Number of post-paid subscriptions	989.074
Percentage of population covered by GSM mobile network	100%
Percentage of population coverage with (UMTS) 3G mobile network	97%
Percentage of population coverage with (LTE) 4G mobile network	93%

Source: Telekomunikacijski pokazatelji BIH (2021)

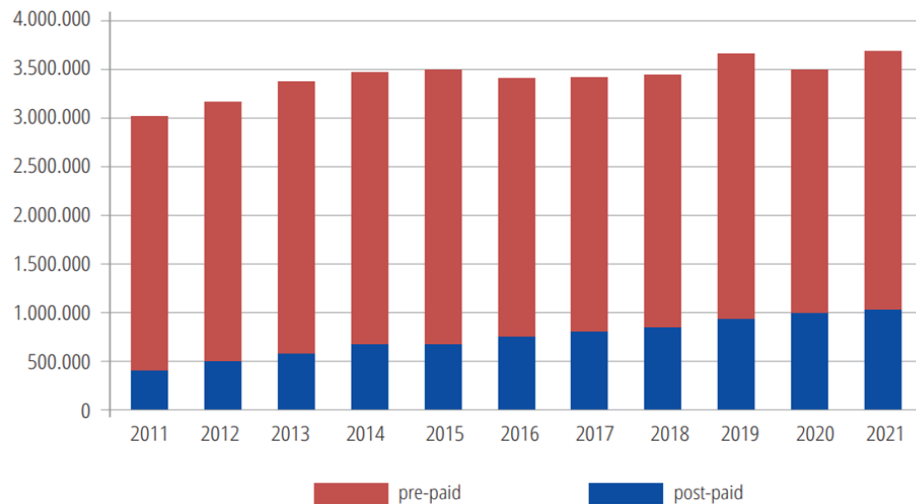
On 08.04.2019., in accordance with the Decision on Licenses for the Use of Radio Frequency Spectrum for the Provision of Services via Mobile Access Systems („Službeni glasnik BiH“, broj 23/19), the Communications Regulatory Agency granted mobile operators licenses for the use of radio frequency spectrum for the provision of services via mobile access systems to the listed licensed mobile operators.

By the end of 2021, four mobile service providers existed on the networks of three mobile network

operators: BH Telecom d.d. Sarajevo, M:tel AD Banja Luka and HT Mostar DD, as follows (Godišnji izvještaj regulatorne agencije za komunikacije, 2021):

- DASTO SEMTEL d. o. o. Bijeljina;
- LOGOSOFT d. o. o. Sarajevo;
- NOVOTEL d. o. o. Sarajevo;
- HALOO d. o. o. Sarajevo.

Figure 1: Number of mobile phone subscribers in the period from 2011 to 2021.



Source: Godišnji izvještaj regulatorne agencije za komunikacije, 2021

Based on the single definition of active prepaid and postpaid subscribers for all SMP operators in mobile telephony, which is aligned with the standards of the European Commission and ITU, the number of mobile subscribers on 31.12.2020 was 3,509,674. This number recorded a slight decrease compared to 2019, and the number of prepaid subscribers is still several times higher than postpaid subscribers (Figure 1). At the end of the third quarter of 2020, the share of postpaid users in the total number of users of telephone services in mobile telephony was 28.93%, and there is evident growth in this segment over the years, but it is still much lower than the average in the surrounding countries and the European Union. According to available data from the regulatory agencies of the countries in the region for 2019–2020, the share of postpaid users in Serbia is 61.14%, in Croatia it is approximately 56%, and in Montenegro it is 57.87%. The number of mobile

