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ИНСТИТУТ ЗА ИКОНОМИЧЕСКИ ИЗСЛЕДВАНИЯ НА БЪЛГАРСКАТА АКАДЕМИЯ НА НАУКИТЕ

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CONTENTS

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ИКОНОМИЧЕСКИ ИЗСЛЕДВАНИЯ
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THE IMPACT OF PUBLIC DEBT ON THE ECONOMIC GROWTH IN SOUTH-EASTERN EUROPE: AN EMPIRICAL PANEL INVESTIGATION

The goal of this paper is to examine the impact of public debt in six countries from South-Eastern Europe over the period 2008 to 2017, by applying three different panel methods: the fixed effects model, the GMM method and the system-GMM method. More specifically, we investigate if there is evidence of a non-linear (quadratic) relationship in this group of countries. The results of our study confirm that increasing public debt has a statistically significant negative influence on the GDP growth. Also, the results confirm the existence of a „U inverted" relationship, with a maximum debt threshold of about 58% of GDP. After this threshold, public debt is expected to negatively affect the economic growth rate, due to fear of public debt unsustainability higher interest rates, and severe budgetary consolidation measures.
JEL: E62; H63; O47

1. Introduction

The macroeconomic implications of public debt gained huge public attention in the last two decades in many countries and regions around the world, and especially in the European countries. The reason behind this is the enormous and continuously growing level of indebtedness that occurred after the latest financial crisis in 2008. The implications from the crisis have raised serious concerns about the fiscal sustainability and potential negative impact on the financial markets and economic growth in all European countries.

In that regard, the specific aim of this paper is to empirically examine the impact of public debt on the economic growth in the sample of six countries from Southeastern Europe (Albania, Bosnia and Hercegovina, Kosovo, Macedonia, Montenegro and Serbia)[2] for the period 2008-2017. According to the knowledge of the author, very little has been written about the experience of the public debt in the countries from Southeastern Europe. Namely previous empirical studies have been based either on euro area (Baum et al., 2012;

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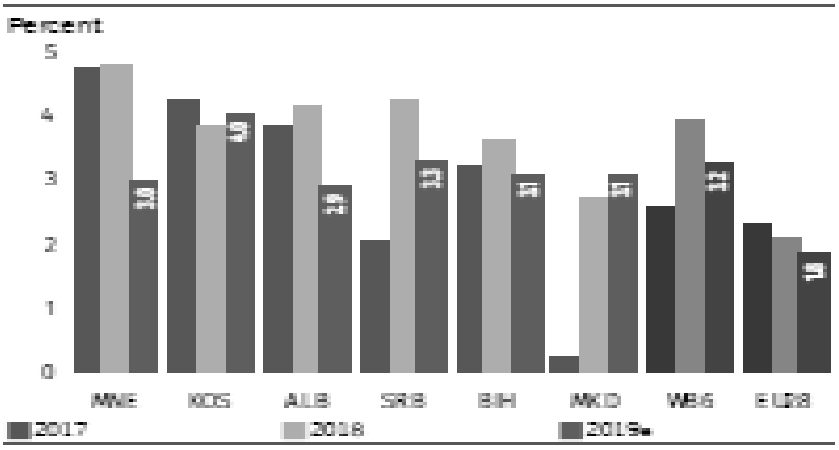
[2] This six countries listed in the World Bank's Regular Economic Report are grouped as "South Eastern European Six" (SEE6).

Checherita and Rother, 2010), selected group of developing countries (Imbs, Rancire, 2005; Pattillo et al., 2011) or countries from Central and Eastern Europe (Časni et al., 2014).

When considering the countries in South-eastern Europe, we must keep in mind that these are small economies and not very large markets. In 2018, the economies in the region, with few exceptions, suffered from more or less the same problems: declining rates of GDP and high unemployment. Current average GDP per capita for the six countries is only half the average in the 11 EU member states of eastern Europe, and just one-quarter of the most advanced western European countries EBRD (2018). Growth in the (SEE6) countries is projected to slow from a high of 3.9 per cent in 2018 to 3.2 per cent in 2019 (Figure 1). Except for Macedonia, where growth has continued to pick up after a major slowdown in 2017, and Kosovo, where it is expected to remain strong at 4.0 per cent, in the rest of the region growth will be somewhat lower than in 2018. By year-end, growth in Macedonia is projected to reach 3.1 per cent, driven by higher investment. In Kosovo, growth is expected to be driven mainly by consumption and service exports. Serbia, the largest economy in the region, is expected to grow at 3.3 per cent in 2019, down from 4.2 per cent in 2018, as higher consumption is undermined by the negative contribution of net exports and a deceleration of investment growth. In Albania, also despite strong consumption growth, a plunge in energy production is projected to slow growth to 2.9 per cent. In Bosnia and Herzegovina, growth is expected to slip to 3.1 per cent because of lower contributions from net exports and investment. In Montenegro, growth is expected to moderate to 3 per cent from a high of 4.9 per cent in 2018 as the public investment cycle is phased out.

Figure 1

In 2019 growth in SEE6 countries is projected to decelerate



Source: National authorities and World Bank estimates.

Furthermore, according to the data from World Development Indicators, the unemployment in Bosnia and Herzegovina, Macedonia and Kosovo is the highest in Europe World Development Indicators, while, employment rates remain low. Namely, by June 2019, 150,000 additional jobs have been created in the (SEE6) countries compared to a year

earlier. Some 43,000 young people have found jobs, especially in Albania, as youth unemployment in the region has fallen supported by the growing business-process outsourcing sector. Economic activity in 2018 has also attracted more women into the labour force. Despite these positive labour-market developments, less than half of those of working-age in the Western Balkans have a job (44 per cent). In Bosnia and Herzegovina and in Kosovo, only 34 per cent and 30 per cent of the working-age population has a job and youth unemployment remains high in both countries. Sustaining high and equitable economic growth is thus essential to create many more, much-needed job opportunities in the region World Bank Regular Economic Report No 16. In addition, these countries obtaining economic growth and protecting the population, through reduction of inflation and measures for limitation of the unemployment phenomenon, are considered to be priorities. Budgetary deficit and public debt are the instruments the state can use to achieve these major objectives. While increasing continuously (and almost doubling at the regional level in absolute values since 2006), the total public debt of the countries from Southeastern Europe is still relatively moderate at around 55% of GDP (weighted average) WBIF, **"**Outlook for Macroeconomic Development in the Western Balkans: IFI Coordination Office However, there are considerable variances among the countries. Successful fiscal consolidation programs and more prudent fiscal management have allowed Serbia to reduce PPG debt as a share of GDP to 52.1 per cent and Albania to reduce its PPG debt to 68.4 per cent. Albania achieved its reduction by careful spending, clearance of arrears, and currency appreciation; but mounting off balance risks, including from a rapid buildup in PPPs, are now a major concern. In Bosnia and Herzegovina, PPG debt has been stable in nominal terms and has declined a bit as a percentage of GDP; much of its debt is longterm, at favourable rates. However, the country must also deal with fiscal risks emanating from its highly leveraged state-owned enterprises (SOEs) and from sizable expenditure arrears. Kosovo's PPG debt is projected to go up slightly, to 17.7 per cent, as capital investments (mainly financed by privatization proceeds) are expected to pick up later in the year World Bank Regular Economic Report No 16. According to World Bank, Macedonia will see an increase in PPG debt, due mainly to higher government borrowing, but also because the public investment is due to accelerate. Montenegro's PPG debt is projected to reach a high of 83 per cent of GDP by yearend following the government's issuance of €500 million in Eurobonds to service debt due in 2020, and an expected intensification of highway construction later this year. Levels of public debt in South-eastern Europe combined with the pressures on public finance due to increased demand for social assistance and sluggish revenue growth further limit the fiscal space on the budget for further expanding infrastructure investments. At the same time, the region is still lagging behind in terms of its capital stock, both private and public, so further investment is needed. WBIF Strategy, **"**Meeting the challenges of realizing the Socio-economic Investments in Western Balkans", Discussion paper, IFI Coordination Office, May 2013.

Bearing in mind the purpose of this paper we will follow the studies of **(**Mencinger, Aristovnik, Verbič, 2014; Checherita, Rother, 2010), and we have applied a dynamic panel data approach to explain the impact of public debt on the economic growth. In order to provide consistent and unbiased results, we implemented three different panel methods: the fixed effects model, the GMM method and the system-GMM method. Against this background, one important question refers to the economic consequences of a regime of

high and potentially persistent public debt. While the economic growth rate is likely to have a linear negative impact on the public debt-to-GDP ratio (a decline in the economic growth rate is, *ceteris paribus*, associated with an increase in the public debt-to-GDP ratio), high levels of public debt are likely to be deleterious for growth. Potentially, this effect is non-linear in the sense that it becomes relevant only after a certain threshold has been reached Checerita and Rother (2010). Bearing this in mind, this non-linear relationship that the present paper seeks to investigate.

The results show that increasing public debt has a statistically significant negative influence on the GDP growth. Also, the results confirm the existence of a „U inverted" relationship, with a maximum debt threshold of about 57% of GDP. After this, threshold public debt is expected to negatively affect the economic growth rate, due to fear of public debt unsustainability higher interest rates, and severe budgetary consolidation measures.

The main contribution of this paper is that he deals with a subject with a small volume of empirical literature for the region of Southeastern Europe. Namely, according to the author, this is the first study who have analyzed the effect od public debt on economic growth for this region using a panel investigation. Furthermore, it also contributes by increasing the volume of literature on economic growth by applying a theoretical model with instrumental variables in square regression with assumed sustainability of public finances in relation to government debt. Finally, the findings in the paper can be of use in further analysis of economic growth and the creation of policies for effective debt management.

The structure of the paper is as follows. After the Introduction, Section 2 briefly reviews the existing relevant studies on the public debt and economic growth relationship. The sources for the data used as well as model specification and data are presented in Section 3. The results are presented and interpreted in Section 4. Finally, Section 5 concludes the paper findings and gives policy recommendations.

2. Literature Review

In this section, we present a brief sublimate of empirical literature concerning the relationship between public debt and economic growth. In the literature, there are empirical studies that analyze the impact of public debt on economic growth, both on individual countries such as (Smyth and Hsing 1995) in the USA (Balassone, Francese, Pace, 2011) for the case of Italy and in the panel set of countries (Clements, Bhattacharya, Nguyen, 2003; Reinhart, Rogoff, 2010; Schclarek, 2004). Bearing in mind the purposes of our study, we will be focus only on studies that cover primarily the countries from Eastern and South-east Europe.

The empirical literature on the relationship of the public debt and growth in the countries from Eastern and Southeastern Europe is quite scarce (Časni, Badurina, Sertić, 2014; Gál, Babos, 2014; Bilan, Ihnatov, 2015).

With dynamic panel analysis of a sample with 14 countries from the Middle, East and Southeast Europe for the period 2000-2011, Časni, Badurina and Sertic (2014) found that public debt has a statistically significant negative impact on the rates of economic growth

both in short and long term. Based on their findings, they recommend the creation of policies in the direction of increasing exports, long-term investments, but also support fiscal consolidation to stimulate the economic growth.

Gál and Babos (2014) conducted a comparative analysis of the effects of public debt on economic growth in western and new countries member states of the European Union for the period 2000-2013 and have come to the conclusion that, although the new Member States are less indebted, high levels of public debt are much more harmful to them, so that maintaining debt under control is particularly important for these countries.

Applying a panel analysis Bilan and Ihnatov (2015) was estimate the effect of public indebtedness on economic growth with the involvement of 11 Central and Eastern European countries in the period 1994-2013, established the presence on the oversized debt threshold at the level of 45-55% of GDP. She came to the conclusion that the breaking threshold is lower in less developed countries of the analyzed group (e.g. Bulgaria and Romania), is entirely lower than that of the higher developed countries members of the European Union.

3. Model Specification and Data

The construction of a debt threshold model aims at examining the change in the impact of debt levels on growth after exceeding a certain threshold. For this purpose, as a basis for model building, we will consider the empirical literature who have investigated the relationship between public debt and economic growth.

In this respect, the model is based on the concept of Reinhart and Rogoff (2010), but due to the lack of methodological framework in their paper, as a reference of the model construction, we will use methodological explanations of Chudik, Mohaddes, Pesaran and Raissi (2015).

The basic model below contains a debt threshold, and its equation is:

$$Y_t = \alpha + \beta_1 I(b_t \leq \bar{b}) + \beta_2 I(b_t > \bar{b}) + \varepsilon_t \quad (1)$$

where Yt is real GDPPCG; b_t is the level of public debt relative to GDP; $I(b_t \perp \bar{b})$is an indicator variable that receives a value depending on the ratio of the observed debt level b_t b^*, and the debt threshold b^*, so that $I(b_t \leq \bar{b}) = b_t$ and $I(b_t > \bar{b}) = 0$; ε_t is the member of the error; α is the free member; and μ, β_1, β_2 and δ are the regression coefficients.

Particular attention should be paid to the coefficients β_1, and β_2 as they measure the impact of the debt level on the economic growth. Since the purpose is to determine whether the debt threshold of the set threshold has a negative effect on the change in the debt impact on economic growth, i.e. $\beta_1 > \beta_2$, the alternative hypothesis being tested is

$H_1: \beta_1 > \beta_2$, while the null hypothesis assumes that it has no such effect, ie $H_0: \beta_1 = \beta_2$, and is tested against the one-sided alternative.

Robustness tests. The robustness of the findings in the model is tested by including a set of independent control variables $C_t = \{GCFt, TRADEct, BBct, CABt, UN\}$which includes: Gross fixed capital formation (% of GDP), the sum of export and import shares into GDP; budget balance; current account balance, unemployment. Hence, the adjusted equation of the basic model undertakes the form:

$$Y_t = \alpha + \beta_1 I(b_t \leq \bar{b}) + \beta_2 I(b_t > \bar{b}) + \mu_t C_t + \varepsilon_t, \quad (2)$$

where μ_t is a vector composed of the regression coefficients of the control variables.

Determining debt thresholds. We set the 30% and 40% levels as public debt thresholds, respectively, as control levels in the movement of their time series in the group as a whole, as well as for each individual country, using the least-squares method.

Estimates of the regression coefficients in Table 1 basic model with a public debt threshold relative to GDP of 30% indicate a positive and statistically significant 1% level of debt impact on economic growth. From this finding, it can be concluded that the null hypothesis for the negative threshold effect of 30% $H_0: \beta_1 = \beta_2$ cannot be rejected and thus, the threshold effect is absent. Robustness tests with the inclusion of control variables confirm the relationship established in the baseline model for the absence of the threshold effect and are statistically significant at the 1% level in almost all models. The difference between the estimated ratios in these models is mainly due to the lower positive impact of debt as a consequence of the impact included in the control variables.

Table 1

Threshold estimations for the full sample and each individual country

	Albania	*BiH*	*Kosovo*	*Macedonia*	*Monte Negro*	*Serbia*	SEE six countries
Const	-9.925	9.491	9.555	3.811	-8.672	5.724	-4.340**
$I(b \leq 30\%)$	0.252***	0.367**	0.374**	0.327*	0.369***	0.453*	0.271**
$I(b > 30\%)$	0.284***	0.401**	0.391*	0.452***	0.424***	0.472**	0.321***
$I(b \leq 40\%)$	0.198***	0.254***	0.298***	0.254**	0.312*	0.314***	0.172***
$I(b > 40\%)$	0.124***	0.204***	0.245***	0.198***	0.274***	0.292*	0.121***
BUGET	0.556	0.047	0.483**	5.307*	0.490**	1.454	0.481*
CAB	0.912**	0.940	-0.429**	0.670*	2.578	0.113***	0.688
GCF	0.537*	0.186	0.004	0.732	2.110	1.049	0.087
TRADE	0.046**	0.446	0.178	0.126***	0.482**	0.087	0.026**
UN	-0.026***	-0.863*	-0.048***	-1.455	-1.472*	0.873	-0.147*

***, **, * denote statistical significance at the 1, 5, 10 per cent level respectively
Source: Authors' calculations

When the threshold is set at 40%, a positive and statistically significant relationship is positively assessed, but a decrease in the degree of positive impact is also evident in all models. Namely in the model where included all countries debt increase by 1 pp. at levels

below the threshold, it causes GDP growth of about 0.17%, while the same increase of debt at levels above the threshold results in a GDP growth of 0.12%, leading to the rejection of the null hypothesis of the threshold effect and its confirmation presence. Similar results were obtained in all models.

The absence of the debt threshold effect of setting a lower threshold and its presence at a higher threshold give evidence of a possible non-linear relationship between debt and growth. For this purpose, the following equation is tested:

$$Y_t = \alpha + \beta_1 I(b_t \leq \bar{b}) + \beta_2 [I(b_t > \bar{b})]^2 + \varepsilon_t, \quad (3)$$

whereas the threshold level is taken $\bar{b}$= 40% while the quadratic member refers to the case where the debt exceeds the specified threshold. The reason for this model layout is the nonlinear change in the impact on economic growth precisely at the level of total public debt above 40%. What can be concluded is that the threshold effect starts at the level of public debt in the interval of 30-40%, which it is, in fact, a debt threshold where the impact of debt levels below it equals the impact of debt levels above it. However, the non-linear decrease in the positive impact of debt over higher thresholds also indicates its approximation to the debt threshold, which separates lower debt levels with a positive impact on growth from higher levels of negative debt. The debt threshold b^* is actually the level of debt that maximizes the amount of GDP. The first derivative of the quadratic function under is:

$$\frac{dY_t}{db_t} = \beta_1 + 2\beta_2 b_t, \quad (4)$$

Bearing in mind that the functional relationship between public debt and economic growth is non-linear, of a concave curve type ("Laffer" type), and coefficient β1 associated to the debt variable is positive, and β2 associated to debt² variable is negative. This allows us to determine the maximum affordable public debt that does not have a negative impact on economic growth ($debtmax$), according to relation Bilan and Ihnatov (2015). By introducing dY_t / db_t = 0 into the equation under (14) and expressing it through the debt member we obtain the sum of the debt threshold b*, i.e.:

$$b^* = -\frac{\beta_1}{2\beta_2}, \quad (5)$$

where prerequisite b* is the debt threshold that maximizes GDP and above which debt levels have a negative impact on economic growth is $\beta_2 < 0$.

The model described above is applied for the panel data analysis in order to determine the impact of public debt and other variables on GDP per capita growth in six countries from Southeastern Europe

We choose panel because the panel data have several advantages over time series or cross-sectional data. According to Hsiao, 2006 advantage are:

- Panel data have a higher degree of freedom which leads to the more accurate econometric estimates.

- Panel data control the impact of missing or unobserved variables; thus the effect of omitted variables is controlled.
- Panel data can solve the problem of the nonstationary data, while the ability to transform data can lead to unidentified models and eliminate the measurement errors.

The panel data can be analyzed by using a variety of models as OLS, fixed effects (FE), random effects (RE) models or generalized method of moments (GMM). But, according to Baltagi (2001), least-squares estimation methods produce biased and inconsistent estimates. Therefore, the analysis starting with the evaluation of the models with fixed and random effects – FEM and REM. In short, the analysis of fixed effects assumes that the units of interest (in our case, countries) are fixed, and that the differences between them are not of interest. What is of interest is the variance within each unit, assuming that the units (and their variations) are identical. By contrast, the analysis of random effects assumes that the units are a random sample extracted from a larger population, and that therefore the variance between them is interesting and a conclusion can be drawn for a larger population. The more fundamental difference between them is the way of locking. The model of fixed effects supports only a conclusion for the group of measurements (countries, companies, etc.). The random-effects model, on the other hand, provides a lock to the population from which the sample was extracted. Judson and Owen (1996) argue that the model of fixed effects is desirable in the analysis of economic and financial systems for two reasons: i) the unobserved individual effects that represent the characteristics of units (i.e, countries) are very likely to be in correlation with other regressors; and ii) it is quite likely that such a panel is not a random sample of many countries/companies, but of most countries/companies of interest. Accordingly, for our analysis of the countries, the model of fixed effects will be adequate, since the data set covers countries from a specific region-South-Eastern Europe with almost and the conclusions drawn from this analysis will only apply to them. However, in addition to this, we will also conduct the famous statistical test of Hausman (1978) for distinguishing between the models of fixed and random effects.

The models of fixed and random effects imply that all the variables on the right side of the model (1) are exogenous. However, for some of them, it can be argued that there is a reciprocal causation. Such feedback may cause inconsistency in the assessment of the model of fixed or incidental effects. In order to overcome it, the model can be evaluated by means of the so-called instrumental variables technique, in which potentially endogenous variables are instrumented with variables that are highly correlated with the particular regressor but are not correlated with the error member (Wooldridge, 2007). The most common method of evaluating with instrument variables is the generalized method of moments (GMM). In a GMM assessment, the information contained in the population momentum constraints is used as instruments (Hall, 2005), that is, the instruments are most often generated from the past values of the potentially endogenous variables. A second critique that can be given to models with fixed and random effects is the potential inertia of the dependent variable.

Due to the shortcomings of the previous describe models and in order to provide consistent and unbiased results, we have applied the Generalised Method of Moments (GMM) estimation methodology (Baltagi, 2001). The advantage of GMM model is the ability to

combine several instruments Wooldridge (2002). The selection of valid instruments is most difficult and a tricky issue in GMM methodologies. However, one drawback of the GMM approach, is that in samples with a limited time dimension (small T) and high persistence, the estimation has low precision (Blundell and Bond 1998). Therefore, we also estimate a "system GMM "developed by Arellano and Bover (1995) and Blundell and Bond (1998), which addresses this concern. There exists no rule of thumb in the selection of instruments. However, Murray (2006) discusses various tricks that are handy for this purpose. In this study, we follow Chang Kaltani, and Loayza (2005) and Naeem (2016), and we used the lagged values of independent variables as instruments. The validity of chosen instruments for parameters estimation can be tested using the Hansen test. Accepting the null hypothesis means that the chosen instruments are valid. The second group of tests refers to tests of serial correlations in the differenced residuals – first-order (AR1) and second-order (AR2) serial correlation). The first-order autocorrelation in the differenced residuals does not imply that the estimates are inconsistent (Arellano, Bond, 1991). However, the second-order autocorrelation would imply that the estimates are inconsistent.

Hereinafter, we are developing the basic regression model (1), and we present it in the model, two different models. First, the non-dynamic baseline panel regression specification as follows:

$$GDPPCGct = \beta0 + \beta1(PD)ct + \beta2(PD^2)ct + \beta3(GCF)ct + \beta4(TRADE)ct + \beta5(BB)ct + \beta6(CAB)ct + \beta7(UN)ct + \varepsilon c\ t \quad (2)$$

Second, the instrumental variable dynamic GMM panel regression specification to control for endogeneity is as follows:

$$GDPPCGct = \beta0 + \beta1\left(GDPPCG\right)_{t-1} + \beta2(PD)ct + \beta3(PD^2)ct + \beta4(GCF)ct + \beta5(TRADE)ct + \beta6(BB)ct + \beta7(CAB)ct + \beta8(UN)ct + \varepsilon c\ t \quad (3)$$

Where:

GDPPCG = GDP per-capita growth;

PD = public debt as a share of GDP;

GCF = Gross fixed capital formation (% of GDP)

TRADE = the sum of export and import shares into GDP;

BB = budget balance;

CAB = current account balance;

UN = Unemployment

As a dependent variable in the panel-regression analysis, GDP per capita growth is taken as a variable of economic growth; while as control determinants we used public debt as a debt variable, gross capital formation as a measure of investments in the economy, trade balance and current account balance as measures of openness of the economy, as well as the total budget balance and as an additional measure. Also, we will use an unemployment rate. A detailed overview of the variables is done below.

Public debt. The interaction between public debt and economic growth is rather complex because public debt influences the economic growth dynamics and the economic growth rates impact the size of public debt (Časni, Badurina and Sertić 2014). According to Cantor and Packer (1996), higher rates of economic growth facilitate the public debt burden. Public debt sustainability depends on its ability to raise revenue which decreases when the economy experiences a downturn. The private sector default has an adverse effect on economic activity and increases public debt when private borrowing is backed by discretionary fiscal policy (Cecchetti, Madhusudan, and Zampolli 2011). Public debt may have positive as well as negative impacts on economic growth. In less developed countries, governments use public debt as an imperative tool to finance their expenditures. Economic growth can be increased by effective and proficient utilization of resources to achieve macroeconomic goals. However, if the public debt is not properly utilized, it would restrict economic growth and become the biggest curse for the economy.

The investment is the second determinant that we will use in our model. For these determinants, we expect a positive impact on economic growth. According to Ugochukwu and Chinyere (2013) capital accumulation "refers to the process of amassing or stocking of assets of value, the increase in wealth or the creation of further wealth." Namely, investment in capital stock increases the capacity for production, which also increases national income. In macroeconomics, consumption and fixed investment are the main indicators, which encourage the aggregate expenditure. Thus, the increased aggregate expenditure will fuel the growth. In this paper, we follow Bilan and Ihnatov (2014) as a measure of investments we will use Gross fixed capital formation (% of GDP).

The third determinant that we will use is trade openness. This indicator in the economic growth literature was sometimes used as a major determinant of growth performance (Sachs and Warner 1995). According to Edwards (1998), trade affects economic growth through several channels: technology transfer, exploitation of comparative advantage, and diffusion of knowledge, increasing scale economies and exposure to competition. In addition, Romer (1993) claimed that the countries have higher possibility to implement leading technologies from other countries if they are more open to trade. Furthermore, Chang, Kaltani and Loayza (2005) emphasized that trade promotes the efficient allocation of resources through comparative advantage, allows the dissemination of knowledge and technological progress, and encourages competition in domestic and international markets. Bearing this in mind, we expected a positive effect on economic growth for this determinant.

The next determinant that we will use is the current account balance. The current account balance is a broader measure that includes the trade deficit and is itself a part of a broader measure, the balance of payments. The balance of payments is the sum of all transactions between a nation and all its international trading partners. In addition to the trade deficit, the current account deficit includes factor income and financial transfers.

Furthermore, in our research, we will use the budget balance. It is expressed by the budget balance in % of GDP. Fatima, Ahmed, Rehman (2012) claimed that the balanced fiscal budget is a necessary condition in order to achieve sustainable economic growth. According to the Keynesian model, the budget deficit would have a positive impact on economic growth. Namely, if increased government expenditure or tax-cutting are the reasons for the

budget deficit, then customers would have more money and the marginal propensity to consume would increases.

The last determinant that we used is the unemployment. According to Sanchis-i-Marco, (2011) unemployment not only represents a high social cost for the individual, it also represents a high economic cost for the society Unemployment may be associated with structural change and subsequent economic growth. Bearing this in mind, we follow Baum, Checherita-Westphal, and Rother (2012) and we put this determinant in our model. As a measure for unemployment, we used % of the total labour force.

For our research, we focus on six countries from the South-Eastern Europe (Albania, Bosnia and Hercegovina, Kosovo, Macedonia, Montenegro and Serbia) using yearly data from 2008 to 2017. The choice of the countries and the time periods in this paper was contingent upon the availability of time series data on all the variables included in the model. The selection of countries is mainly based on similarities in terms of their historical developments, but also on their geographical and cultural familiarity, which greatly influences the creation of economic relations between some of them. The time period is chosen to correspond to the period of starting the growing trends in the dynamics of the debt and the increased uncertainty in the movement of economic activity at the time of the outbreak of the Great Financial and Economic Crisis of the late 2000s and the period of recovery immediately after.

Data are obtained from various sources. Data for the GDPPC, pubic debt, investments, trade and unemployment are taken from the websites of the World Bank. The current account balance and the budget balance are taken from the websites of the central banks for the selected countries. Table 2 presents the descriptive statistics for all the variables used in the regressions.

Table 2

Descriptive statistics

	GDPPCG	PD	GCF	TRADE	BUGET	CAB	UN
Mean	2.393	40.52	25.33	90.90	-2.916	-9.696	23.05
Median	2.636	38.25	25.79	87.88	-2.800	-8.193	22.15
Maximum	8.328	74.70	41.18	132.3	2.600	-0.629	47.50
Minimum	-6.001	5.510	16.33	69.02	-7.200	-49.66	13.05
Std. Dev.	2.386	20.86	5.652	15.87	2.130	7.506	7.785
Observations	60	57	60	60	53	60	55

Source: Authors' calculations

Although, as we pointed out in the Introduction, the countries of the selected sample are relatively similar; however, with the selected variables, there are significant differences among them. Namely, the differences in the level of economic development measured through the growth of GDP per capita are noticeable, so that the peak of GDP growth in one year was almost 8.5%, while there are countries in the sample where it decreased by 6%. Also, large differences appear at the level of public debt. Thus, it ranges from a minimum of 5.5% of GDP, up to a maximum of 75% of GDP. Also, the remaining determinants during the analyzed period have significant deviations.

3. Empirical results and discussion

In this section we begin with an analysis of the results of the empirical estimations of Equation (2) and (3) for the effect of public debt on GDP growth in six countries from South-Eastern Europe using data from 2008 to 2017, using a fixed model and generalized method of moments (GMM).

The results reported in Table 3 indicates the high robustness of our results, given that in all specifications, regardless of their specs, variables generally retain their economic and statistical significance. The Hausman test favours fixed effects estimation over random effects. Furthermore, the Hansen test shows that the chosen instruments are valid (with *p*-value of 0.37). The estimator ensures efficiency and consistency provided that the residuals do not show a serial correlation of order two. Inconsistency would be implied if second-order autocorrelation was present Arellano and Bond (1991), but this case is rejected by the test for AR(2) errors.

Since as we discussed before we prefer the dynamic GMM estimations, we will not discuss the estimation results of the fixed model.

First, from Table 4, it can be seen that the coefficient of the lagged value of the GDP per capita growth has a negative and significant impact on economic growth. This result is consistent with the convergence theory, explained by the neoclassical model. According to Barro (1996) "the lower the starting level of real per capita gross domestic product the higher is the predicted growth rate".

Table 4

Estimation Results

Independent variables	Fixed Effects (FE) regressions		Instrumental Variables– GMM		System GMM	
	Coefficient	*Std. Error*	*Coefficient*	*Std. Error*	*Coefficient*	*Std. Error*
GDPPCG(-1)			−0.308***	0.085	−0.274***	0.072
Const	−9.503	5.812	0.135	0.213	0.428*	0.139
PD	0.644***	0.192	0.453**	0.157	0.814***	0.049
PD2	−0.007***	0.001	−0.004**	0.001	−0.007***	0.057
BUGET	0.513***	0.180	0.373**	0.183	0.248**	0.148
CAB	0.314**	0.136	0.280	0.088	0.145*	0.005
GCF	0.0561	0.138	0.156***	0.143	0.198***	0.187
TRADE	0.0700	0.052	0.056*	0.040	0.075**	0.028
UN	-0.201*	0.101	-0.129	0.088	-0.146	0.053
Hausman test (p-value)		0.362				
Test for AR(1) errors				0.059		0.046
Test for AR(2) errors				0.611		0.722
Hansen test (p-value)				0.372		0.246
Turning point (%)		46		56.6		58.1

***, **, * denote statistical significance at the 1, 5, 10 per cent level respectively
Source: Authors' calculations

Next coefficient of the public debt variable has a positive value, while those associated to square public debt have negative implying that the functional relationship linking the growth rate of GDP to the size of public debt is one of concave type relationship between economic growth and public debt. These results confirm the general theoretical assumption that at low levels of public debt the impact on growth is positive, whereas beyond a certain debt turning point a negative effect on growth prevails Elmendorf and Mankiw (1998).

Furthermore, we calculated debt-to-GDP turning point. The results of our paper of 56.6% confirm the findings of other recent empirical studies on the situation of developing countries, Greenidge et al. (2012), of about 55% of GDP, or Dinca and Dinca (2015) of about 51%. A possible explanation for this situation lies that these six countries from Southeastern Europe have lower credibility from potential creditors, investors, etc., which makes the negative effects of a high public debt to occur more rapidly than in the case of developed countries. Namely threshold of debt in the study of Mencinger, Aristovnik, and Verbič (2014) who have analyzed 25 member states of the EU was above 75%.Thus, the effects on the economic growth of lower willingness of foreign creditors and investors to provide capital, due to the higher risk they perceive when public authorities' debt is important, are more unfavourable.

The result from the threshold does not provide the level to be targeted to support the growth projections. Namely, those results represent an additional argument for implementing fiscal consolidation strategies to reduce public debt. In this context, it is reasonable to assume that our research provides direct evidence of nonlinearity between public debt and economic growth. According to the Cecchetti, Mohanty and Zampolli, (2010) the results thus imply that unstable debt dynamics may increase the risk of a detrimental effect on capital accumulation and productivity growth, which would potentially trigger an adverse effect on economic growth.

The coefficients of the other explanatory variables are in line with expectations according to economic theory Checherita and Rother (2010) Kumar and Woo (2010) Dragos and Dragos (2012).

From the statistically significant variables, the budget balance has a positive impact on economic growth. Namely the results indicate that If the governments are running a budget surplus, then the governments do not have to borrow and can encourage economic growth through the efficient investment, social expenditure or other ways of money distribution. But, we can also mention that too high budget surplus does not necessarily encourage economic growth.

In addition, as we expected, current account balance and trade has a positive impact on GDP growth. Namely trade creates the opportunity for faster implementation of the rapidly improving technologies from the leading countries. According to Edwards (1997) emerging economies could grow faster than developed economies if it is cheaper to import new technologies than to create them within the country. In other words, trade helps to allocate the resources in a more efficient way. Thus, the trade increases economic growth due to efficient allocation of resources, implementation of new technologies and ideas, but the economy grows at a high rate until the trade openness reaches the equilibrium.

4. Conclusions

The public debt sustainability is one of the most important concepts nowadays in both developed and transition countries. The high public debt level doesn't necessarily need to hinder the economic performance of the countries, as some developed countries achieved substantial economic growth rates over the past years, despite the high debt level. However, the latest global financial and debt crisis raised serious concerns about the enormous and continuously growing debt level in countries of Southeastern Europe and its potential negative impact on the economic growth. The analysis we have conducted for a panel of six countries from South-Eastern Europe, over the period 2008-2017, confirmed the existence of a „U inverted" relationship between public debt and economic growth, with a maximum debt threshold of about 55.5% of GDP for the whole group. After this threshold, public debt is expected to negatively affect the economic growth rate, due to higher interest rates, fear of public debt unsustainability and severe budgetary consolidation measures.

This study does not face significant limitations, but their removal will certainly contribute to broader results. The first constraint is the lack of available data on selected determinants for longer periods. The existence of long time series of data would enable obtaining more accurate and more reliable results.

This study complements the existing economic literature by analyzing the impact of public debt on economic growth and threshold effect in the six countries from South-Eastern Europe, and according to the knowledge of the author, it is the first empirical study that analyzes these topics in this region.

The results obtained in this paper can provide an additional argument for implementing fiscal consolidation strategies to reduce public debt. Namely, the research motivation of this paper stems from the importance of the topic itself and the significance of the lessons learned for the macroeconomic policy during and after the crisis. The analysis of fiscal indicators pointed out some serious consequences for the public debt sustainability after the crisis, in almost all CSEE countries. Although the countries' experiences differ, and there is no behavioural pattern followed by all CSEE countries, some general tendencies in the implementation of restrictive fiscal policy can be observed. More specifically, most members focused on restructuring the public sector (rationalizing employment, benefits and freezing salaries), reducing social benefits and increasing VAT. Thanks to considerable efforts, the budget deficits are largely brought under control, but the economies are currently confronted with various economic and social difficulties and market uncertainties. The rising debt levels, along with the current emigration crisis, rising inequality and unstable labour markets, bring some serious challenges for the CSEE countries in future.

The future research in the analysis should include other countries from Central and South-Eastern Europe, to include the other channels through which the effects are transmitted (total factor productivity, long-term nominal and real interest rates, private investment and capital accumulation, public investment…) Econometric techniques that researchers could use in the future regarding this topic should be either the method of two or three least squares, Vector Error Correction Model (VECM) or the autoregressive distributed lag (ARDL).

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ИКОНОМИЧЕСКИ ИЗСЛЕДВАНИЯ
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EXPECTED EFFECTS OF THE EURO ADOPTION IN BULGARIA

This article interprets facts regarding the accession to the euro area of selected (representative) EU Member States and the expected effects on the Bulgarian economy. In addition, the main risks of myths are identified, and the objective is to provide an objective view of the benefits and risks of the introduction of the euro in Bulgaria, respectively joining the euro area. The identification of the "critical zones" of possible negative effects is based on a precise examination of the experience gained in countries that have already introduced the single currency. This enables the measures aimed at joining the euro area to incorporate the necessary measures so that the positive effects dominate, which would justify the introduction of the euro in Bulgaria.
JEL: E31; E42

Introduction

The object of the study is the introduction of the euro in Bulgaria, and the subject is the expected effects for the Bulgarian economy. The main purpose of the study is to present an objective analysis of the possible effects, direct and indirect, of the possible integration of our economy into the euro area, based on theoretical achievements in this direction and supported by available and relevant empirical data. Successful achievement of this objective results in the identification of "critical (risk) zones" in the economy of the country, which is the most vulnerable and, in this sense, pose a certain risk for a smooth and unhindered changeover to euro-denominated currency. This means that on the basis of the analysis, the necessary preliminary steps – as part of the accession process – will be outlined and formulated so that the risks of the identified risks will be minimized/eliminated, and in the case of any of them, be prepared in advance to overcome any undesirable effects. The thesis overlaid with this study is to say that there are a number of objective prerequisites – derived specifically and thoroughly examined – that can generate such effects of the introduction of the euro that would have a negative impact in the medium to long term. Thus, the main tasks that are set are: (1) to examine the

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experience of the newly admitted members of the euro area (adopted after 2007), as well as that of the countries in the waiting room (i.e. non-euro area countries to come to join); (2) to evaluate the economic and accession effects and (3) to summarize and systematize the main conclusions, based on which recommendations to the negotiators (from Bulgaria) should be formulated.

The Nobel Laureates in Economics – Joseph Stiglitz and Paul Krugman, draw grim forecasts for the future of the Eurozone, based on its fundamental inconsistencies with Robert Mundell's theoretical statement of the "optimal currency zone". They point to two main groups of reasons: first, the deep differences in the economic structure and level of development of the euro area countries, and second, the inability to pursue a single fiscal policy. Paul Krugman (2016) believes that the creation of a "working euro area" requires reforms in two main directions: reforming the structure of the European Union; and crisis policy reforms. Thus, the question is to what extent political consensus will be reached between the euro area countries, which will allow radical reforms and gradual harmonization of the fiscal policies of the Union countries. With its development so far, the euro area has not convincingly denied the destructive potential of these discrepancies. So far, in our opinion, the answer is no. In an interview for Central banking (Oct.16, 2016) the former Chief Economist of the ECB Prof. Otmar Issing stated the “the house of cards is set to collapse” thus predicting a dark future for the Eurozone.

Bulgaria's accession to the euro area is a political commitment made upon our accession to the EU. However, the Accession Treaty does not specify the specific timeframe or date on which this obligation is to be fulfilled. The main reason for this is that, at the time of our accession to the EU in 2007, our economy is still far from the Union average for economic development. At this time, we are only meeting some of the key indicators that each country should meet in order to discuss its adoption in the euro area.