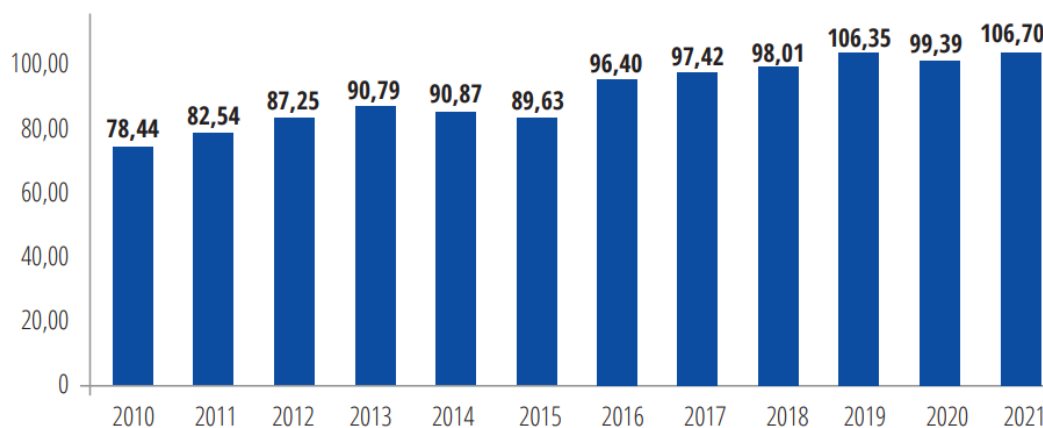
subscribers in BiH as of December 31, 2021 was 3,767,810, recording an increase of 7.35% compared to 2020⁹.

When looking at the level of penetration (number of mobile subscribers per 100 inhabitants) of mobile telephony at the end of 2020 was 99.39%, while for 2019 it was 106.35%. The mobile telephony penetration rate is below the latest available values in neighboring countries (Montenegro 174.51%, Serbia 122%, Croatia 104.36%)¹⁰. The large use of applications as substitutes for making voice calls (such as Viber, Skype, Gtalk, Whatsapp) and substitutes for SMS and MMS (such as Whatsapp, Google Talk, Facebook Messenger, Viber, Skype) has led to a continuous decline in international outgoing voice traffic and the number of SMS and MMS messages. The level of the number of mobile subscribers per 100 inhabitants of mobile telephony in BiH at the end of 2021 was 106.70%.¹¹

⁹ Regulatorna agencija za komunikacije (2022), *Godišnji izvještaj Regulatorne agencije za komunikacije za 2021*, www.rak.ba.

¹⁰ Godišnji izvještaj za poslovnu 2020, www.mtel.com.

¹¹ Regulatorna agencija za komunikacije (2022), *Godišnji izvještaj Regulatorne agencije za komunikacije za 2021*, www.rak.ba.

Figure 2: Number of mobile phone subscribers per 100 inhabitants in the period from 2010 to 2021.

Source: Godišnji izvještaj regulatorne agencije za komunikacije, 2021

5.1. Telecommunications RS AD, Banja Luka (Mtel)

“Telekomunikacije Republike Srpske” a.d. Banja Luka was founded on 20.12.1996. as the Public Basic State Enterprise for Telecommunications of the Republic of Srpska. It is headquartered in Banja Luka. Its main area of activity is information and communications. Its main activity is wireline telecommunications and related service activities, i.e. the transmission of voice, data, text, sound and image, which includes:¹²

the activity of wired telecommunications, wireless telecommunications activity, activity of satellite telecommunications, other telecommunication activities.

The ownership is divided between Telekom Srbije a.d. Belgrade (65.01%) and public funds and other shareholders (34.99%). The value of the share capital is 491,383,755 KM. Mtel has shares in seven companies, as follows:¹³

- five subsidiaries with 100% ownership: Logosoft, Telard Net, Blicnet, Elta-Kabel and Finance;
- two associated companies with less than 50% ownership: Društvo za telekomunikacije MTEL d.o.o. Podgorica and MTEL global d.o.o. Belgrade.

Mtel with a total number of employees in 2020 is 2,105. Business decisions were made to ensure a safe working environment for employees, given that it was necessary to maintain all business processes, as well as the quality of services, so that customers would not feel the consequences of the situation the entire planet found itself in. This is supported by the results for 2021, from which the company emerged with success and managed to maintain the level of employees in the amount of 2,085 employees on 31.12.2021.¹⁴

The strategic focus is classified into several segments – technological, user and socially responsible business segments. In addition to the above, Mtel's strategic focus is on activities aimed at preventing the spread and consequences of Covid-19. In 2021, total revenues amounted to 447.0 million convertible marks, which represents an increase of 4.3% compared to 2020. Mobile telephony revenues were realized in the amount of 191.3 million convertible marks, which is 4.3% more compared to 2020, as a result of the growth of the user base by more than 126,000 users.