From a procedural point of view, Bulgaria's accession to the euro area is preceded by our inclusion in ERM II, simultaneously (or preceded) by our inclusion in the so-called. Banking Union, adherence to certain criteria (the so-called Maastricht criteria), negotiation process, etc. On the content side: the "exchange" of the lev with the euro is not simply an act of change in the denomination of prices – it is a rejection of the opportunities offered by the currency denominated in national currency. At the same time, the introduction of the euro brings with it the advantages that a currency denominated in national currency does not provide. Bulgaria's "accession deal" to the euro area can be a justified balance between the two trends.

Bulgaria has been a member of the European Union for over 12 years, and within this relatively short period, the necessary degree of cooperation and policy coordination in all spheres has been achieved, which has enabled the country to sustainably fulfil the necessary prerequisites for its full integration into the EU, Schengen, the Banking Union and eventually the euro area. Bulgaria strictly adheres to the requirements for convergence, and by some indicators, it is even among the leading countries, which shows that our country is ready to fulfil the permanent commitments related to the adoption of the euro (Hristozov, 2016). One of the underlying factors that contribute to the eurozone’s travails is the lack of economic convergence among its members. This problem is far from new, as it was a central argument of the opponents to the Maastricht Treaty (Mourlon-Druol, 2014). The

topic of joining the euro area is sporadically emerging in the public space, but in the light of economic conditions, it has been put on the "agenda" for the first time in 2018, thanks to the efforts of a number of politicians and public figures who have reflected in their actions public consensus – on the issue of joining the euro area; and resulted in the submission of an application to the ECB regarding Bulgaria's wish to join ERM II. With this step commitments have been made, some of which have already been fulfilled but for the implementation of others – in particular, the possibility of "negotiating the course", with which Bulgaria joins the ERM II, required legislative changes. This happened in early 2020 – through an amendment to the BNB Act. This legislative change triggered heated discussions which resulted in the decision that Bulgaria would refuse to join the euro area if it failed to negotiate an entry at the current BGN/EUR exchange rate of 1.955830, fixed with the introduction of the regime of the Monetary Council. This "path" episode of the "path to the euro" is the subject of a separate analysis – in the relevant part of the study, but it should be noted here that it is particularly indicative of the actual state of the degree and aspects of the euro's readiness for adoption. Thus, in economic terms, the country is on the alert, with stable prospects for meeting the economic criteria; but at the same time, in the "technological aspect" directly affecting economic stability, and hence affecting the medium and long-term ability to adhere to the levels of indicators determined by the criteria for membership of the euro area, there is no degree of preparedness (Możdzierz, 2019). What has become indicative is that the problems that arise and the changes that are needed (including legislative ones) will be solved ad hoc: the trial-and-error principle, which is unacceptable when it comes to such a crucial issue, not just the economy of our country, and for society as a whole. Therefore, not only economic logic but also a significant political commitment to society and other EU Member States is behind one country's decision to join (Kamelarov, 2018). This calls for a careful examination of the positive examples of countries that have already taken this path, as well as of other countries preparing for accession to Bulgaria.

The main part of the benchmarking study (point 1) of pre-accession strategies identifies and interprets the main "crisis zones (risks)", with attention to one of the most significant – the potential pro-inflation effects of the adoption of the euro. Other effects of the introduction of the euro in the newly acceded euro area members are commented on individually, some main "scenarios" were synthesized upon our accession to the euro area, with detailed options as well as potential options effects and risks of Bulgaria's accession to the Eurozone.

1. Pre-accession strategies, following the example of Lithuania and Slovenia

The purpose of this part of the study is to compare the experiences and good practices of selected countries in drawing up strategies prior to joining the euro area and subsequently adopting the euro. The strategies and plans of the selected countries vary significantly in content and purpose. Such a strategy in Bulgaria is missing at this time, and it should have been drawn up years ago. We regard this omission as a significant disadvantage, leading to the creation of unrealistic myths and the emergence of unfounded fears in society – as the

example above. The Bulgarian state, represented by the public authorities, should take the necessary urgent action to overcome this significant omission.

In Lithuania's pre-accession strategy, the impact that the introduction of the euro would have on the Lithuanian economy is defined in two categories, direct and indirect (indirect). "Direct" impact is understood to mean effects that will automatically manifest themselves in the short term, allowing them to continue in the medium to long term. The impact is understood as 'indirect' impact through other variables, which depends on different circumstances, and in most cases, they occur over a longer period. Concrete:

- direct impact: replacing the local currency with the euro would reduce interest rates due to a reduction in currency risk, while reducing currency and accounting costs, strengthening the balance sheet structure of public and private sector assets and expanding liquidity management capabilities in the banking sector.
- indirect impact: adopting the euro can have a positive impact on the country's credit rating (which would further reduce interest rates), encourage investment and foreign trade, accelerate economic growth and citizens' well-being. The Central Bank of Lithuania (BoL) looks at two scenarios (Table 1).

Table 1

Scenarios on currency risk, interest rates and credit rating

Scenario 1	Scenario 2
Currency risk will decrease, and credit risk will be reduced the country will receive a better credit rating than BBB of A.	• only the currency risk will decrease. • the credit risk and the country's rating will remain unchanged
Interest rates will decrease: • as interest rates on transactions in Lithuanian litas will be replaced by lower one's interest rates on similar transactions in euro. • interest rates on euro transactions in Lithuania will also decrease	Interest rates will decrease: • as interest rates on litas transactions will be replaced by lower interest rates on similar transactions in euro. • interest rates on euro transactions in Lithuania will not decrease.

Source: http://www.lb.lt

According to the BoL, the likelihood of an increase in the country's credit rating is increasing since international credit rating agencies see the introduction of the euro in Lithuania as a factor that reduces credit risk. The following specific aspects of the positive impact of the changeover to the euro are outlined:

- the risk to the country and the risk to households and businesses related to the currency structure of their income and liabilities will decrease, as their main income is currently in litas and the share of liabilities are in euro;
- improving access to the financial markets and liquidity management capacity in the banking system;

- the predictability of the country's economic policy will be increased.

➢ *The impact of the adoption of the euro on interest rates and interest rates due*

The strategy for joining the Eurozone of Lithuania states that adopting the euro would reduce the average interest rate that the Government of the Republic of Lithuania would borrow in 2015 by 0.80 percentage points according to scenario 1; respectively 0.18 percentage points in scenario 2 (see Table 2).

Table 2

Interest rate change scenarios after the adoption of the euro

Average interest rate due from debtors	Change in percentage point (2015)	
	Scenario 1	Scenario 2
Loans to non-financial corporations and households	-0.80	-0.18
Loans to non-financial corporations and households	-0.53	-0.31
• Non-financial corporations	-0.49	-0.26
• Households	-0.56	-0.34
Weighted average interest rate at which the Lithuanian Government and local businesses and households will receive a loan.	-0.56	-0.29

Source: http://www.lb.lt

These conclusions are justified by an analysis of the impact of the introduction of the euro on interest rates on long-term (maturity 10 and over) debt securities of the governments of Slovenia, Cyprus, Malta and Slovakia, on an individual basis. It is concluded that joining the euro area lowers these interest rates by an average of 0.51 percentage points. Thus, after assessing the impact of the introduction of the euro on interest rates on loans to non-financial corporations from Lithuania and households, it follows that the average interest rate in 2015 will be lower by 0.53 points – a forecast found in the right direction.

➢ *Impact of adopting the euro on currency exchange costs*

The strategy for joining the Eurozone of Lithuania indicates that the introduction of the euro would reduce the cost of currency exchange in the non-banking sector in Lithuania. With the removal of the local currency, there will be no cost for currency and hedging transactions against currency risk. Based on Lithuania's foreign exchange market data for 2010-2012, it is estimated that the cost of exchanging Euros and Litas (LTL), as well as for hedging against fluctuations in the Litas exchange rate, will be 0.14% of GDP per year.

Calculations show that in 2015-2022, the non-banking sector will save around LTL 1.9 billion. Reducing the cost of the bank in the non-banking sector in Lithuania would limit the banks' income in the country in the short term, which would limit both credit risk and foreign exchange risk. Banks could develop their business in Lithuania at a lower cost of capital and expect a more stable return. In the medium to long term, bank revenue could

increase as a result of credit developments, driven by probably stronger economic growth and the expected higher debt-to-GDP ratio.

- *Impact of the adoption of the euro on Lithuania's exports and investments*

According to Lithuania's pre-accession strategy, the introduction of the euro would have a positive impact on Lithuania's foreign trade due to lower trade and entry costs, business attitude towards the euro area market, increased foreign investment, market transparency and competition. The experience of the euro area countries shows that the introduction of the euro has increased foreign trade of these countries by 5-10%. In assessing the likely impact of the introduction of the euro on Lithuania's exports in 2015, the summary assumes a conservative assumption, that real exports (excluding mineral products) as a result of the introduction of the euro in 2015-2022 should increase by 5%. For now, the data justify this prediction.

The impact of the euro on foreign trade and foreign direct investment (FDI) has been examined through the effect of the euro on foreign trade. The introduction of the euro would provide prerequisites for an increase in FDI, and FDI and foreign trade are closely linked. The results of international studies of the experience are very different; therefore, the choice of quantification in the case of Lithuania is difficult. Given this, the increase in FDI was not quantified during this study. The cautious attitude towards the impact of joining the euro area on FDI in Lithuania is motivated by the fact that Lithuania has been a member of the EU for more than a decade and the lithium rate against the euro has been fixed for a long time.

- *Impact of the euro adoption on the country's GDP and employment*

The impact of the interest rate cut on Lithuania's real GDP, in the long run, would be greater if corporations in the country were actively investing in activities, significantly enhancing the competitiveness of the economy. The period after the introduction of the euro could be more favourable for such investments because of the expected lower real interest rates, which will allow corporations to invest at a lower price for a longer period.

The euro would increase employment in the medium term but increasing it in the long term would require structural reforms to harmonize labour supply and demand. Unemployment in 2014-2022 is estimated to be on average 0.4-0.5 pp. lower and employment higher by 6.9-7.4 thousand people. In the medium term, a reduction in the unemployment rate will be the result of a strong increase in labour demand. As corporations will need time to accumulate the necessary amount of physical capital, the increased demand for their products would initially be met by hiring more new workers. However, the impact of the euro on unemployment and employment will decrease later. In order to reduce structural unemployment, targeted structural reforms to harmonize labour supply and demand would need to be continued.

➢ *One-off and additional costs of adopting the euro.*

In order to assess the overall impact of the targeted adoption of the euro on the Lithuanian economy, Lithuania's pre-accession strategy quantified the one-off costs for the changeover to the euro and the additional financial contributions that the country would have to pay to international institutions. The one-off costs of adopting the euro include the increase in the one-off price level and the cost of adopting the single European currency. According to the results of international studies, it is estimated that the introduction of the euro in Lithuania should have a short-term one-off effect on the price level: it will increase by 0.2-0.3 p in the first months of 2015. Such estimates were obtained from Eurostat, which looked at the situation in Estonia and other countries that have adopted the euro after 2007. International studies show that a one-off increase in prices when countries join the euro area is triggered by four key factors:

- rounding off prices and the desire of sellers to make them attractive.
- the transfer of some of the costs of adopting the euro to consumers.
- the so-called "rational non-compliance" of consumers (it is difficult for consumers to evaluate all price changes simultaneously and in some cases even try to remember them because of their small size, and sellers can take advantage of this).
- synchronization of price changes (usually prices will be revised gradually, while prices will be revised at the time of adoption of the euro).

Lithuania's accession to the euro area would increase the country's financial contribution to international institutions – in particular, the capital of the European Stability Mechanism (ESM), but this is seen as an investment rather than cost. Because the income generated from ESM operations and the successful repayment of creditors' debts will receive a return, which will increase the value of the share of capital invested by Lithuania. While the repayment capability is low in the coming years, it is generally foreseen that when the ESM reaches a common credit position and the euro area countries no longer need their assistance, the ESM may pay dividends (reduction of operating income) in a proportion of the country's contributions. The Lithuanian Central Bank (BoL, Bank of Lithuania) will transfer an additional contribution of EUR 43 million (around LTL 148 million) to the European Central Bank (ECB) capital. This amount would not require additional funds as it would use a small portion of BoL's assets (compared to the end of August 2013, BoL's assets amount to LTL 20.7 billion). If any, losses to the ECB as well as losses to the ECB.

When Lithuania joins the euro area, BoL will be entitled to a share of the ECB's annual financial result in proportion to BoL's share of the ECB's paid-up capital. He would have earned the right to a proportionate share of the ECB's profits and the Euro system’s monetary policy earnings, regardless of how many monetary policy transactions he would have made. The ECB's net profit in 2012 amounted to almost EUR 1 billion. If Lithuania were a member of the euro area (as of 2012), it would receive a payment of 0.61% of its profit, i.e. LTL 21 million. National central banks (NCBs) outside the euro area are not entitled to distribute ECB profits. The total amount of one-off costs for adopting the euro in

Lithuania, considering the experience of foreign countries, can reach 0.5-0.7% of GDP (LTL 0.6-0.9 billion).

- *Inflationary concerns*

Various instruments are provided in the National Transition Plan approved by the Lithuanian Government, considering international experience, which will help prevent unjustified price increases and strengthen consumer positions. One of the main instruments is the requirement to indicate the double pricing of sheets and euros for goods and services before the changeover. The national plan for the changeover to the euro stipulates that double pricing will be completed 60 days after the Council of the European Union decides to fix a fixed exchange rate for litas and the euro and will continue one year after the adoption of the euro. It will play a particularly important role during the adoption of the euro by the controlling institutions, which will check how prices are translated and whether they are correctly quoted, will address consumer complaints, impose sanctions for infringements and publish infringers. The National Switchover Plan also stipulates that price changes for major commodities will be actively monitored and announced. Public organizations and consumer organizations should also be actively involved in price monitoring. Under the National Switchover Plan, businesses will be encouraged to sign the Code of Good Business Practice. Economic agents who sign this code are committed to refraining from using the euro as a pretext for price increases. Such businesses will have clear identification marks.

With its accession to the EU, Slovenia (just like Lithuania) is committed to accepting the euro as its currency. The first step towards achieving this goal is to participate in ERM II for two years. Slovenia acceded to this mechanism on 28 June 2004 and, having successfully fulfilled the convergence criteria (nominal), the country acceded to 1 January 2007. In January 2005, the Government of the Republic of Slovenia and the Bank of Slovenia adopted the introduction of the euro ", which sets out all the essential procedures for the introduction of the euro.

Driven by the understanding that the introduction of the euro is a large and complex project, several bodies are directly involved in the development of the strategy, which are directly involved in the process of joining the euro area and have the relevant decision-making and activities powers. Technically, the preparation for the introduction of the euro is the responsibility of the coordinating body – the Technical Preparation Committee for the introduction of the euro. This is a body set up at the initiative of the Slovenian Ministry of Finance to join the country in ERM II. The Committee consists of several working groups, each responsible for a specific substantive area for which it has prepared an appropriate action plan and, in the implementation of which, regularly coordinates its work with the other working groups. Other ministries and government departments, heads of individual parts of the financial system, professional associations of financial service providers and business representatives also participate in the activities of these working groups.

➢ *Common feature of the "Euro introduction plan"*

The original "Plan for the Introduction of the Euro" drafted by the Government and the Central Bank of Slovenia was presented to the public for broad public consultation, as a result of which the document was updated twice – the first time in January 2006 and the second (Masterplan of introduction of the Euro, Government of Republic of Slovenia, 2006) – in October 2006. There is no structural change. In both variants, the Plan… contains four main strands: General; Legal framework; Euro adoption standards and best practices and Sector training: Banking sector; Public Sector and Capital Market.

But the same structure reveals profound developments in the areas identified. Without going into detail, it can be noted that the interpreted areas of concern are public expenditure (incl. Taxes), debt instruments (respectively interest rates), social transfers and more. It is noteworthy that the fears arising in the euro area candidate countries, declared after the 2008/09 global financial and economic crisis – such as: fear of inflation, labour market problems, competitiveness (including FDI, level) export), price stability, etc. – have not been interpreted in detail (http://www.evro.si/en/faq/slo-euro/index.html). Particular attention was paid to informing the population, with a central focus on the so-called. "Communication strategy for the introduction of the euro", developed by the Central Bank of Slovenia (https://bankaslovenije.blob.core.windows.net/publication-files/gdgetGfgsfd ggo_communication_strategy.pdf). As for the information – the last document is valuable, we pay special attention.

➢ *Working Party on Communication and Information to the Population*

The European Commission prepares special assistance provisions for the implementation of communication programs for the introduction of the euro by the new Member States. Basically, recommendations and principles for support and cooperation with the new Member States can be seen in two communication strategies (Implementing the Information and Communication Strategy for the European Union, 2004): umbrella communication strategy – COM (2004) 196 and COM (2004) 552 final (http://www.evro.si/en/faq/slo-euro/index.html). The main differences regarding the first introduction of the euro are as follows:

- euro banknotes and coins are already in circulation and are well known and are often used in the new Member States.
- due to probably a small number of ATMs, POS terminals (there is still widespread use of cash.

The European Commission recommends the conclusion of different partnerships for the implementation of the communication strategy. The most appropriate type of partnership within a campaign to support the introduction of the euro is the so-called ad hoc partnership whereby the government of a Member State and the EC enter partnerships within individual projects where necessary.

Providing information to the public is one of the priorities of the Euro Introduction Plan, which is why a Communication Working Group has been set up within the Coordination

Committee. Its members include representatives of the Government of the Republic of Slovenia (Office of the President of the Government of the Republic of Slovenia, Government Office for Public Relations and Media, Ministry of Economy, Statistical Office of the Republic of Slovenia, Bank of Slovenia, Bankers Association of Slovenia, the Slovenian Chamber of Commerce and the Slovenian Chamber of Crafts). The group is managed by the press service of the Government and the Bank of Slovenia. The group's most important task is to develop a national multi-annual communication strategy to support the introduction of the euro, its implementation and coordination of communication and information activities.

In informing the public about the introduction of the euro, Slovenia takes into account the experience of countries that have successfully switched to the new currency, as well as some important facts that are particularly specific to its social environment: Slovenian citizens are already familiar with euro coins and banknotes; the introduction of the euro at that time was considered to be extremely favourable and is eagerly anticipated. The main objective of the campaign is to inform and educate the public during the transition period and during the introduction of the euro and to provide follow-up advice. An important objective of the campaign is also to build people's confidence in the euro and ensure a smooth transition to the single currency. In building this confidence, Slovenia also takes advantage of its positive attitude and experience gained in the introduction of its own national currency (upon separation from the SFRY), as well as the experience of the euro area Member States. Initially, the campaign is primarily informative and educational, aiming to highlight the benefits of the common currency, the common monetary area and the functioning of the European Central Bank, the Euro system’s rules of operation and finding people familiar with euro banknotes and coins.

In the last months before the changeover, information activities have focused on attracting people and developing technologies that will help the changeover, training cash workers to identify counterfeits, and more. The introduction of the new currency is expected to be followed by consultative activities, as it was believed that the public would need assistance in the form of practical information, data, advice, instructions on how to proceed with the changeover to the euro, where to go old banknotes and coins are exchanged, etc. a schedule of campaigns is set out that includes five stages:

- preparatory phase (June – December 2005): it involves the provision of information to the public on the start of the dual-display of price prices, including procurement procedures necessary for follow-up, regular media monitoring, activities carried out together with the selected twinning country, setting up a common website (www.evro.si), indicating the logo and eventual slogan of the campaign (provided that the ECB may determine a common logo and slogan for all countries adopting the euro in the same time);

- an introductory phase (1 January 2006 – 1 September 2006) in which information and education activities are envisaged to be at the forefront of the overall procedures;

- the final phase of two years of participation in ERM II (June 2006) and the definition of currency exchange: general information for the public on the functioning of Economic

and Monetary Union and compliance with the convergence criteria and, at the same time, disclosure of the first concrete activities, related to the adoption of the euro;

- the period between the termination of two years of participation in ERM II and the adoption of the euro (foreseen for the period July 2006 to January 2007): essentially the continuation of the transitional stages for public awareness of the progress and preparation of banks, design of coins and banknotes and the preparation of practical tips for exchanging national currencies for the euro;

- the period between the introduction of the euro (1 January 2007) and the end of currency exchange and conversion with banks: public communication, mainly focused on providing practical exchange/conversion advice.

The comparative analysis between the Strategy of Lithuania and the Plan of Slovenia gives an opportunity to outline the main features of this type of documents: Formal characteristic: An official government document prepared jointly with the CB of the respective country. Adopted after a wide discussion, with the participation of representatives from academia, industry chambers, employers 'and workers' organizations, NGOs, etc.; led by a specially created body/committee. Structurally: the document consists of separate parts, each of which analyses the identified direct/indirect impacts of the introduction of the euro. It includes guidance for public authorities and information for the general public. It results in a "Plan/Strategy for the Introduction of the Euro" which includes several significant areas of impact: prices and interest rates, employment, GDP dynamics, banks and the capital market (including credit ratings) and more. The preparation of the document is the responsibility of a specially created body/committee, which: structurally consists of a number of working groups (identified by major areas of impact of the euro: cash and credit institutions), business environment, technical preparedness in the public sector, consumer protection, legal issues, communications (informing partner institutions, business, the public) and information activities (attracting people and identifying technologies that will help with the transition Anne to the euro, learning to identify counterfeit); a Maastricht criteria monitoring group. Each group is responsible for a specific material area for which it has prepared an appropriate action plan and, in the implementation of which, regularly coordinates its action with the other working groups. This specially created body includes experts from the public sector, representatives of the private sector, academia, industry chambers, organizations of employers and workers, NGOs, etc.

Substantive characteristic: The following are considered as direct effects of the introduction of the euro: inflation, liquidity, balance sheet structure of assets in the public and private sectors, money supply and banking, etc .; so are the indirect effects of the introduction of the euro: credit rating, foreign investment, business climate, economic growth, foreign trade, labour costs, employment, etc. Based on the outlined direct/indirect impacts, scenarios are reproduced, outlining the impact and measures (to overcome the negative effects) developed jointly by the government and the Central Bank.

Later strategies always identify a separate analysis of one-off and additional costs of adopting the euro: the overall impact of targeted adoption of the euro on the economy requires the review to quantify the one-off costs of converting to the euro and the additional financial contributions that the country will it must pay to international institutions (for

example: ESM, change in the contribution to the ECB's capital, etc.). An institutional mechanism is being developed and instruments are being put in place to prevent unjustified price increases and to strengthen consumer positions (usually concentrated in the "legal framework" part).

2. Policies Against the Inflationary Effects of the Adoption of the Euro

Inflationary uncertainty is considered to pose risks to the real economy. One of the most frequently asked questions when joining countries in the euro area and adopting the single currency is will this process lead to price increases? Many comments and analysis can be found on the topic; for the most part, they diverge and are at opposite poles. Some sources undoubtedly see high inflation, others say inflation is moderate and even deflation may be observed in the first months after accession. Public opinion has its own position, which often diverges from that of experts, and this is normal, as it is formed mainly based on read articles on the Internet or analysis of any commentators on television channels. These analysis and articles are not always credible and are supported by credible sources and information (Hristozov, 2019).

Price stability allows us to consider the lags in the manifestation of monetary policy, based on the lack of a long-term link between inflation on the one hand and unemployment and growth on the other, helps to solve the problem of time inconsistency (Chobanov, 2018). Concerns that the introduction of the euro will trigger an inflation wave are fuelling one of the basic myths about a possible "price jump". These concerns assume that traders will benefit from currency changes to speculatively increase the prices of goods and services.

The assumption is that this may happen when the prices are rounded off after the exchange rate is calculated against the euro and even by making a speculative addition to the price. These concerns have not yet been realized in any country that has joined the Eurozone. Comparative analysis shows that this was possible due to the introduction of a set of institutional (administrative control) and economic measures that did not allow deliberate price manipulation in favour of traders. It should be explicitly emphasized that this is possible after detailed preparation of the state institutions, coordination and harmonization of their activities, so that attempts for speculative pricing are blocked a priori. The main instruments of these policies are:

- *Advance announcement of the conversion rate of the national currency into euro* – three to six months before the introduction of the euro.

This is an enough period for producers and consumers to get used to the price conversion from the respective national currency to the euro. The pre-announcement of the exchange rate of the national currency precludes the possibility of speculation based on lack of information on the element of surprise. So far, this instrument has been applied only to countries that have used the managed exchange rate of their national currency – Slovakia, Slovenia, Cyprus, Malta and others. However, it is not necessary for countries where the Monetary Council and/or the fixed exchange rate were applied before joining the Eurozone,

as was the case with the Baltic Republics of Latvia, Lithuania and Estonia. Obviously, this also applies to Bulgaria. There is no need to announce a pre-exchange rate here since it has been fixed since mid-1997 at a ratio of two levs per euro, i.e. we are greatly facilitated from this point of view.

- *Simultaneous use of the national currency and the euro as a payment instrument within one to three months after the introduction of the euro*

The ECB generally recommends that this period be as short as possible; within a month or two. In most cases, this recommendation was followed. This transition period guarantees peace in society and allows price control by the buyers themselves. Under these conditions, it is impossible to carry out a speculative pricing policy, since in addition to controlling state authorities, the comparison of prices in levs and euros will be made by millions of buyers. In view of the specifics of the Bulgarian conditions, this period may be a month or two, i.e. in full compliance with the ECB's recommendations. At the same time, this will provide conditions for the gradual withdrawal of BGN from circulation and smooth replacement with the new single currency. We should also consider the experience of other countries that have enforced the principle (with a legal guarantee) of an unlimited in time exchange (redemption) of other euro banknotes.

- *Establishment of target organization and coordination in the work of the state control bodies against possible attempts at price speculation*

As soon as it submits its application for ERM2 membership, the government, in close cooperation and coordination with the BNB, should take steps to adequately organize, regulate and control the overall mechanism for the introduction of the single currency. The experience of other Eurozone countries shows that it is not necessary to create new state bodies, but rather to coordinate existing institutions, including National Revenue Agency, State Financial Inspection Agency, Consumer Protection Commission, Competition Protection Commission, Financial Supervision Commission. Price controls can involve municipal authorities as well as non-governmental organizations and citizens.

- *Widespread public consultation with the participation of experts, NGOs and business representatives prior to joining the Eurozone*

Introducing to the public the various aspects of the introduction of the single currency, the expected effects, risks and challenges, the economic, social and political benefits, etc. is a prerequisite for the success of the whole process. But in Bulgaria, this issue is highly underestimated. The government has stated its intention to submit a formal application for ERM II membership, but public hearings are limited and sporadic. The government has not yet provided detailed economic estimates of the effects of the introduction of the euro – on imports and exports, on competitiveness, on the development of individual sectors of the economy, on employment and labour productivity, on economic growth and resilience in economic crises, on living standards etc. The government could use extensively in these

discussions and evaluations the teams of economic universities and faculties, the potential of the Economic Institute of the Bulgarian Academy of Sciences, trade unions and business organizations, NGOs and others. This preparation will be particularly useful regardless of the length of the preparatory period and the final decision of the Bulgarian Government to become a member of the EU Banking Union and the Eurozone.

3. Effects of the introduction of the euro in the newly adopted members of the euro area

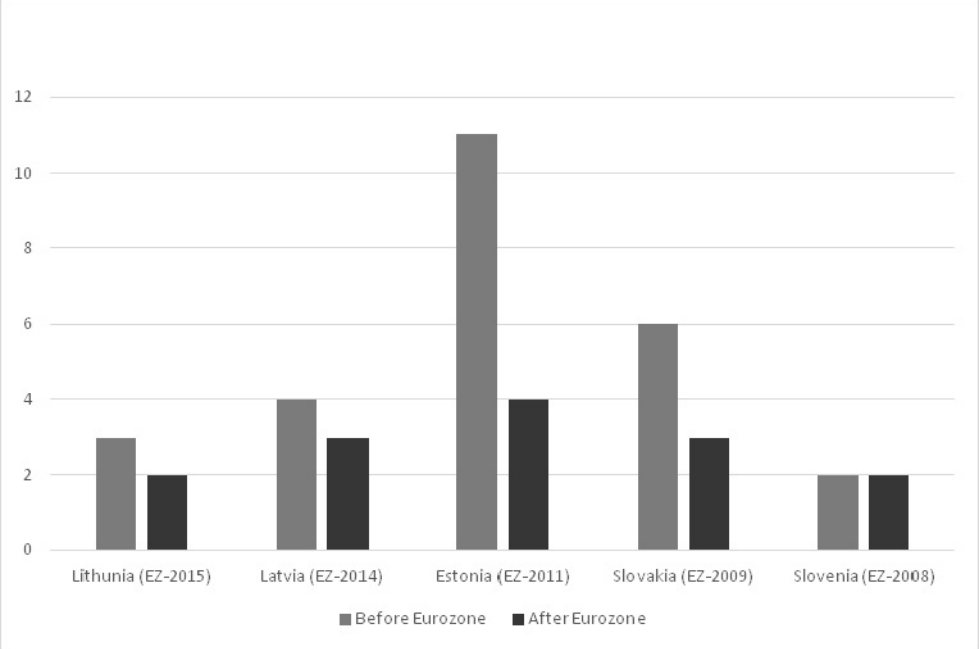
The effects of the introduction of the euro on the national economy have different dimensions. The level and structure of foreign direct investments (FDI) and portfolio investment are one of them. FDI is a key indicator not only and not so much because it increases the total volume of investments (domestic plus foreign). FDI also has other significant macroeconomic effects, including:

- Transfer of technologies, know-how and innovative products; knowledge and experience;
- Providing access to new markets guaranteed by foreign investors;
- Development of import substitute production and improvement of trade balance;
- Increasing market competition;
- Increase in foreign exchange reserves and thus improve the stability of the national currency;
- Accelerating GDP growth and raising living standards;
- Improving the image and position of the country in the world economy.

From this point of view, the changes in the flows and structure of FDI after the introduction of the single European currency are a particularly important indicator for countries like Bulgaria, which are eager to join the Eurozone.

Foreign direct investments decline in% of GDP (Figure 1) in the years after the adoption of the euro in all the analysed countries, except for Slovenia. The most significant decline is observed in Estonia, followed by Slovakia. However, it would be wrong to accept that the introduction of the single currency is the reason for this decline. Undoubtedly, as evidenced by comparative analysis of the global economy, the decisive cause of the downturn is the global financial and economic crisis of 2007 and, accordingly, the difficulties of the post-crisis period. As a rule, there is always a sharp decline in FDI volume in major regional and even more global crises. This applies to both investment from developed to developing countries and from developed to developed economies. But the decline from developed to developing countries is always more pronounced. In the countries mentioned above, it should also be borne in mind that, for most of them, joining the Eurozone coincided with the difficulties of the post-crisis period.

Figure 1
FDI before and after admission to the Eurozone (average for the period 2006-2019; as a percentage of GDP)

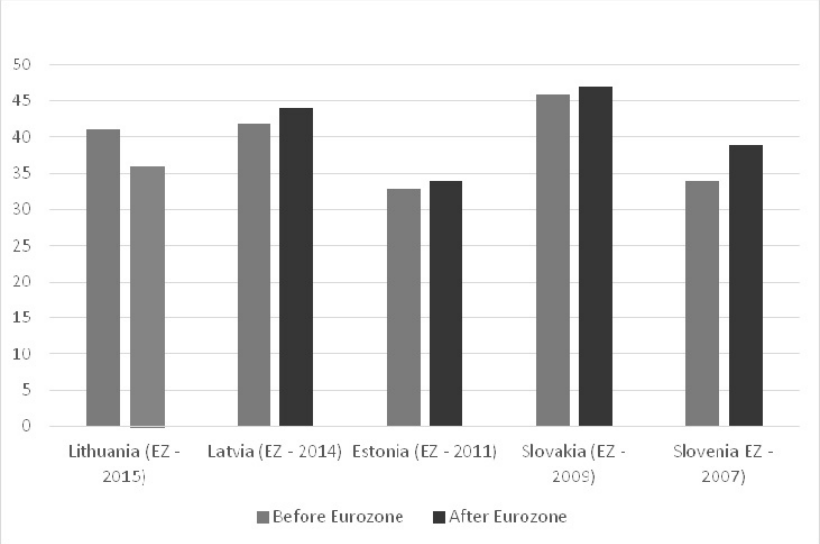


Source: Eurostat.

Considering the decline in FDI in others. countries outside the euro area, it can be concluded that the single European currency has rather helped to curb (reduce) the decline in FDI flows. And a typical example of this is Bulgaria. In Bulgaria, FDI of nine billion euros in the pre-crisis year 2007 shrunk to half a billion levs in 2017 and 2018, or almost ten times. Growth is noticeable in 2019 and they are close to BGN 1 billion, but they are mainly from loans to parent companies. And even though the lion has a fixed exchange rate against the euro, i.e. there is no foreign exchange risk for foreign investors. Therefore, the reasons are not related to whether a single or national currency is used. This is the subject of another analysis, but it is pertinent to point out that the decline in FDI in and outside EU countries is smaller in those of those with highly developed industrial production. Typical examples of this are Germany, Poland, Slovenia, etc., where there was no economic crisis or it was weakly expressed, which logically limited and outflows of FDI. Conversely, a weaker outflow of foreign investment was one of the factors behind the sustainability of growth. Similar are the conclusions regarding changes in the country's competitiveness rank before and after joining the Eurozone. Of the five selected countries (Figure 2), one, Lithuania, has improved its position, and the other two are more likely to demonstrate their ability to remain competitive. Change is only in a few positions.

Figure 2

Chart Global Competitiveness Index (World Economic Forum)



Source: World Economic Forum.

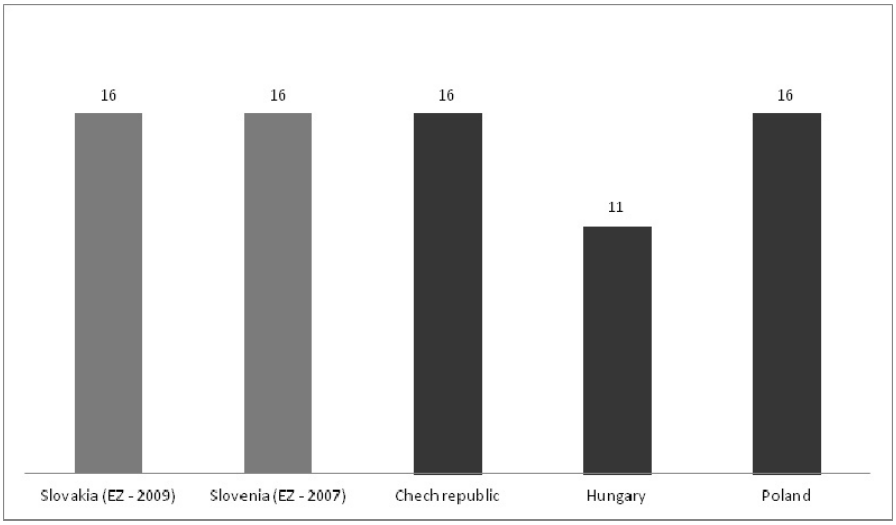
For Estonia and Latvia, the "deterioration" of the position is symbolic – with only one, two positions, and Lithuania comes forward with five positions. The choice of these countries for comparison is important for Bulgaria because they are also on the Monetary Council. Our conclusion is that the single currency guarantees relative stability in terms of competitiveness. But at the same time, the concrete results of each country depend on the relationship between price and non-price competitiveness. It is well known that changes in the euro's exchange rates have different effects on individual Member States. The differences are due to the structure and technological level of a national economy. On the other hand, the share of foreign trade turnover inside and outside the euro area is essential. For intra-euro area trade, a change in production costs and product non-price competitiveness is crucial. Another possible factor is the ability to enter markets that are less affected by changes in exchange rates – mainly between the euro and the dollar.

Average changes in GDP export share (Figure 3) for the five selected countries show that joining the euro area of Slovakia and Slovenia did not lead to any different results than those of the Czech Republic and Poland, which remain outside the European Monetary Union. In the 20-year period considered, the share of exports to GDP of the four compared countries increased at the same rate of 16%. For Hungary, it is noted to be slightly abandoned by about 5% compared to other countries. Of course, the demand for a correlation between entry into the Eurozone and the share of exports should be differentiated for each country. Because the selected five countries have different economic potential and respectively different market potential in their internal market. The rule is that the smaller an economy, in terms of production capacity and number of consumers, the

more it depends on international markets, it is in full force. It is worth mentioning here that there are no grounds for unrealistic expectations that joining the Eurozone will automatically improve competitiveness. The truth is that the single currency only creates conditions for higher competitiveness, but the utilization of these conditions depends on several other factors.

Figure 3

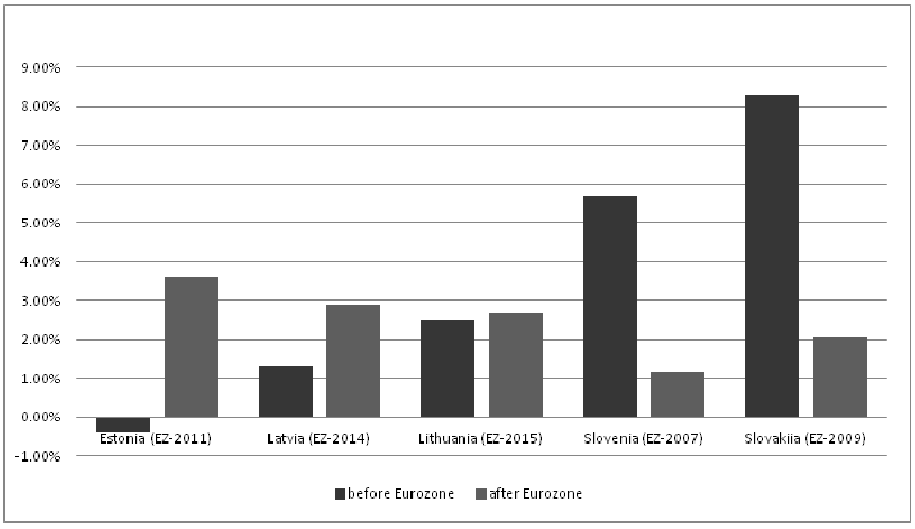
Increase in the share of exports in GDP (2008-2019)



Source: Eurostat.

Figure 4

GDP rate before and after admission to the Eurozone (2006-2019 average)



Source: Eurostat.