Table 4: Revenue from telecommunications services (in million KM)

	2017.	2018.	2019.	2020.
Total income	1.339	1.266	1.240	1.241
Mobile telephony revenues	579	549	529	529
Fixed telephony revenues	377	365	298	340
Income from internet services	141	168	172	172

Source: Godišnji izvještaj za poslovnu 2021

Given the coronavirus pandemic since March 2020, the main goal in terms of the number of users was to

preserve the user base and focus on other ways of selling services, besides direct sales - web sales, telesales,

¹² Godišnji izvještaj za poslovnu 2020. godinu, www.mtel.com.

¹³ Godišnji izvještaj za poslovnu 2020, www.mtel.com,

¹⁴ Godišnji izvještaj za poslovnu 2021, www.mtel.com,

indirect/field sales. Also, significant growth was recorded in the segment of integrated services with TV, postpaid mobile telephony, m:SAT and internet services.¹⁵

Mtel's customer base consists of more than 1.7 million users. Despite the coronavirus pandemic and the market situation, it should be noted that the increase in the

number of users in 2021 was close to 150 thousand users, of which the most significant increase was in the mobile telephony services segment. The number of mobile telephony users as of 31.12.2021 is 1,392,979, of which the number of prepaid users is 961,154, while the number of postpaid users is 431,825.¹⁶

Table 5: Service users

	2017.	2018.	2019.	2020.	2021.	2021. vs 2020.
Mobile telephony (mil.)	1,31	1,32	1,36	1,27	1,39	10%
Fixed telephony (thousand)	235,3	227,3	220,5	212,4	203,6	-4,1%
Integrated services (thousand)	97,1	109,5	118,7	126,3	133,1	5,4%
NET services (thousand)	134,1	143,0	152,4	164,2	175,6	7,0%

Source: Godišnji izvještaj za poslovnu 2021

During 2021, there was an increase in the segment of prepaid users, with the number of users increasing by 12.1%, as a result of constant improvement of the prepaid offer and the creation of attractive prepaid packages and promotional offers. In addition to the above, there was also an improvement in the situation related to the Covid-19 pandemic, which was directly reflected in the total number of users. Prepaid users in the total user base of mobile telephony participate with 69.0%.

5.2. JP BH Telecom DD, Sarajevo (BH Telecom)

JP BH Telecom was established by the Decision of the Government of the Federation of Bosnia and Herzegovina on 20.12.2001. when two new entities JP BH Pošta and JP BH Telecom were formed from the legal predecessor of the Public Enterprise PTT Traffic of Bosnia and Herzegovina. In its current form, the Joint Stock Company BH Telecom Sarajevo has existed since 12.03.2004. when the form of the company was changed. Ownership is divided into 90% owned by the Government of the Federation of Bosnia and Herzegovina and 10% by other shareholders. The value of the share capital of the Joint Stock Company BH Telecom Sarajevo as of 31.12.2021. amounted to 634.57 million KM, divided into 63,457,358 ordinary shares, with a nominal value of 10 KM.¹⁷ According to the annual statistical report of the Sarajevo Stock Exchange (SASE), the highest turnover this year was achieved with shares of the issuer BH Telecom DD, Sarajevo and represents 18% of the total regular turnover achieved on the SASE Free Market.¹⁸ BH Telecom emphasizes the social responsibility of business, which is an integral part of its practice and which is implemented through continuous activities

such as: donations to non-profit organizations, supporting cultural, sports, humanitarian events through various sponsorship arrangements, investing in education and science projects, as well as implementing environmental protection measures. By placing service users in the spotlight, responsibly managing the implementation of new technologies and making good business decisions, they have managed to become the best provider of telecommunications services.

The number of employees was reduced by 62 compared to 2020, and as of 31.12.2021 there were 3,104 employees. Total revenues in 2021 were 471.6 million KM, which represents a growth of 3% compared to the previous year. Revenues from the mobile user segment in 2021 were 15.3 million KM higher, or 9% more than the previous year. During 2021, the offer for prepaid users was constantly improved, so the number of users at the end of 2021 was 7% higher than the previous year. The easing of measures and the lifting of travel restrictions resulted in an increase in the arrivals of people from the diaspora and tourists in the summer months.¹⁹