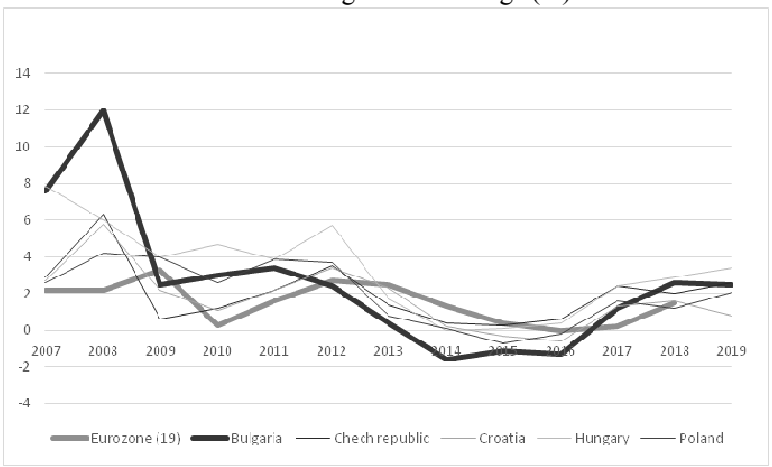
In Figure 4 looks at the average rate of GDP growth before and after the euro area countries. Growth in the Baltic States is most significant in Estonia, followed by Latvia and Lithuania. Of interest to the figure is the pace of Slovenia and Slovakia, which has seen a significant decline, and at times. This confirms our view that the Eurozone only creates the conditions. It is up to the individual countries and precisely their economic policies to determine how their national economy will adapt to changing market conditions. Eurozone membership leads to mixed results in a crisis – the example of Slovakia (Židel, Melioris, 2016). From 2009 to 2018, real GDP per capita in Slovakia has increased by 10%. But the Organization for Economic Development and Cooperation (OECD) analysis show that if the country had delayed entry into the Eurozone by one year, that is, the OECD for 2010, GDP decline in 2009 would have been 2% lower. The reason is that by regulating the floating exchange rate, the Slovak Central Bank could more adequately "adjust" the national economy to the deteriorating business environment.

The advantage of a managed exchange rate to mitigate the effects of a crisis and thus to get out of the crisis has not been discussed in the economic literature and has been proven many times in a series of crises. It influences the price competitiveness of exports and imports respectively. Typically, the goal is to increase exports and limit imports by enhancing the price advantages of local producers. Thus, several effects are achieved: improving the trade balance, stimulating domestic and foreign investment, maintaining and expanding local production of goods and services, maintaining and increasing jobs, keeping the decline in the standard of living, and creating conditions for raising it, leaving the economy in crisis. A typical example of comparison in the case of Slovakia is Poland, which avoided the economic crisis of 2007-2008, including because of the ability to manage the exchange rate of the zloty.

In Figure 5 lists non-euro area and ERM II countries. It is noted that inflation rates in most countries except Bulgaria (after 2012) are above the euro area average. After 2014, inflation in countries is approaching between 1.5 and 2.5%.

Figure 5

Annual average rate of change (%)



Source: Eurostat.

International studies show that a one-off increase in prices when countries join the euro area is triggered by four key factors:

- rounding prices and the desire of sellers to make them attractive;
- transferring some of the costs of adopting the euro to consumers;
- so-called "rational non-compliance" of consumers (it is difficult for consumers to evaluate all price changes simultaneously and in some cases even try to remember them because of their small size, and sellers can take advantage of this);
- synchronization of price changes (usually prices are revised gradually, while prices will be revised at the time of adoption of the euro).

4. Expected scenarios, effects and risks of Bulgaria's accession to the euro area

One of the most significant problems of the euro area is the uneven development of the national economies of the Member States, including significant differences in technological and product levels, in the qualifications of the workforce, in the scope and effectiveness of applied research, in access to markets, in the level of competition, in the economic structure, etc. It is these differences according to leading economists, incl. and the Nobel Prize winners in economics, Joseph Stiglitz and Paul Krugman, quoted in the introduction, do not allow the effects of the "optimum currency zone" to be achieved.

There is no way that the common exchange rate policy pursued by the ECB is in line with the interests of individual euro area countries, which have such wide differences. Therefore, in addition to the problem areas outlined by Krugman (see above), we believe that limiting these undesirable effects is necessary:

First, to extend EU cohesion policy to less developed EU countries, so that – quickly bridge the technological gap and the gap in labour productivity and standard of living.

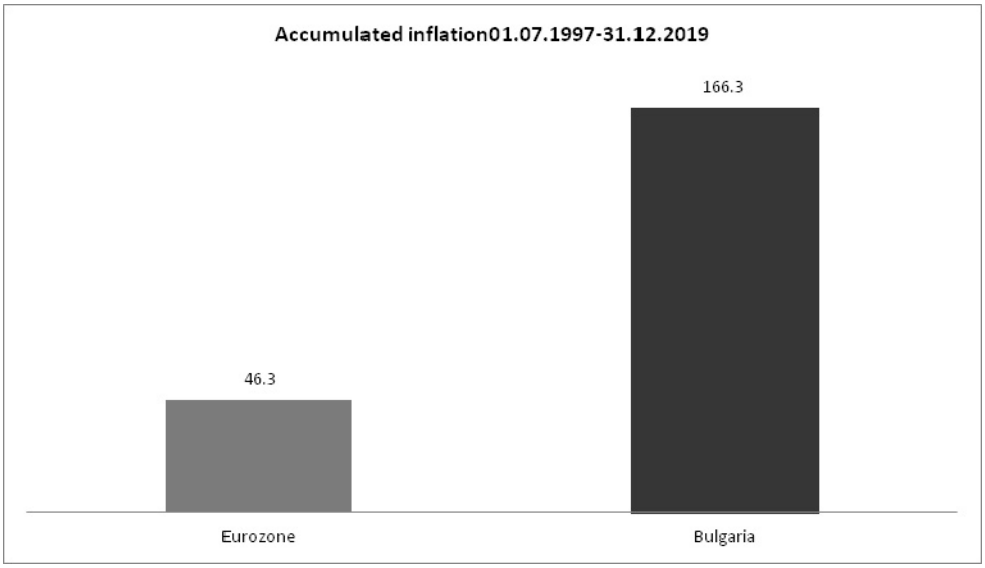
Secondly, to improve the efficiency of the use of cohesion funds and to strengthen their role in generating additional "national investment" through public-private partnerships.

Third, a better balance is achieved in protecting the national interests of all euro area countries when the monetary policy of the European Central Bank is formed and implemented.

The replacement of the local currency with the euro has led to several discussions, comments, disputes, the most common of which are related to questions about rising general levels of prices for goods and services (Hristozov, 2019). The main problem is that, at this stage, there is a lack of a prepared strategy by the Central Bank and / or the government (or at least the Ministry of Finance), for example, of all countries that have so far adopted the euro or are about to do so. The data in the above figure 6 is of great importance for the possible scenarios and the consequences for Bulgaria of its possible admission to the Eurozone.

Figure 6

Accumulated inflation 01.07.1997 – 31.12.2019



Source: National Statistics Institute, Bulgaria

There is a very large difference of about 110% in the accumulated inflation in Bulgaria (166.3%) and the Eurozone countries (46.3%) for the period since the introduction of the Currency Board in Bulgaria (mid-1997 – until now). And all things being equal, it is the inflation differential that has always and everywhere played a major role in changes in floating exchange rates. The lev-euro / German mark has not changed for more than 20 years, despite the significant difference in the accumulated inflation. If we were in a floating exchange rate regime, all things being equal, the inflation differential would have led us to depreciate the lev to about four levs for one euro. But there is no such depreciation here because through the Monetary Council Act the rate was "anchored". There are two scenarios (variants) with fundamentally opposite consequences for us:

Scenario "A". The most desirable scenarios for us: we enter the Eurozone with the same exchange rate of BGN 1.955583 for Euro, or

Scenario "B". Possible scenarios: Bulgaria joins at a market rate of about four leva per euro or another like that rate agreed with the European Council, the European Central Bank and the finance ministers of the euro area countries.

Option A has its chances because there is a precedent: all three countries with the Currency Board and/or fixed exchange rate – Estonia, Latvia and Lithuania were admitted to the Eurozone with the same fixed exchange rate as when the Currency Board was introduced in those countries. This option would guarantee us a smooth and hassle-free transition to the new unit of exchange, without inflationary pressures and without losing the real purchasing power of the lev.

Option B would have extremely negative consequences for Bulgaria. Among other things, this would devalue the savings in levs of companies and citizens and generate serious inflation problems. This would be "sufficient" to cause serious macroeconomic imbalances and lower living standards, at least in the medium term.

There is a third hypothesis that some economists have advocated in recent days in Bulgaria. Namely, that the lev is also undervalued in case of "decoupling" of the exchange rate, its real value is higher and the exchange rate against the euro would become 1.7-1.8 levs per euro. In this way, the Bulgarian economy would benefit. To us, these are unsubstantiated statements that do not rely on any real numbers or studies. Such claims are dangerous to the security and stability of the Bulgarian lev and the currency board and should not be commented at all. In addition, it should be borne in mind that determining the exact value of a currency requires statistics that must meet a number of requirements, which, in view of the dynamics of changes in their reporting methodology (leading to their permanent revision), if not nearly impossible, it is certainly extremely difficult to accomplish this task. In this view, the historically established (fixed rate) decision seems the most reasonable and in this sense the topic of the adoption of the euro at a different rate of 1.9558830 should not be commented on. In this sense, the decision of the Parliament of 30.01.2020 to refuse accession to the eurozone, if it fails to negotiate entry at the current exchange rate of the lev to the euro, is a step in the right direction.

As noted above in the text (see Introduction), more attention should be paid to this "episode" of Bulgaria's first real steps towards the euro. The change states that from the date of Bulgaria's entry into ERM II, the official lev to euro exchange rate should be carried out at the rate agreed at the relevant resolutions between the ECB and the other euro area countries, plus Denmark, which is currently in the mechanism. It was felt that this would allow other countries and institutions to address this issue. The official position of the BNB (http://www.bnb.bg/PressOffice/POPressReleases/POPRDate/PR_20200126_BG) is that the purpose of the bill is to ensure that the internal regulatory framework complies with the European, governing the administrative process and the operational procedures for the approval of the exchange rate under the conditions of the ERM II exchange mechanism, which is a mandatory condition for accession to ERM II. In our opinion, this change does not lead to such a risk, because the mandate that the government will give to the negotiating parties on the part of Bulgaria is important and, in the event of an attempt to implement Option B, Bulgaria will abandon ERM II by this time. Obviously, referring to the ECB's current practice of adopting Monetary Council countries in the Eurozone, Bulgaria should insist and expect membership in the single currency system under Option A (as applied to other countries). Only in this case will the serious risks of an inflationary wave with severe economic and social consequences be eliminated. However, the risks inherent in the Council of Europe's 1997 regulatory framework should not be underestimated, where it is explicitly emphasized that the exchange rate of national currencies against the euro, when adopted in the euro area, is decided after confidential negotiations. What the exchange rate has set in law does not in any way oblige the negotiating parties to adopt such a rate. Therefore, we explicitly emphasize that it is essential at what exchange rate the ERM II will exit, not what the rate at entering this "waiting room". In addition, Bulgaria does not have an option to exit the ERM II mechanism. The minimum stay is two years, but there is no guarantee that the lion will stay there for three, five or fifteen years. In these pessimistic

scenarios, all elements of our national monetary policy will be blocked. The consequences can be dire, especially in the face of a new financial and economic crisis in the euro area. If, by the example of Croatia, Bulgaria prepares a forecast for the expected effects of the introduction of the euro, through the cost-benefit model, they can be synthesized as follows (see Table 3):

Table. 3

Cost-benefit analysis of the introduction of the euro

Costs	Benefits
• Loss of opportunity for independent monetary policy; • Increase in the price level in the conversion process; • Risk of macroeconomic imbalances; • Different one-off costs; • Participation in financial support mechanisms.	• Elimination of currency risk; • Reducing the cost of credit servicing; • Reducing transaction costs; • stimulation of foreign trade and investment; • Reduction of the risk of currency collapse and banking crises; • Access to financial support mechanisms.

Source: own Analysis.

Comment on the explicit "benefits":

1. Elimination of transaction costs for the purchase and sale of euro. According to a several analysis by reputable think tanks, this saves from 0.2 to 0.4% of GDP, depending on the share of foreign trade turnover in GDP and the degree of openness of the economy. The share of trade with and outside the euro area is essential. Our expert estimate is that with the current GDP of about BGN 100 billion, we would save about BGN 400 to 500 million a year.
2. The possibility of direct comparability of the prices of goods sold domestically with those sold in other euro area countries. This will make it easier for our users and manufacturers, and it will also limit the possibility of raising the prices of goods and services imported into our country.
3. Decrease in the cost of investment capital as a result of lowering interest rates to the levels of the euro area countries. (In Greece, corporate loan interest rates have fallen by almost 4% since its entry into the Eurozone. In the Baltic Republics, Cyprus and Slovenia, the decline is about 1.5%). This is one of the most important positive effects on our national economy. Because cheaper investment means lower overall production costs and higher price competitiveness in the domestic and international markets. And citizens will be able to rely on significantly lower interest rates on consumer and mortgage loans. Because now the interest rate differential between the interest rates in Bulgaria and the Eurozone remains unreasonably high.
4. Attracting more foreign direct and portfolio investments due to the significant reduction of investment risk and improvement of the business environment. Joining the Eurozone would mean more integration of our country into the EU. In this way, the overall

benefits of the EU will be "transferred" to investment climate assessments in Bulgaria. This would undoubtedly increase the interest in the transfer of capital to Bulgaria.

The positive effects of a possible accession of Bulgaria to the euro area are related to expectations for increased investment activity, enhancing the integration of Bulgaria into the euro area economy and the EU. These effects will gradually begin to be felt and will be reflected mainly in improving the internal business climate and increasing external confidence, strengthening the banking system, stability of the Bulgarian economy, reducing investment risk, reducing foreign exchange costs for businesses.

No significant inflationary effects are expected to occur and there is no risk of high inflation, as other countries have shown. Since the last polls, an attempt has been made among the citizens to instil an opinion and manipulate the results of dubious organizations, as it turns out that they largely do not want the changeover to the euro (over 50%) and the main argument is the expected high inflation. We are firm on this point, it is not expected that the prices of goods and services in Bulgaria will increase significantly after the adoption of the euro.

There are also no risks in terms of savings and there is no need for a panic change in the euro. The BNB's foreign exchange reserves amounted to almost BGN 48 billion as of January 31, 2020, which shows significant coverage of the currency board and the monetary base with international reserves, there is no risk to the banking system.

Conclusions

Eurozone membership is a political commitment, but its implementation may not be "at any cost" because:

1. Eurozone membership creates favourable conditions for the economic development of Member States, but the actual indicators depend on the economic structures of the countries concerned and the effectiveness of the implemented national policies – fiscall, export, investment, employment policy, etc.
2. Some of the countries that, for one reason or another, do not prepare for the recent entry into the Eurozone – Denmark, Sweden, Poland, Hungary and the Czech Republic – demonstrate sufficient potential to overcome the banking and economic crisis of 2008-2009 and maintain a comparable dynamic its main macroeconomic indicators, incl. real GDP, exports, GDP per capita, stability of public finances, accessibility to investment loans, share of foreign direct investment in GDP, etc.
3. The main challenge facing the Eurozone is related to the varying degrees of economic development of the Member States and the significant differences in their fiscal policies. This limits the manifestation of enough advantages – typical of the optimal currency area. The euro area's insufficiently strong performance is also due to the delayed and ineffective intervention of the European Commission, the ECB and the IMF to mitigate the effects of the severe debt and banking crisis in the euro area.

Recommendations to monetary authorities

Bulgaria's interest in membership of ERM II, backed by concrete actions by public authorities, was announced in April 2018, but a final decision should only be made after:

1. In-depth econometric and political-economic analysis of the possible effects on our national economy, individual industries, on the elements of the balance of payments, standard of living, etc. It is imperative to examine the analysis and arguments of countries that refrain from joining the Eurozone at this stage. These tasks should be entrusted to a specially created interagency body/committee whose task is to secure the necessary powers, and which include representatives of science and public figures.
2. To develop and implement new, specific economic policy instruments to improve the degree of development and adaptation of the Bulgarian economy to the specific environment of the Eurozone, which will result in the development of the Bulgarian Strategy for joining the Eurozone.
3. We believe that there is a risk in Bulgaria's accession to the Banking Union at this stage, because Bulgaria will bear joint and several liabilities in the event of banking crises in the euro area member states, while this will not be the reverse until Bulgaria becomes a member of the euro area. In other words, Bulgaria could be exposed to liquidity risk in the event of the need to pay several billion euros in cash (an estimated 5-6 billion euros) in the eventual need to rescue the banking sector in a foreign country. It is our recommendation that Bulgaria joins ERM II without joining the Banking Union at this stage.
4. We believe that an agreement with the European Council will be crucial, which, in consultation with the ECB, should determine the exchange rate of the lev to the euro. These negotiations will be difficult because the accumulated inflation in Bulgaria since the introduction of the Monetary Council is three times higher than the one for the Eurozone. But Bulgaria has every reason, based on the precedent with the adoption in the Eurozone of Lithuania, Latvia and Estonia with their fixed exchange rates, to demand the same approach when introducing the euro. Only in this way will we protect our economic interests and limit the challenges posed by the change of national currency to the euro. Following the example of the first "episode" of Bulgaria's path to the euro (see above), effective protection of these interests is only possible with a parliamentary mandate. In other words, a sufficiently flexible mechanism must be devised to empower the negotiators – in the course of the negotiations themselves – to defend the Bulgarian position by virtue of a parliamentary term on the issue.

At the same time, it is important for states and civil society structures to actively involve their citizens in these processes, helping them to adapt to new realities (Bystryakov, Nenkovski, Ponomarenko, 2019). The most optimistic outlook is for Bulgaria to join ERM II in 2020, or 2021. To maintain the currency board until the actual adoption of the euro, which can happen earlier in 2023-2024 and should only take place at the current exchange rate. It is difficult for the Bulgarian governments, whoever they are during this period, would agree to the devaluation of the Bulgarian lev because this act would constitute political suicide. However, meeting the criteria for nominal convergence does not mean that

Bulgaria has consistently fulfilled all EU requirements for joining ERM II. The ECB has repeatedly stressed that Bulgarian legislation fails to fully protect the independence of the banking system, as well as restrictions on public sector funding from the central bank and legal compatibility with the Euro system. Despite the successes in achieving nominal convergence with the euro area countries, Bulgaria still demonstrates a low degree of real economic and social convergence. The main task of the Bulgarian state is to prepare an in-depth analysis of the possible effects and strategy for the changeover to the euro, to conduct an appropriate educational campaign for the population in order to eliminate the risks and myths about the euro. We believe that the implementation of the recommendations outlined above will generate the necessary institutional environment through which the impact of the outlined negative effects will be minimized or even avoided (i.e. avoided), such as thus, the positive effects will dominate, which would justify the introduction of the euro in Bulgaria.

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ИКОНОМИЧЕСКИ ИЗСЛЕДВАНИЯ
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FISCAL DISCIPLINE ASSESSMENT MODEL FOR BULGARIAN MUNICIPALITIES

This article examines the fiscal stability of Bulgarian municipalities in conjunction with financial discipline, which is crucial for carrying out the criteria and indicators set up by Bulgarian Public Finance Act (2017). An evaluation model has been developed to assess the propensity of municipalities to observe fiscal discipline, which is a prerequisite for their financial stability. The study covers all municipalities in Bulgaria (265 municipalities in total) irrespective of their population size and economic potential. The evaluation in the model is complex and dependencies are drawn between the financial indicators that characterize the municipalities' financial state and the fiscal discipline. The findings and the results of the model contribute to the existing literature on local public finance by empirically developing indices for assessment of the dependency of fiscal stability and fiscal discipline.
JEL: H10; H11; H7

Introduction

Two major components stand out in the structure of the study – the correlation between the economic situation of the municipality, the financial stability and the financial discipline, i.e. the fulfilment of the defined indicators on the fiscal condition of the municipalities. The purpose of the study is to evaluate the fiscal discipline of the municipalities in the short term according to a certain methodology based on developed complex indexes. The subject matter of this study is an assessment of financial stability through the impact of economic and demographic indicators and the observance of fiscal discipline for Bulgarian municipalities.