5.3. Public Company Croatian Telecommunications DD, (HT Mostar)

JP Hrvatske telekomunikacije DD, Mostar was created by the separation of Croatian Post and Telecommunications into Croatian Post (HP) and Croatian Telecommunications (HT), so it was officially established on 1.1.2003.²⁰ became one of the three national network operators. At the beginning of 2009, a decision was made to re-register the company from a limited liability company to a joint stock company, and the shares are listed on the free market of the Sarajevo Stock Exchange. Ownership is divided between the

¹⁵ Godišnji izvještaj za poslovnu 2020, www.mtel.com,

¹⁶ Godišnji izvještaj za poslovnu 2021, www.mtel.com,

¹⁷ Godišnji izvještaj o poslovanju 2021, www.bhtelecom.ba.

¹⁸ Godišnji izvještaj o poslovanju 2020, www.bhtelecom.ba.

¹⁹ Godišnji izvještaj o poslovanju 2021, www.bhtelecom.ba.

²⁰ HT Eronet – upoznajte nas, www.hteronet.ba.

Government of the Federation of Bosnia and Herzegovina, T-Hrvatski telekom DD, Zagreb (T-HT, Zagreb), Hrvatska pošta DD, Zagreb and small shareholders.

HT Mostar has adopted a value-based approach to its business based on social responsibility, through environmental protection activities through various

6. RESEARCH RESULTS AND DISCUSSIONS

The telecommunications market in Bosnia and Herzegovina can be characterized as oligopolistic in terms of competition (a market with a small number of participants), with a very strong level of competition between individual mobile operators. The telecommunications market is influenced by the general, economic and political conditions in the country, with a high rate of population migration (departure of the population from BiH). It is also characterized by a low level of information and communication technologies compared to the level in the European Union. Also, new technologies such as mobile phones and the Internet stand out for their rapid acceptance by the younger population. Strengthening competition in the telecommunications market of BiH, all negative influences, but also rapid progress in the development of technology has enabled the introduction of new and better services to end users, but still at a higher price than in the countries of the region.

The beginning of 2020 was marked by a major global economic crisis caused by the coronavirus, which led to the closure of borders, and the Council of Ministers declared a state of natural disaster in the country, which had a negative impact on the economy of Bosnia and Herzegovina. The economic shock hit non-financial companies the hardest, and had a negative impact on the labor market, with the transport and tourism sectors recording the highest losses. Like all other sectors, the telecommunications market in 2020 felt changes in business due to the consequences of the pandemic, with people across the country relying on technology to work from home, maintain social connections, and stay informed. The pandemic particularly highlighted the importance of the telecommunications sector in maintaining business operations and the connectivity of society. The trend of consumer habits changed, where the demand for mobile internet decreased, as most residents were at home and used wifi networks, with a pronounced need for broadband internet. Mobile operators tried to respond to these needs by increasing network bandwidth and increasing data transfer speeds due to increased user demand. Also, changes were

sponsorship and donation activities. Also, through sponsorship and donation activities, it supports education, culture, scientific institutions and sports. HT Eronet particularly emphasizes that the basic principle of today's society is sustainable development and that we should think about our actions today because of what we leave for future generations.

recorded in the increase in the problem of collecting receivables caused by the recession.²¹

Telecommunications operators were obliged to maintain the existing level and quality of services and to provide competent institutions, bodies and institutions with priority in the flow of traffic, or, at the request of competent authorities, to ensure priority access to emergency numbers. The Agency concluded that the provision of telecommunications services in Bosnia and Herzegovina was largely uninterrupted, but the use of internet traffic had clearly increased. In this regard, the Agency appealed to citizens, users of telecommunications services, to use the internet rationally in the circumstances of the declared state of emergency, or to make the use of the internet rational. The impact of the pandemic has led to cooperation between mobile operators, which was unthinkable in previous years. Given the importance of telecommunications services for the citizens of Bosnia and Herzegovina during the declared state of emergency, the Communications Regulatory Agency has called on operators of public telecommunications networks and services to provide full support to all competent institutions in Bosnia and Herzegovina in terms of urgent notification of users through all available advertising channels (SMS, e-mail, system-generated messages, info channels, etc.). During the state of emergency, telecommunications operators are called on to work together and cooperate in terms of technical support, troubleshooting and capacity sharing, if necessary. In some countries, data exchange and communication between authorities and telecom operators has been crucial in identifying infected individuals and controlling the spread of the coronavirus. Some mobile operators have even leased frequency spectrum from competitors to enable access and better quality network services.

The market leader in BiH mobile telephony is BH Telecom with a total of 1,630,440 subscribers and a 43.27% share, followed by Telekom Srpske, which controls 35.49% of the market with 1,337,534 subscribers, and HT Eronet with a 21.03% market share

²¹ Deloitte, Undearstandig the sector impact COVID-19, Telecommunications, www2.deloitte.com, 2021.

and 792,253 mobile subscribers.²²

Table number 6 shows a comparative analysis of mobile operators in the period from 2015 to 2021. Based on the data presented, it can be seen that Mtel and BH Telecom dominate the market of mobile operators, but following

the trend from year to year, the constant growth of HT Eronet can be noticed, which increased its market share from 13.94% in 2015 to 21.03% in the last observed year, 2021.

Table 6: Comparative analysis of mobile operators in BIH

YEAR	NUMBER OF USERS	MTEL (num. usr.)	MTEL (in %)	BHTEL (num. usr.)	BHTEL (in %)	HT ERONET (num. usr.)	HT ERONET (in %)	OTHER (in %)
2015.	3443520	1402702	40.73	1545743	44.89	479902	13.94	0.44
2016.	3404043	1303876	38.30	1595159	46.86	495353	14.55	0.28
2017.	3440085	1332479	38.73	1601462	46.55	500395	14.55	0.17
2018.	3461058	1321627	38.19	1626000	46.98	508042	14.68	0.16
2019.	3755521	1355222	36.09	1636023	43.56	760268	20.24	0.11
2020.	3509674	1266174	36.08	1526959	43.51	715113	20.38	0.04
2021.	3767810	1337534	35.49	1630440	43.27	792353	21.03	0,21

Source: Author calculation on the basis Godišnji izvještaj Regulatorne agencije za komunikacije (2021)

Applying the sales volume coefficient for the N largest firms (the “Big 4” sales volume coefficient) to the current three most dominant operators:

$$C_3 = \frac{S_1 + S_2 + S_3}{S_t}$$

S_1 , S_2 i S_3 are individual shares, and S_t – represents total sales, it follows that:

$$C_3 = \frac{35,49 + 43,27 + 21,03}{100}$$

$$C_3 = 0,9979$$

Based on the high concentration coefficient of 99.79%, it can be concluded that there is an extreme example of oligopoly in the market, which is why such a market is monitored by state regulatory bodies. This coefficient

measures linearly and does not differentiate between different sizes of firms as long as it concerns the four largest firms that hold the most market shares. To test the truth of the above statement, we also apply the HHI index:

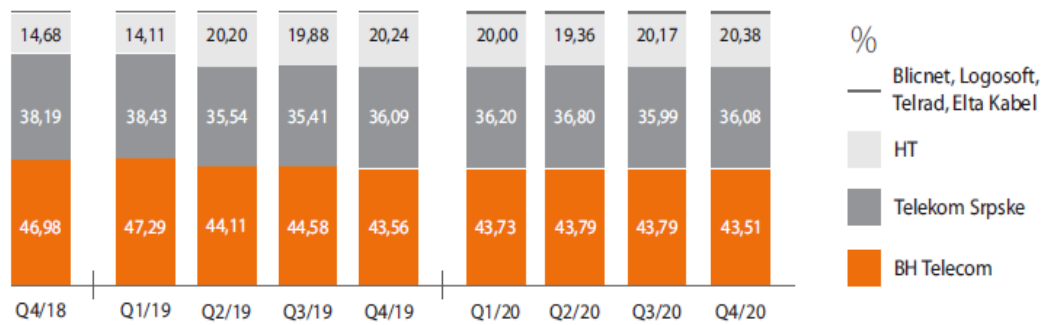
$$I_{HH} = \sum_{i=1}^N (S_i)^2$$

$$I_{HH} = (35,49)^2 + (43,27)^2 + (21,03)^2 + (0,21)^2$$

$$I_{HH} = 3574,13$$

Based on this, we see that the value of the HH index ranges from 2600 to 10000, which is interpreted as a very high concentrated supply, thus confirming the veracity of the sales coefficient of the four largest companies.