The study is tailored to the intended purpose, which is the following: 1) an overview of opinions expressed in the economic literature on interrelated concepts that characterize local finances and their management, such as financial stability, fiscal stability and fiscal discipline: 1) An overview of the criteria developed within the Ministry of Finance methodology for identifying municipalities facing financial difficulties; 2) The methodology and the hypotheses of the study are presented; 3) The main characteristics of the study and the relevant impact assessment results for economic and demographic factors are presented through the development of the K1 index for assessing the economic, social

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and administrative potential of the municipality and the K2 and K3 indices for Tendency for violation of fiscal discipline; 4) Identifying of the main results of the model and formulating conclusions concerning the reliability of the financial situation of the municipalities according to the conditions/criteria established by the Public Finance Act and whether they can help to better present the real financial situation of the municipalities and compliance with financial discipline can be a means of managing local finances.

Understanding financial stability and fiscal discipline in the study context

In the framework of this study, basic concepts, such as financial stability and fiscal discipline, are used. In view of the different content of these concepts in the scientific literature, the applied analyzes and the regulatory framework, it is correct to specify their content and scope.

Financial stability in a broad sense is the ability of a local authority to ensure the sustainability of its incoming and outgoing cash flows over time, while at the same time achieving its goals in the short and long term. In this sense, in the context of municipal finances, this should mean that the municipality has the ability to provide financial resources to cover its core operating costs and policy implementation by properly planning its costs and revenue over time. At the same time, however, the Bulgarian municipalities and the Ministry of Finance provide information on their financial characteristics only related to the budget of the municipality in individual years. Thus, for some of the key indicators needed to analyze the stability of municipal finances over time, such as the total credit exposure of municipalities and the maturity of their liabilities, there is no quantitative information. Another issue relevant to the availability of public data is related to investment activity and sources of funding, as projects funded with targeted available funds (from different EU funds or Council of Ministries) are not directly reflected in municipal budgets. All these limitations, related to the lack of relevant information, are explained to a big extent by the lack of research in the scientific literature devoted to municipal financial stability in particular. In order to avoid this problem, within the framework of the present study we will understand financial stability as „the ability of the municipality to provide sufficient financial resources within the separate budget year in order to fulfil its legal functions, including policy implementation at a local level“, using data and financial indicators for the annual implementation of municipal budgets in Bulgaria.

Fiscal discipline is usually associated with the ability of budget municipalities to comply with the rules for forming and implementing their budgets. The legal definition in the PFA involves the implementation of a set of specific criteria that constitute the legal framework of the concept and its scope. It should be noted that some of them are of a financial nature (such as covering the costs of local activities with their own revenues). For the purposes of the study, fiscal discipline is understood as "The ability of the municipality to meet its planned budgets, both in terms of the structure and magnitude of its revenues, and in terms of cost, and its commitment to bear costs", using for this purpose data on financial indicators for the annual implementation of municipal budgets in Bulgaria. The difference in concept is due to the effort to draw a demarcation line between financial stability and fiscal discipline and seek a relational relationship between them within the present study.

1. Definitions and Literature Review

Before presenting the evaluation model and the findings of the study, we shall briefly review the existing definitions, which reveal the different characteristics of financial stability, fiscal stability and financial management of municipalities, as well as various studies which have been published and are used in the field.

Terms used in the literature which characterize financial stability of municipalities to a various degree are fiscal stability, fiscal position, financial conditions and fiscal stress. Essentially, all of the definitions encompass to some extent the ability of local governments to maintain stable financial conditions and budget balance, and to satisfy the financial obligations for public service delivery and prosperity of people. Financial stability is a broad term that includes a variety of indicators that illustrate the diverse aspects of municipalities' financial management, such as: financial management capacity, macroeconomic factor impacts, legislative and business environment impacts. The Organization for Economic Cooperation and Development (OECD) defines financial stability as the "ability of local government to maintain public finances at a credible and serviceable position over the long term" (OECD, 2013).

In the Bulgarian economic literature, the issues of financial stability, the problems of the fiscal decentralization of the municipalities are examined. Analyzes, articles on financial stability, municipal finance management stand out (Ivanov,2017) The relationship between the decentralization policy and the financial condition of the municipalities has been deeply explored, as well as a system of indicators for assessing the financial condition of municipalities in the annual report "The Road to the European Union and the Balance of the First 10 Years, Annual Report of the Institute of Economic Research". In relation to a system of indicators for assessing the financial condition of the municipalities, Ivanov (2017) points out that "the selected indicators address the influence of the management factors on the financial situation, they set limits, thus becoming evaluation criteria and are regulated in the Public Finance Act ". The financial indicators for assessing the financial condition of the municipalities are analyzed in the article by Ivanova and Kusheva (2017), the authors believe that "the financial indicators of the Bulgarian municipalities can be used not only for the purposes of implementing the financial recovery rules but also for the purposes of better financial management and control." (Ganev and Aleksiev, 2018) in a study on fiscal decentralization "point out that the procedure for financial recovery of municipalities has a disciplinary character – both for those who receive interest-free loans and for all the others". Fiscal decentralization and fiscal management of the Bulgarian municipalities is an extensively explored topic in the monograph "Fiscal Decentralization and Financial Management of the Municipalities in Bulgaria" by Zahariev (2017).

In reference to fiscal stability

Fiscal stability refers to well-functioning financial management systems enabling local governments to manage financial resources effectively and responsibly, to maintain sustainable, balanced budgets and to apply imposed fiscal rules by the governments so that they meet their short and long term financial and operational obligations. (Hendrick, 2011)

defines fiscal stability as "the ability of the municipality to meet its administrative and capital (investment) needs by maintaining and developing its own assets in accordance with the current and future demand for the provided public services, while also adapting to possible external influences". Roberto Cabaleiro Casala et al. (2009) consider as key the determination of the adaptability of the budgeted costs and revenues to changes in the external environment or generally known as the fiscal stability analysis economy. Groves et al. (2003) state that "the financial condition of a local authority can be assessed by measures of cash solvency, budgetary solvency, long-run solvency and service-level solvency".

In reference to Fiscal discipline

There is no strict definition of fiscal discipline in the literature. The term 'fiscal discipline' in public finance literature has been used broadly. Fiscal discipline in the area of public finances is usually linked to the ability of public institutions to limit the costs associated with the performance of their assigned functions within the available budget. Musgrave's (1989) concept of financing the deficit is related to "cutting back on spending to the limits of available finance and fiscal discipline as part of the budgetary control process". The set of administrative, business and investment functions assigned by legislation to the local government is extremely broad, which affects both the budgeting process and municipal budgets. Own revenues in these budgets represent a relatively small part of the required financial resources, as a result of which the municipalities are additionally financed by the central budget. In this sense, the fiscal stability of the municipalities is directly related to the country's fiscal indicators. The lack of financial discipline in the spending of municipal funds makes it necessary for the centralized state budget to cover unplanned deficits. In this respect, Petrov (2017) highlights that "Practices for continuous additional targeted funding and covering municipal budgets by the state budget raise the questions the effectiveness of the local administration to encourage the economic and social development".

Fiscal discipline is applied to limit the expenditures and to guarantee a reasonable budget. The fiscal discipline of municipalities in this study refers to fulfilment financial indicators, which are connected with achieving financial robustness and stability of municipal finance.[2]

In the present study, a model for evaluation of municipalities in terms of fiscal discipline has been developed. In developing the evaluation model, the author assumes that local authorities possess the ability to fulfil administrative commitments related to their financial obligations to provide quality public services and to maintain stable fiscal conditions.

[2] Budget discipline" within the framework of this paper refers to the specified fiscal parameters with the implementation of an article. 130a of the Public Finance Act. The Ministry of Finance periodically publishes the data on the financial situation of the municipalities and municipalities undergoing a financial recovery procedure for 2017. In order to achieve financial sustainability, municipalities with deteriorated financial status develop a plan for financial recovery.

2. Capacity of municipalities to manage municipal finances

The topic of the study on fiscal discipline is up to date as the financial situation of the municipalities is monitored by the Ministry of Finance through a set of criteria established by the Public Finance Act. A methodology for the financial situation has been developed which covers the indicators that refer to the formulated criteria for the stability and sustainability of the financial condition of the municipalities. The indicators the Ministry of Finance sets refer to fiscal discipline and financial stability of the municipalities. The fulfilment of the criteria and indicators shows the current financial situation; however, the capacity of municipalities to manage municipal finances, to observe fiscal discipline is key to maintaining the sustainability of the municipal budget. Municipalities, which do not meet the financial criteria under the Public Finance Act, fall under the procedure of financial rehabilitation, and this is the reason for the granting of temporary non-interest-paying, this is, in reality, assistance to the municipalities. Under the Public Finance Act, municipalities with financial difficulties are those that meet only three of the six criteria for financial stability/sustainability. In particular, the conditions and the extent to which municipalities comply with them by the end of 2018 are:

- The annual amount of the municipal debt payments for each municipality may not exceed 15 per cent of the average annual amount of own revenues and the total equalization subsidy for the last three years; According to this criterion at the end of 2018 only 8 municipalities, or 3% of all, violate the rule under Art. 32, para 1 of the Public Finance Act.[3]

- Regarding another condition, "The municipal budget expenditures at the end of the year may not exceed 15 per cent of the average annual expenditure for the last 4 years", only 5 municipalities do not meet this condition.

- The condition "Commitments made available at the end of the year for expenditures on the budget of the municipality may not exceed 50 per cent of the average annual amount of the reported expenditures for the last 4 years – the number of municipalities is 34 (12.8% of all).

- The condition "Municipal overdue budget liabilities available at the end of the year may not exceed 5 per cent of the municipal expenditures reported for the last year" makes it difficult for the municipalities and 49 or (18.5%) of them do not meet it.

- The condition "The budget balance of the municipality budget in the last three years may not be negative for each of the three years", only 4 municipalities have reported a negative budget balance of the municipality budget for the last three years.

- Municipalities, whose average collection rate for real estate tax and vehicle tax is below the average collection rate of the two taxes for all municipalities reported for the last

[3] According to Art. 32, para. 1 of the Public Finance Act stipulating that the annual amount of the municipal debt payments for each municipality may not exceed 15 per cent of the average annual amount of own revenues and the total equalization subsidy for the last three years.

year. At an average collection rate of 71.41% for the country at the end of 2018, a total of 116 municipalities (43.8% of all) reported lower parameters.

The Ministry of Finance indicates for 2018 17 municipalities, most of them are small and medium-sized municipalities, which are in the rural category, with the exception of one larger municipality with potential.

It is noteworthy that the number of municipalities with financial difficulties is decreasing, they are 32 for 2018, which is fewer compared to 2017 and 2016. The limitation of the overdue liabilities is also positive, but in total, they amount to 122.2 million BGN, 7% less compared to 2017 (the total amount of overdue liabilities is approximately 157 million BGN). The number of municipalities where municipal debt payments exceed 15% of their own revenues and subsidies decreases. The decrease in the number of municipalities with financial difficulties is due to the received targeted non-interest-bearing loans and not to the improvement of the fiscal discipline.

3. Research design and methodology

A variety of quantitative and qualitative models which are used to describe and characterize the fiscal stability can be found in the economic literature. Quantitative models investigate the dependence between financial stability and financial, economic, social and demographic indicators. The applied methodologies measure the statistical dependence between the amount of cost and revenue, the budget balance, the amount of debt and fiscal stability. The impact of changes in the external environment and the dynamics of the economy on the implementation of the budget of the municipality is assessed through statistical tools (Carroll, Goodman, 2011). Variability or tendency to modify individual budgetary components is considered to be a function of the fiscal structure of the budget (Afonso, 2013) and the local fiscal policy (Afonso, 2013). Moreover, Bland (2013) use a regression assessment of the municipalities' fiscal stability; the main variables are own revenues, local activity costs and delegated costs.

However, some models characterizing the financial stability of the municipalities assess the impact of socio-economic, demographic and political factors. For examples, Wang, Dennis and Sen (2007) summarize the different approaches and consider that the socio-economic environment is another factor when analyzing the financial situation. Kloha (2005) considers that socio-economic factors affect local finances and should not be included as an additional factor in the analysis of the financial situation, no indicator can outline the whole picture of the fiscal position of local government". Groves, Godsey and Shulman (2003) assume that social, economic, and demographic factors influence the financial position of a municipality Zafra-Gomez et al. (2009) assess the effects of socioeconomic indicators and they evaluated of all the elements that make up the financial condition. Wang et al. (2007) analyze the relationship between the financial condition and population (population size and growth rate) and economic factors (personal income per capita, gross state product per capita, and percentage change in personal income), and infer that these variables can be used to predict the financial condition with a certain level of accuracy.

Moreover, stress-test models are used in practice. The goal of the stress tests is to show the vulnerability of the municipal finances, fiscal stability, financial management flexibility, and sustainability of economic, financial and management factors. Generally speaking, the common feature between the stress-test models is that they are developed on the basis of financial indicators that characterize fiscal and financial stability. The standard practice in the Netherlands, Denmark, France, United Kingdom, USA and others show stress tests are a useful tool for financial planning and financial risk management. In other countries, the practice to monitor compliance with financial discipline through specific laws and administrative procedures, which determines the financial stability of the municipalities, has also been adopted.

From the brief review of the methods and practices used for assessing financial and fiscal stability, one could see that there is a similarity between the used indicators, namely, that they measure the quality of financial planning and management, and include impacts of external socio-economic factors, financial discipline, planning and budget management in municipalities. The economic and demographic factors that influence the financial status of the municipality are selected in the evaluation model based on proven significance through correlation analysis.

The criteria for financial stability set by the Ministry of Finance are a form of a centralized approach to municipal finance management. One such centralized approach to assessing and monitoring financial stability is by conducting stress tests that are used in countries with a high degree of fiscal stabilization and local self-government.

3.1. Methodology Description

The elaborated evaluation model aims at analyzing a dependency between socio-economic and demographic factors and financial stability, on the one hand, and at assessing fiscal discipline from a point of view fulfilment financial indicators determined by the Bulgarian Public Finance Act (2017), on the other hand. The model uses a statistical tool, including correlation analysis and multiple regressions. The correlation analysis verifies the relationships between socio-economic, demographic and financial factors. The correlation between the fiscal situation of the municipalities and the economic and demographic indicators has been evaluated on a step by step basis. The regression analysis is used to define the interdependence of the financial variables and fiscal discipline. The main derived indices concern the financial stability and the capacity of local government to follow discal discipline.

The following hypotheses are formulated within the framework of the development and the test of the evaluation model:

Hypothesis 1. The fiscal discipline of the municipalities is not predetermined by the size of the municipality and its social economic and demographic characteristics, but is the result of the actions of the operational management on a municipal level.

Hypothesis 2. There is a statistically significant dependency between the different components of the fiscal discipline assessment and the demographic, social, economic and administrative characteristics of the municipalities.

The following limitations are set in the assessment model:

- It is assumed that municipalities perform their legal functions within their available budgets.
- Data from official public sources are used for individual municipal indicators; and therefore the scope of the rating model with regard to the data used for its construction is limited to the available public information on individual indicators by municipality.
- No sufficient information for individual municipalities, therefore the information is limited to the total debt exposure of all municipalities. For that reason, the model includes those commitments, which are components of the municipal budget for the current financial year, but the effects of long-term financing on the fiscal stability of municipalities over one year are not assessed. Information on investment funding from the European Structural and Investment Funds (ESIF) is only available on a program level, and there is a lack of systematic information available for each municipality.

Data on the financial situation of the municipalities are taken from the Ministry of Finance's assessment of the indicators in the Public Financial Act. The data on the socio-economic indicators are taken from the National Statistical Institute. All 265 municipalities are included in the evaluation model.

Each of the formulated indices, which are the basis for the evaluation of the municipalities, cover variables that affect the financial situation of the municipalities. In the research are selected indicators for which information is reliable and available for all municipalities in the country.

The model is structured in stages in the following logical sequence:

- Identification of factors that can determine or at least affect the financial condition;
- Verification of interdependencies – statistical dependencies between economic, social, demographic and financial variables, which characterize the financial situation of municipalities and measured by correlation;
- Determination of the main variables in the model related to the rating of the municipalities.
- Verification of the continuity of the calculation function of the individual components included in the assessment indices (i.e. a quantity is calculated for each of the municipalities in the country);
- Calculation of rating indices for all municipalities in the country used for rating;
- Formulation of conclusions from the model and test results of the formulated hypotheses.

In the model presented below, three indices are elaborated. Index K1 is used for assessing the economic, social and administrative potential of the municipality, which is considered as a condition in predicting financial stability of municipality. The other two indices (K2 and K3) – to assess the propensity of municipalities to follow financial discipline.

3.2. Model Specification

Assessment of interdependencies between economic, demographic and financial parameters

A correlation analysis has been made[4] to show the degree of dependence between the financial, demographic and economic factors and the financial situation of the municipality. The statistical significance between economic and social factors and the financial stability indicators is presented below (Table 1).

Table 1

A summary of the results of the correlation analysis

Correlation (without § 19)	1. Share of revenue from total income*	2. Coverage of the cost of local activities with revenues*	3. Budget balance compared to total revenues	4. Debt size as a percentage of planned revenues and equalization subsidy	5. Overdue liabilities as a percentage of planned revenue and equalization subsidy	6. Population per one municipal employee	7. Share of wage and social security costs as a percentage of total costs	8. Share of capital expenditure in total costs (investment activity)	Municipal revenue under Art. 45, para. 1, item 1 of the PFA (without §46, §47 and §48)	Municipal expenditure under Art. 45, para. 1, item 2 of the PFA	Budget balance
Total number of unemployed (number)	0.086096	0.198747	0.04345	0.060183	0.035973	0.437288	0.078524	-0.17846	0.25274	0.306223	0.382865
Unemployed up to 29 years of age	0.0935	0.208442	0.037007	0.062456	0.032424	0.451646	0.089738	-0.19296	0.24853	0.304244	0.385446
Unemployed registered more than a year ago	-0.18626	-0.07061	-0.00562	0.008114	0.128915	0.233907	0.148714	-0.10527	0.016894	0.065002	0.037847
Unemployment rate (%)	-0.44617	-0.45382	-0.12666	-0.19276	0.155194	-0.40551	0.142489	0.133436	-0.15975	-0.18387	-0.13718
Average annual income per person (BGN)	0.405964	0.435581	0.084515	0.048173	-0.1397	0.146056	-0.15838	-0.09676	0.077888	0.077404	0.102848
Total area (decares)	0.121055	0.159868	-0.10633	0.086091	-0.06806	0.328415	0.02752	-0.17648	0.187759	0.225434	0.009214
Population density (per 1 km^2)	0.149566	0.218267	0.076782	0.039374	-0.02467	0.3524	-0.00229	-0.0888	0.272335	0.313944	0.508549

[4] The scale used to determine the relevance of the link is: 0-0.2 – poor correlation; 0.2-0.4 – moderate correlation; 0.4-0.6 – significant correlation; 0.6-0.8 – high correlation; 0.8-1 – very high correlation.

Correlation	Size of municipal debt	Overdue liabilities according to budget	Debts for budget expenditure	Budget expenditure commitments	Share of overdue liabilities according to budget from the expenditure for 2016	Share of budget expenditure debt from the average annual expenditure for 2013-2016	Share of budgetary commitments from the average annual expenditure for 2013-2016	Collection rate of the real estate tax (%)	Collection rate of vehicle tax (%)	Average collection rate of both taxes
Total number of unemployed (number)	0.15458	0.23499	0.231534	0.294364	0.03808	0.052272	0.090423	-0.05006	0.141102	0.082852
Unemployed up to 29 years of age	0.142961	0.237771	0.225014	0.291364	0.042425	0.051397	0.088806	-0.04617	0.143137	0.085212
Unemployed registered more than a year ago	0.00834	0.32071	0.100681	0.040571	0.112755	0.078802	0.028073	-0.21512	-0.04776	-0.12056
Unemployment rate (%)	-0.10873	-0.05642	-0.13192	-0.17809	0.105203	-0.00812	-0.17044	-0.3395	-0.42113	-0.47134
Average annual income per person (BGN)	0.042787	-0.04594	0.032726	0.069837	-0.11443	-0.1225	0.036174	0.134707	0.296296	0.268235
Total area (decares)	0.181955	0.160332	0.225257	0.204	-0.05385	-0.03248	0.067829	0.026093	0.175074	0.16605
Population density (per 1 km^2)	0.102017	0.038296	0.142811	0.300549	-0.01845	-0.00038	0.094694	0.016458	0.111387	0.083516

Source: Ministry of Finace, NSI author's calculations.

The main results of the correlation relationship between economic and demographic and financial indicators are summarized below:

- A significant correlation between the financial indicators (Revenue share from total proceeds and Coverage of costs for local activities with revenues) and the economic indicators (Unemployment rate (%) and average annual income per person (BGN) has been identified. Municipalities that are characterized by high unemployment and low incomes of the population are highly sensitive to the availability and extent of their own revenues. Improving macroeconomic characteristics is directly linked to generating more own revenues in the future. Additionally, the dependence on municipal expenditures and obligations is moderate in relation to the indicators Unemployed up to 29 years of age and Unemployed registered more than a year ago.
- A similar dependence is also observed in terms of the parameters – municipal territory and the density of the population (Total area and Population density (per sq. km)). If the territory is a constant magnitude, then the unemployment rate and the presumed social cost, expressed in a larger amount of social and other commitments of the municipality, respectively, leads to an increase in costs. The correlation analysis shows that municipal financial situation is dependant on the unemployment rate; for example, the increase the unemployment rate contributes to decrease of the municipal revenues and so that it slows down the economic activity. A moderate correlation has been identified between the demographic indicators (Population per one municipal employee) and (Total

number of unemployed), but a more significant dependence is recorded for unemployed up to 29 years of age and unemployed registered more than a year ago. Higher unemployment rate and a larger territory lead to increase of the need of expenditures connected with carrying out social and pubic duties.

- A change in the population could have important consequences on the financial situation of the municipality. For example, increases of retirement age population can put increased pressures on social service demand. Conversely, an increase of the share of working-age population could increase revenues and require more supply of public services.
- The correlation is moderate between the indicator measuring the capacity of the administration to serve the population (Population per one municipal employee) and economic indicators (unemployed up to 29 years of age, unemployed registered more than a year ago and unemployment rate (%). It shows that less" busy" municipalities which deliver service to population are more inclined to form a deficit. This higher sensitivity should be taken into account in the forming of buffers in the financial management and could become a cause of low fiscal discipline due to the greater sensitivity to possible external shocks.

There is a strong relationship between the tax collection rate in the municipality (real estate tax (%), vehicle tax (%) and average collection rate of both taxes) and economic indicators (Unemployed registered more than a year ago, Unemployment rate (%) and Average annual income per person (BGN). The dependence shows that fiscal stability is sensitive to the tax rate and tax collection. Fiscal discipline indirectly impacts on fiscal stability through how to municipal employees carry out a control on tax collection. In practice for small municipalities, there is a danger for fiscal stability because of the higher unemployment and low incomes of the population in comparison to urban and big municipalities. Ivanov (2017) expresses doubt regarding the performance indicator – population per one municipal employee – it is meaningless as far as it reflects the size of the municipality. A small municipality, however efficient, cannot catch up with a large inefficient municipality on this indicator. This indicator is included as it is used as a standard in many methodologies for assessing the efficiency of the activity of the administrative unit.

The correlation analysis shows that economic, demographic indicators and financial situation of the municipality have statistical relationships with separate indicators for fiscal discipline at the municipal level. At the same time, the concepts of financial stability and fiscal discipline are complex, using a set of indicators to quantify each of them. In this sense, although there is a correlation between individual indicators in one group, it remains questionable whether it is sufficiently serious in order for us to assume that there is, indeed, a significant link between financial stability and fiscal discipline (perceived as complex variables). The construction of complex indexes evaluating the two indicators would make it possible to empirically prove such a hypothesis.

Assesment of financial stability

In the assessment, financial stability is a complex of economic, social, demographic and other characteristics of the municipalities, such as unemployment, population income and productivity of the local economy.

Index **K1 Assessment of the economic, social and administrative potential of the municipality is formulated in the following equation**:

$$K1 = \ln(1+A) + \ln(1+B) + \ln(1+C) + \ln(1+D) - \ln(1+k) + \ln\left(1+\frac{n}{\max(nn)}\right) + \ln(1+\frac{m}{\max(mm)})$$

or

$$K1 = \ln\left(\frac{(1+A)*(1+B)*(1+C)*(1+D)}{(1+k)} * (1+\frac{n}{\max(nn)}) * (1+\frac{m}{\max(mm)})\right)$$

Where:

K1 is aggregated index

A – Share of revenue from the total proceeds

B – Coverage of the cost of local revenue activities

C – Population per one municipal employee

D – Share of wage and social security costs from the total costs

k – Unemployment rate (%).

n – Average annual income per person (BGN)

max(nn) – maximum value of the variable Average annual income per person (BGN) for the municipalities in the sample

m – Production of enterprises (thousand BGN)

max(mm) – maximum value of the variable Production of enterprises (thousand BGN) for the municipalities in the sample

For the calculation of the index **K1** variables that have a strong correlation with the financial condition of the municipality and with the socio-economic parameters have been included. The share of the revenues from the total proceeds of the municipality depends on the economic and social profile of the municipality. The higher value of the variable, the more the municipality has the ability to resist external financial and economic impacts. Another variable is the coverage of the cost of local revenue activities (B), which is a direct measure of how well the municipality observes financial discipline. The higher its value, the more positive the influence of the capacity of the municipality to resist external impacts. The variable Population per one municipal employee (C) is a measure of the effectiveness of the municipal administration's activity to serve the population. The regression results indicate moderate dependency between expenditures and unemployment rate.

An additional variable Share of wage and social security costs from the total costs (D) is included in order to take into account the optimization of the workload of the municipal administration. The deterioration of the financial state of the municipality could occur as a result of the reverse effect of the unemployment rate (k). The average income per person and the production of enterprises affect positively the financial condition of the municipality.

Assessment of the fiscal discipline

Index **K2 The tendency for violation of fiscal discipline is expressed by the following logarithmic equation.**

$$K2 = \ln(1+G) - \ln(1+E) - \ln(1+F) + \ln(1+S*H) + \ln\left(\frac{I}{aver(II)}\right) + \ln\left(\frac{J}{aver(JJ)}\right)$$

or

$$K2 = \ln\left(\frac{(1+G)*(1+S*H)*I*J}{(1+E)*(1+F)*aver(II)*aver(JJ)}\right)$$

Where:

G – The budget balance compared to total revenues

E – Debt size as a percentage of planned revenue and equalization subsidy

F – Overdue liabilities as a percentage of planned revenue and an equalization subsidy

H – Share of capital expenditure in total costs (investment activity)

I – Tax collection rate on real estate (%)

aver(II) – average value of the index Tax collection rate on real estate (%) for all municipalities in the sample

J – Tax collection rate on vehicles (%)

aver(JJ) – average value of the index Tax collection rate on vehicles (%) for all municipalities in the sample

S – is indicative of whether the municipality has overdue liabilities, or:

$$S = \begin{cases} F > 0 & \rightarrow S = -1 \\ F \leq 0 & \rightarrow S = 1 \end{cases}$$

Financial variables are included that characterize the financial management of the local government. Budget balance compared to total revenues (G) is a key variable to assess the fiscal discipline and not to allow a municipal budget deficit. An additional condition, in this case, is that the greater the balance at the end of the year (as a percentage or relative share of the magnitude of the expenditure of the municipality), the greater the ability to precisely plan revenue and expenditure in the respective municipality is weak. The high value testifies to the existence of good fiscal discipline, while the opposite testifies to a low one.

Debt size as a percentage of planned revenue and equalization subsidy (E) is a variable for the assessment of the financial situation is the structure of the debt for the current year. The high value has a negative impact on the company's finances.

The variable „Overdue liabilities as a percentage of planned revenue and equalization subsidy (F) shows the quality of the financial management of the municipality and the extent to which financial commitments are fulfilled. The existence of a large delay in payment is a overburdens the municipality financially with a commitment that is transferred into subsequent periods and breaks the financial planning process entirely. The variation of the financial balance could be the result of insufficient synchronization of revenue and expense by periods, and overdue liabilities are always evidence of poor fiscal discipline. Therefore, the dependence between the index and the variable is negative and the value of the index is negative. In its optimal version, the indicator has a zero value, which indicates a lack of overdue liabilities.

The Share of capital expenditure in total costs (investment activity) (H) is an important factor displaying the dynamics of the investment activity of the municipality and it directly affects the process of optimizing revenues and expenditures in the coming years. Where there are a sound financial management and lack of budget deficit, the investment activity has favourable effect on the fiscal stability. On the other hand, investments in the condition of existing overdue liabilities will result in worsening the fiscal stability and can be a signal for the absence of any fiscal discipline. In other words, the high value of the index is an evidence of good financial management and fiscal discipline, and the absence of overdue liabilities.

Average collections of both taxes – real estate tax (I) and a vehicle tax (J) show the attitude of the municipality towards its own main sources of income. Regardless of any external environment conditions and other factors, the high value of the indicators is a testimony of the ability of the local government to secure the revenue set in its budget, and the low figure is evidence of a lack of discipline with regard to fiscal stability.

It is accepted (in the approach proposed by the PFA) that the collection rate limit would be the average collection rate for the relevant tax, although thus, the lack of discipline could have a demotivating and antidisciplinary effects on all other municipalities. Regardless of that, the average tax collection rate of all municipalities in the country has been taken as a basis for the construction of this rating indicator.

A verification of the calculation of the value of the indicators in the formed indices is made by taking the maximum and minimum values of each indicator, i.e. it has been checked whether the values of the indicators fall within the range of continuity of the function. The purpose of the calculations based on the continuity of the function is to ensure, under equal conditions, the correctness of the evaluation, for municipalities with inferior values of the indicator to get a lower value in the rating index. The verification results are presented in the table below:

Code	Name of the index	range of variation		There is a better condition for values that are:		range of variation within the indicator	
	Name of the indicator	min	max			min	max
	Characteristics of the municipality						
A	Share of revenue from total incomes	0.058205556	0.85830128	high	LN(1+A)	0.056574602	0.61966278
B	Coverage of the cost of local activities with revenue	0.125351807	1.90374382	high	LN(1+B)	0.118095704	1.066000877
C	Population per one municipal employee	26.93548387	583.7864078	high	LN(1+C)	3.329897704	6.371246666
D	Share of wage and social security costs from the total costs	0.236695324	0.691136659	high	LN(1+D)	0.212442761	0.525400882
k	Unemployment rate (%)	2.01894317	65.54621849	low	ln(1+k)		
n	Average annual income per person (BGN)	4859	25043	high	LN(1+(n/MAX(nn)	0.17733102	0.693147181
m	Production of enterprises (thousand BGN)	383	55541798	high	LN(1+(m/MAX(mm)	0	0.693147181
	Tendency for violation of fiscal discipline						
G	Budget balance compared to total revenues	-0.83996297	0.367884184	high	LN(1+G)	-1.832350028	0.313265155
E	Debt size as a percentage of planned revenues and equalization subsidy	0	2.7034626	low	LN(1+E)	0	1.30926822
F	Overdue liabilities as a percentage of planned revenue and equalization subsidy	0	2.785018717	low	LN(1+F)	0	1.331050832
H	Share of capital expenditure in total costs (investment activity)	0.015718574	0.531893187	conditional	LN(1+H)	0.015596317	0.426504348
				conditional	LN(1-H)	-0.015843421	-0.759058777
I	Collection rate of real estate tax (%)	0.4168	1	high	LN(I/average(II))	-0.530402415	0.344746373
J	Collection rate of vehicle tax (%)	0.3179	1	high	LN(J/average(JJ))	-0.728910791	0.41710762
	Average collection rate of both taxes	0.3958	0.9436	high			

Source: Ministry of Finace, NSI author's calculations.

A range of minimum and maximum values of the individual variables in the above calculation confirms that it is possible to rate municipalities in terms of both indices.[5]

The values of K1 and K2 have been calculated for every municipality in the country.[6] The evaluation shows that the fiscal discipline of the municipalities is not predetermined by the size of the municipality and its economic, social and demographic characteristics, but it is the result of the actions of the operational and financial management on a municipal level. To verify whether the more vulnerable financial municipalities are exposed to adverse external changes to the macro- or micro-environment and to show the impact of the external environment on their ability to comply with fiscal discipline, the dependence of the K2 indicator on K1 has been tested in case K2 is a function of K1.

The results of the linear regression test for K1 and K2 are:

Regression Statistics	
Multiple R	0.09165
R Square	0.0084
Adjusted R Square	0.004629
Standard Error	0.450106
Observations	265

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	1	0.451349	0.451349	2.227835	0.136742
Residual	263	53.28258	0.202595		
Total	264	53.73393			

	Coefficients	*Standard Error*	*t Stat*	*P-value*
Intercept	-0,69432	0.269605	-2.5753	0.010562
X Variable 1	0,063301	0.04241	1.492593	0.136742

The statistical result confirms that the vulnerability of municipalities to financial turmoil is not a factor for compliance or non-compliance with fiscal discipline. Therefore, non-compliance with fiscal rules and criteria should not be explained by shocks from the external environment but rather by the quality of financial management.

The condition under which the assessment is made is that when action is taken for financial recovery, it is possible to change the behaviour of the municipality in the direction of increasing the fiscal discipline in the following period. The assessment takes into consideration the number of unmet fiscal criteria under the PFA.

The connection between the number of unmet criteria and the financial situation has been verified through the functional dependence of the individual components (variables) included in index K1.

[5] A reverse-dependent variable that is noted are reversely correlated with the financial stability index K1 (for example, the unemployment rate at which the high values are reversely correlated with the financial stability index K1), the component is included in furthers calculations with a negative sign.
[6] The results are calculated and applied in a common table in annex.

The data from the regression analysis are as follows:

Regression Statistics	
Multiple R	0.324246
R Square	0.105136
Adjusted R Square	0.080762
Standard Error	1.08188
Observations	265

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	7	35.34148	5.048783	4.313486	0.000156
Residual	257	300.8095	1.170465		
Total	264	336.1509			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
Intercept	3.735257	1.296574	2.880868	0.0043	1.181996	6.288519	1.181996	6.288519
X Variable 1	0.073805	1.835307	0.040214	0.967954	-3.54035	3.68796	-3.54035	3.68796
X Variable 2	-1.02265	1.196452	-0.85474	0.393493	-3.37875	1.333447	-3.37875	1.333447
X Variable 3	-0.00633	0.148034	-0.04274	0.965944	-0.29784	0.285187	-0.29784	0.285187
X Variable 4	-4.51237	2.013638	-2.2409	0.025887	-8.4777	-0.54703	-8.4777	-0.54703
X Variable 5	0.169224	0.139616	1.212068	0.2266	-0.10571	0.444162	-0.10571	0.444162
X Variable 6	-2.37394	1.275567	-1.86109	0.063873	-4.88584	0.13795	-4.88584	0.13795
X Variable 7	1.38062	1.573157	0.877611	0.380974	-1.7173	4.478539	-1.7173	4.478539

The regression analysis shows that there is no statistical dependence, or the current external environment (micro and macro) of the municipality does not lead to a deterioration (or improvement) of the fiscal discipline.

As a result of the regression, the K1 does not characterize fiscal discipline, it is a summary of the influence of factors from the external environment, and through it the municipalities can be ranked according to their vulnerability to external impacts.

K2 measures the propensity for violating fiscal discipline, and values below 0 (zero) shall be viewed as risky or violating the fiscal stability of the municipality as a result of poor management, and vice versa. If K2 has positive values, it can be assumed that municipalities comply with fiscal discipline.

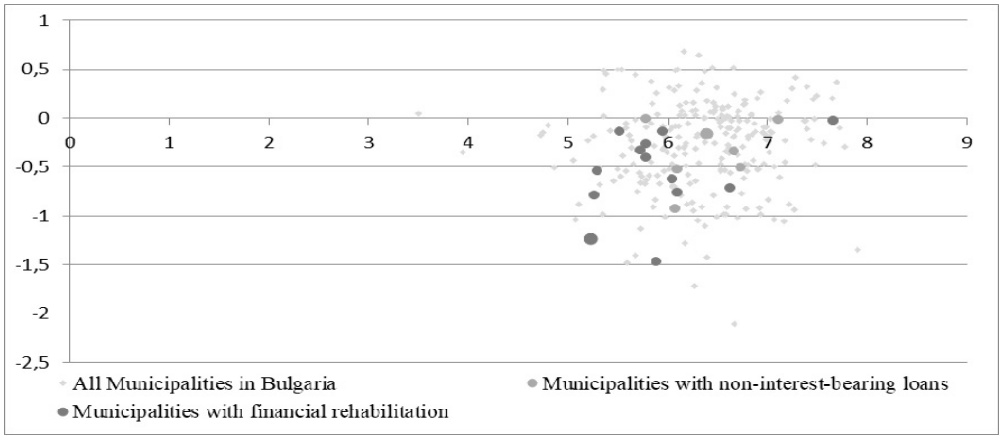
Compliance with fiscal discipline is a characteristic of the financial management of the municipality and not of the surrounding environment, as much as the control applied by the Ministry of Finance, based on the rules of the PFA, actually encompasses the "most undisciplined" municipalities in the country. According to data from the Ministry of Finance, two groups of municipalities are under special supervision: (i) Municipalities with non-interest-bearing loans, and (ii) Municipalities with financial recovery. Some of the municipalities fall within both groups.

The following figure presents the conditional location of the municipalities according to the assessment of the economic, social and administrative potential of the municipality and the propensity for violation of fiscal discipline. Separately (in a different colour) the

municipalities of the two groups under special supervision are marked (Municipalities with non-interest-bearing loans and Municipalities with financial recovery[7]).

Figure 1

Location of the municipalities according to fiscal stability assessment



Source: Ministry of Finace, NSI author's calculations.

The measures for financial recovery include the intervention of the Ministry of Finance by providing interest-free loans aimed at improving the financial performance of local authorities. In some cases, the Ministry of Finance remits the loans. However, there is a lack of transparency in relation to the loan remission practice, which may lead to the undesirable results of favouring one municipality over others.

As it can be seen, all supervised municipalities fall below the set limit of value 0 of the evaluatimg index K2. In practice, most of the supervised municipalities fit into that part of the total set in which K2 <0.

Supervised municipalities do not have the lowest value of K2. There are municipalities with significantly lower values of the K2 than the lowest ones of the supervised municipalities. This detailed review of the dependence between the components of the index makes it possible to formulate the assumption that this is due to a certain simplicity of the fiscal discipline assessment approach used in the PFA. This can be explained by the fact that the Ministry of Finance does not take into account the extent to which the criteria are not met (minimum or maximum).[8]

Municipalities that do not meet one or two indicators defining financial discipline, and their values are negative, have a low value compared to other municipalities that have not

[7] For convenience of work and brevity of expression, the two groups of municipalities with fiscal discipline violations and subject to special supervision by the MoF, according to the ministry's data, will be referred to as "supervised".

[8] Supervised municipalities are municipalities that do not meet a number of parameters related to redefined fiscal criteria.

fulfilled three or more criteria. Therefore, in order to refine the overall evaluation weight ratios of each individual indicator in the K2 index are determined. Thus the degree of statistical dependence is assessed by establishing the functional relationship between the index and the future results for the next fiscal year).