²² Regulatorna agencija za komunikacije (2022), *Godišnji izvještaj Regulatorne agencije za komunikacije za 2021*, www.rak.ba.

Figure 2: Market share of all mobile phone operators in BiH by quarter

Source: Godišnji izvještaj o poslovanju BH telecom (2020)

The figure shows the market share of all mobile telephony operators in BiH by quarter, based on data from the Communications Regulatory Agency of BiH. Since 1.1.2013, with the aim of strengthening the development of competition in the market, number portability in mobile networks has been enabled. As can

be seen in the figure, the total number of mobile telephony service users between the third and fourth quarters of 2020 has increased and has a growth trend, but in the same period, BH Telecom's market share has recorded a downward trend.

7. CONCLUSION

The degree of concentration of supply in a market is influenced by a large number of different factors. They can be divided into those that are of crucial importance for determining the degree of concentration, i.e. the main ones, and additional ones, when their importance in determining concentration is lower. Factors that influence the degree of concentration are the number of competitors in the market, the dispersion of market share and barriers to entry into the market, and they represent the main factors. Additional factors include economic potential, the geographical size of the market, technological conditions of production, etc. If we focus only on the number of market participants, at first glance this criterion can lead us to a large number of possible combinations, because each side of the market, whether on the supply or demand side, can have a large number of economic units. In theory, it has been shown that all these structures can be combined into three typical categories that cover all situations: where one side of the market consists of only one economic participant, it is a monopoly, where it consists of several economic units – oligopoly, and where there are a very large number of economic units, then there is perfect competition. Oligopoly theory is based on emphasizing the importance of the number of companies in the industry and the nature of the product.

One way to avoid the uncertainty of oligopolistic interdependence is to enter into collusion. If collusion is possible, firms are better off choosing the output that maximizes total industry profits and then sharing the profits among themselves. The collusion generally prevents the entry or development of new products that could threaten the profitability or survival of existing

firms. Economic power and economic concentration are closely related. Any form of economic concentration inevitably stems from adequate economic power. In the context of industrial concentration, the number and size of the distribution of enterprises can be cited as very important determinants of market power. Of course, there are many different ways to measure this market power.

It is quite certain that there is a tendency for a number of companies in different industries to operate more efficiently by exploiting economies of scale and sales and thereby achieve a successful degree of concentration in sales. In addition, there is a tendency for a number of companies in certain industries to develop the most efficient and profitable levels of sales promotion. There is also a group of “forces” operating in the market that cause growth or concentration. They provide an incentive for companies to progressively increase concentration within an industry or even beyond the boundaries of an industry. Merging two companies in this way has direct implications for the concentration of sellers and the structure of the industry, giving them greater market power in the combined organization. However, increasing market power is not necessarily the only reason why integration may be an attractive strategy. It may be motivated by the desire to achieve savings through economies of scale in production, purchasing, marketing or research and development.

Barriers to entry for new competitors are the production costs faced by firms seeking to enter an industry, while

firms already in that industry are exempt from these costs. Recently, a typical example of a barrier to entry into a particular market has been the control of a rare input necessary for the production process by a competitor. The mobile operator market in Bosnia and Herzegovina is an example of a market with pronounced barriers to entry, where only three operators have licenses to provide services, and the number of mobile service providers is decreasing year by year.

Based on the presented research and data, it can be concluded that the basic hypothesis has been confirmed, i.e. that the telecommunications market in Bosnia and Herzegovina is highly concentrated. Market concentration has been increasing in recent years as a result of various influences. This is also supported by the impact of the coronavirus, which has had a significant impact on both the domestic and global markets. In the example of the domestic mobile operator

market, especially at a time when the whole world was adapting to the new situation due to the pandemic, telecommunications have assumed an important role, or rather, the most important, after healthcare. After a slow recovery from the consequences of the coronavirus on the economy, global energy prices have risen sharply and caused a general increase in prices and an increase in the inflation rate. This economic environment has led to the increasing emergence of market-dominant companies, which are able to continuously maintain high prices, significantly above long-term average costs, without significantly reducing sales.

The Communications Regulatory Agency, as well as the Competition Council of BiH, through various activities of regulation and monitoring of compliance with laws and rules, are trying to combat certain irregularities in a given market, as well as the possible presence of discrimination against end users.

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