There is a static dependence between the rating index K2 and the financial discipline indicators, with the number of unmet criteria being considered as a function of the individual variables composing the rating coefficient K2. The results of the linear, multiple regression analysis are as follows:

Regression Statistics	
Multiple R	0.721831
R Square	0.52104
Adjusted R Square	0.509901
Standard Error	0.789963
Observations	265

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	6	175.1481	29.19134	46.77783	1.34E-38
Residual	258	161.0029	0.624042		
Total	264	336.1509			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
Intercept	0.568777	0.06773	8.397721	3.06E-15	0.435403	0.702151	0.435403	0.702151
X Variable 1	1.066741	0.229583	4.646418	5.39E-06	0.614645	1.518837	0.614645	1.518837
X Variable 2	2.836997	0.309621	9.162822	1.63E-17	2.227292	3.446703	2.227292	3.446703
X Variable 3	0.090751	0.335561	0.270446	0.787033	-0.57004	0.751538	-0.57004	0.751538
X Variable 4	-0.99592	0.344241	-2.89308	0.004141	-1.6738	-0.31804	-1.6738	-0.31804
X Variable 5	-1.74883	0.399358	-4.3791	1.73E-05	-2.53524	-0.96241	-2.53524	-0.96241
X Variable 6	-1.51314	0.321123	-4.71202	4.01E-06	-2.14549	-0.88078	-2.14549	-0.88078

It should be noted that there is statistical significance (Pearson's correlation coefficient R is 0,721831, a R Square 0,52104). The dispersion of unmet fiscal discipline criteria can be explained by the dispersion of the evaluating index variables in the previous period. In addition, the resulting values of the linear equality coefficients (Coefficients) can in practice be used and included in the **K3** index, which shows the degree of compliance with the fiscal discipline criteria and it is more accurate than index K2.

Index **K3 Propensity for violation of fiscal discipline**

Index K3 calculations are presented in the following equation:

$$K3 = 1{,}066741 * \ln(1+G) - 2{,}836997 * \ln(1+E) - 0{,}090751 * -$$

$$-0{,}99592 * \ln(1+S*H) - 1{,}74883 * \ln\left(\frac{I}{aver(II)}\right) - 1{,}51314 * \ln\left(\frac{J}{aver(JJ)}\right)$$

Where:

G – The budget balance compared to total revenues

E – Debt size as a percentage of planned revenue and equalization subsidy

F – Overdue liabilities as a percentage of planned revenue and an equalization subsidy

H – Share of capital expenditure in total costs (investment activity)

I – Tax collection rate on real estate (%)

aver(II) – average value of the index Tax collection rate on real estate (%) for all municipalities in the sample

J – Tax collection rate on vehicles (%)

aver(JJ) – average value of the index Tax collection rate on vehicles (%) for all municipalities in the sample

S – is indicative of whether the municipality has overdue liabilities, or:

$$S = \begin{cases} F > 0 & \rightarrow \quad S = -1 \\ F \leq 0 & \rightarrow \quad S = 1 \end{cases}$$

The improved index **K3** is calculated on the basis of K2. Weights are added to the variables according to their significance to the index, and it is calculated for each municipality individually (the data is presented in Annex 1). The results of a multifactorial regression test are as follows:

Regression Statistics	
Multiple R	0.721831
R Square	0.52104
Adjusted R Square	0.509901
Standard Error	0.789963
Observations	265

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	6	175.1481	29.19134	46.77783	1.34E-38
Residual	258	161.0029	0.624042		
Total	264	336.1509			

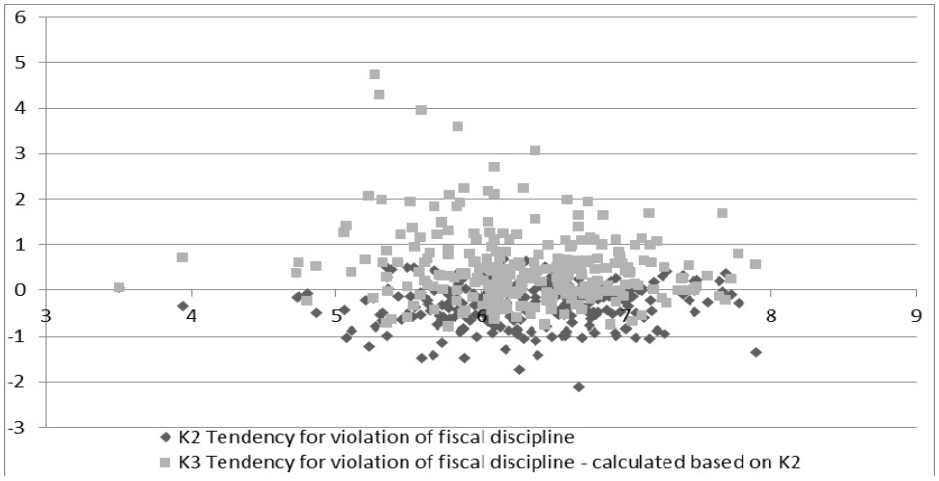
	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
Intercept	0.568777	0.06773	8.397721	3.06E-15	0.435403	0.702151	0.435403	0.702151
X Variable 1	1.066741	0.229583	4.646418	5.39E-06	0.614645	1.518837	0.614645	1.518837
X Variable 2	2.836997	0.309621	9.162822	1.63E-17	2.227292	3.446703	2.227292	3.446703
X Variable 3	0.090751	0.335561	0.270446	0.787033	-0.57004	0.751538	-0.57004	0.751538
X Variable 4	-0.99592	0.344241	-2.89308	0.004141	-1.6738	-0.31804	-1.6738	-0.31804
X Variable 5	-1.74883	0.399358	-4.3791	1.73E-05	-2.53524	-0.96241	-2.53524	-0.96241
X Variable 6	-1.51314	0.321123	-4.71202	4.01E-06	-2.14549	-0.88078	-2.14549	-0.88078

The regression shows statistical reliability and significance. Pearson's correlation coefficient R is 0,721831, and R Square 0.52104, is similar to the test of K2. Compared to

the individual values of K2, those of the index K3 are higher and more accurate from a valuation and risk value margin perspective (K3 <0). Graphically this is evident from the simultaneous representation of the multitude of points {K1;K2} and {K1;K3} for each municipality (see the figure below).

Figure 2

Propensity to violate the fiscal discipline



Source: Ministry of Finace, NSI author's calculations.

The total of three indices obtained is an improved version of the rating index K2 for Propensity for violation of fiscal discipline. They are functionally related to the future fulfillment or non-fulfillment of a number of fiscal discipline criteria under the PFA. The results from a regression, multifactoral dependency test are as follows:

Regression Statistics	
Multiple R	0.72406
R Square	0.524263
Adjusted R Square	0.518795
Standard Error	0.782763
Observations	265

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	3	176.2315	58.74384	95.87419	7.4E-42
Residual	261	159.9194	0.612718		
Total	264	336.1509			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
Intercept	1.066842	0.482989	2.208834	0.028055	0.115791	2.017893	0.115791	2.017893
X Variable 1	-0.08041	0.074928	-1.07312	0.284208	-0.22795	0.067134	-0.22795	0.067134
X Variable 2	-0.09177	0.119329	-0.76908	0.44254	-0.32674	0.143196	-0.32674	0.143196
X Variable 3	0.965992	0.066857	14.44867	3.62E-35	0.834345	1.09764	0.834345	1.09764

The test shows the following statistical reliability and significance. Pearson's correlation coefficient R is 0.72406, and R Square 0.524263. Significance F is below the limit of 5%, and the refined index K3 has the highest coefficient, which confirms its higher credibility against the index K2, since different weights have been reported according to the degree of impact. There are a large number of municipalities that have a value below 0 (K2<0), but they are not under supervision and the Ministry of Finance does not require that they present a recovery plan.

The municipalities with very low values of the indicators (K2 and K3) pose the following issues: is compliance with fiscal discipline a function of the general financial situation of these municipalities and whether this is due to an investment activity, which does not correspond to the financial capacity of municipalities. The municipalities that have "too high" values of the indicators (K2 and K3), on the other hand, raise the issue of the effectiveness of the budget management, in particular, in relation to existing of large budget surpluses.

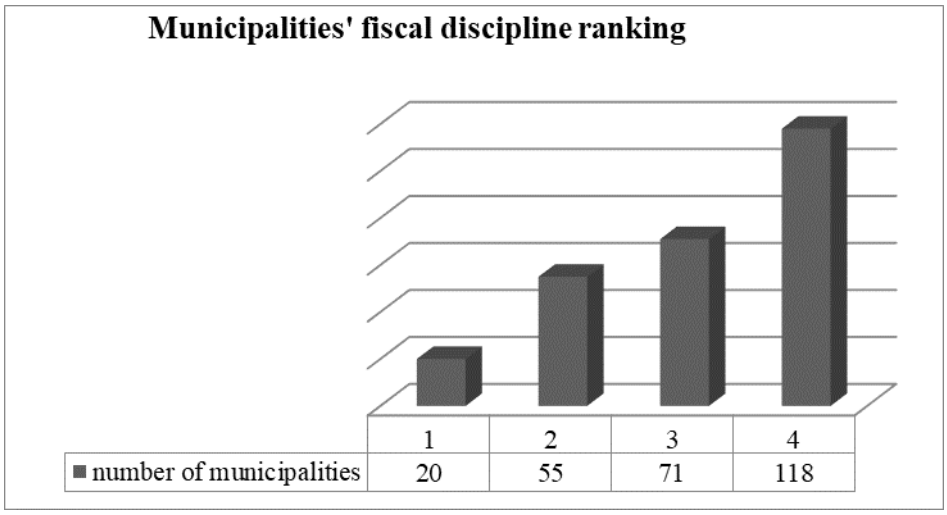
Values of the index K3 allow for ranking the municipalities according to their compliance with fiscal discipline. The municipalities are divided in the following four groups:

- Group 1 “systematically low fiscal discipline”: municipalities with the lowest rating for propensity to follow fiscal discipline. Their lack of fiscal discipline and compliance with the fiscal criteria and indicators is systematic, and they are considered to be the most at risk.
- Group 2 “low fiscal discipline”: municipalities which face difficulties in complying with the indicators for fiscal discipline. It is considered that despite that they can start complying with fiscal criteria and indicators;
- Group 3 “good fiscal discipline”: municipalities which comply with the criteria and indicators for fiscal discipline;
- Group 4 "High Fiscal Discipline ": municipalities with the highest rating value (above 0), they comply with the fiscal criteria and there are few instances of non-compliance.

Most of the municipalities (118) comply with indicators for fiscal discipline, the other municipalities (the number is 71) comply with regulatory requirements for fiscal discipline but are not very resilient to exogenous shocks (the number is 118), only 20 municipalities are rated as low fiscal discipline (they do not comply with the fiscal indicators, which reflects their poor financial management capacity. The rating estimates show that the majority of municipalities hold strong to high fiscal discipline, which contributes to sound financial management.

Figure 3

Ranking of municipalities according to fiscal discipline



Source: Ministry of Finance and author's calculations.

3.3. Findings of the evaluation model

The main results of the assessment of municipalities in terms of their propensity to observe financial discipline are summarized below:

- The interaction between the indicators characterizing the local development and the financial situation of the municipalities shows a sensitivity of the financial stability towards the income of the population and the unemployment. In other words, this means that in order to improve the financial management of the municipalities it is necessary to take into account the impact of external factors as well as the efficiency of the work of the municipal administration.
- The collection level of the municipal revenues is in a reverse functional commitment with certain social characteristics of the municipalities. Insufficient control of the collection of local taxes appeared as a form of support for the population (this statement is a consequence of the statistical analysis).
- Large discrepancies in the implementation of the financial efficiency indicators (formulated under the PFA Methodology) have been found, which require their specification in terms of reducing dissimilarities between different municipalities. This confirms that the presence of "too big" and "too small" municipalities poses some methodological problems from analytical, as well as from a practical system management point of view.
- The analysis shows that the existing methodology for identifying municipalities with problems in their fiscal performance, according to the criteria of the PFA, can be

substantially improved. In the model, indices K1, K2 and K3 are suggested, which are calculated according to available data. These indicators measure financial stability (K1) and fiscal discipline (K2 and K3) of municipalities in Bulgaria. They are better than the PFA indicators, as they are quantifiable and have a determined value. The PFA indicators are binomial, i.e. compliance or non-compliance. According to the PFA indicators and methodology, if two municipalities fail to meet a PFA criterion, for example, due to a negative budget balance, and only one of them has a smaller deficit in value, while the other a larger one, no difference is made, i.e. according to this criterion non-compliance is reported for both municipalities. According to the K3 index, the extent of non-compliance with financial indicators affects its rating and ranking. That is why it can be assumed that the index approach is better and gives a better idea of the real financial situation of the municipalities.

- The index K2 Propensity for violation of fiscal discipline in its improved version K3 shows good results, as the selected limit of K3<0 correctly differentiates municipalities that observe fiscal discipline from those which fail to do so, while at the same time giving enough opportunity for direct comparisons between two municipalities, which is not provided by the PFA's methodology. The evaluation of this indicator shows that many municipalities with respect to the risk of non-fulfilment of the criteria are close to 0, but there are those that are not able to meet the criteria and in the future, there is a real risk of violation of the fiscal discipline.

- The indicator K1 (Assessment of the economic, social and administrative potential of the municipality) is suitable for designing stress tests as well as for evaluating and modelling the system of decentralization of local self-government, which is not the purpose of this analysis. The index evaluates sources of systemic risk that are entirely the result of the impact of the external environment, which depends on factors typical for a specific municipality.

The pre-formulated hypotheses have been confirmed as a result of the applied statistical tools (multiple regression).

- The hypothesis that *„The fiscal discipline of the municipalities is not predetermined by the size of the municipality and its economic, social and demographic characteristics, but is the result of the actions under operational management on a municipal level“* is confirmed. Factors of the surrounding macro-environment do not predetermine the level of fiscal discipline, which means that fiscal discipline is a function of the quality of management in the municipality or at least that part of the management's functions that are related to the management of the municipality's finances.

- The hypothesis that *„There are statistically significant dependency between the different components of the fiscal discipline assessment and individual characteristics of the municipalities – demographic, social, economic and administrative. In other words, it is possible to construct a profile of municipalities where the risk of negative impact of the external environment is higher than in the other municipalities“* is confirmed by the statistical analysis.

The above findings are evidence of the fact that compliance with fiscal discipline can be a compensatory mechanism of local government management in cases of external shocks and stressful situations on a local level. In that respect, it would be a good idea to consider whether the financial system of heterogeneous municipalities could be improved in terms of their resistance to external shocks in the future.

4. Conclusions

The evaluation model developed in this study attempts to evaluate municipalities according to their propensity to comply with financial discipline. It is a comprehensive assessment model examining the impacts of economic, demographic and financial factors on the fiscal stability and evaluating the fiscal discipline through the fulfilment of relevant criteria for the financial situation of the municipalities.

The indices show that the criteria thus indicated and the pool of indicators set by them by the Ministry of Finance, the main municipalities that violate the budget discipline are not exactly those for which there is a risk for the fiscal stability and are not only municipalities that do not have enough own revenues.

Overall, the fulfilment of the requirements for fiscal discipline can be perceived as functionally related to the financial performance of the municipalities and their budgetary implementation. This means that there is a broad set of financial management tools that can help improving the fiscal performance of municipalities. However, this raises an important question of whether there is a need to amend the rules for operational and monitoring control of municipal finances, or whether the problems are related to the lack of real consequences of non-compliance with them. The deteriorated financial and fiscal indicators of the municipalities are not an exception, but a normal state of the system.

The developed evaluation model provides a conceptual and empirical framework that can be used to improve the monitoring and control of the financial situation of municipalities, as well as their fiscal stability and financial risk management. The findings summarized above can serve as guidelines for future research as well as to implement an actual policy for improving the fiscal performance of municipalities.

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Annex1

Calculated value of the rating indicators K1, K2 and K3 for the municipalities in Bulgaria (data 2018)

Municipalities	K1	K2	K3	Municipalities	K1	K2	K3
Avren	3.503141	0.042255	0.058652	Lukovit	6.810088	-0.18436	0.19868
Aytos	6.960017	-0.0898	-0.00369	Laki	5.493481	0.493677	-0.59997
Aksakovo	6.590074	0.020843	0.253463	Lyubimets	6.371686	-0.00156	0.611245
Alfatar	5.583721	-0.05888	-0.11749	Lyaskovets	6.531813	-0.54361	0.680971
Anton	5.351378	0.291942	0.286436	Madan	5.986966	-0.19565	0.219794
Antonovo	5.109344	-0.8842	0.395413	Madzharovo	4.730195	-0.17035	0.365608
Apriltsi	6.014925	0.314489	-0.35462	Makresh	5.071974	-1.03586	1.400082
Ardino	5.578714	-0.10313	0.384003	Malko Tarnovo	5.882334	0.255676	0.319543
Asenovgrad	7.440552	-0.21949	0.54319	Maritsa	6.904422	-0.52521	-0.02455
Balchik	6.695497	-1.01983	0.651987	Medkovets	5.773982	-0.66646	0.762154
Banite	5.312806	-0.67594	1.9879	Mezdra	6.548277	0.094774	0.581858
Bansko	6.188341	-0.8858	0.424037	Miziya	6.076549	-0.92906	0.936039
Batak	5.528696	-0.59328	1.364594	Mineralni Bani	6.373313	-1.09912	1.548423
Belene	6.783209	-0.92746	1.096692	Mirkovo	6.307828	-0.45981	0.368099
Belitsa	6.047209	-0.4647	-0.19706	Momchilgrad	6.11437	0.027037	0.179264
Belovo	6.097688	-0.52623	2.112522	Montana	7.069352	-0.49836	0.981203
Belogradchik	5.886837	-1.46684	2.241528	Maglizh	6.226718	-0.6723	0.553789
Beloslav	6.453247	-0.7888	0.451916	Nevestino	4.801327	-0.07591	-0.25244
Berkovitsa	6.750662	-0.29779	0.610394	Nedelino	5.299719	-0.54483	4.290762
Blagoevgrad	7.563824	-0.26059	0.311005	Nesebar	6.262409	-1.72266	0.601356
Bobov dol	6.296115	-1.04553	2.241496	Nikola Kozlevo	6.010917	-0.52772	0.465138
Boboshevo	5.492048	-0.52765	0.067687	Nikolaevo	5.973074	-0.18432	0.255021
Bozhurishte	6.619128	-0.3062	0.650834	Nikopol	5.952245	-0.32244	0.609347
Boynitsa	4.743045	-0.14782	0.60206	Nova Zagora	6.807715	-0.21005	-0.12248
Boychinovsti	6.199805	-0.57592	1.111374	Novi Pazar	7.126048	-0.60384	0.640165
Bolyarovo	5.35456	0.487505	-0.74383	Novo Selo	5.254597	-0.18169	-0.18482
Borino	5.056748	-0.43258	1.264431	Omurtag	6.080557	-0.07859	0.401707
Borovan	5.589012	-1.48142	3.953154	Opaka	6.04137	-0.09556	0.5625
Borovo	6.171942	-1.277	-0.07482	Opan	5.611601	-0.17206	0.18954
Botevgrad	6.76266	0.138791	0.074647	Oryahovo	6.84268	-0.16704	1.633644
Bratya Daskalovi	5.897352	-0.58378	0.363948	Pavel Banya	6.579031	-0.33553	-0.53966
Bratsigovo	6.603773	-0.27997	0.508442	Pavlikeni	6.607589	0.123749	0.295109
Bregovo	5.837394	-0.4461	1.835532	Pazardzhik	7.178569	-0.45135	0.597561
Breznik	5.817076	-0.58987	0.271679	Panagyurishte	7.114022	0.054034	-0.5695
Brezovo	6.107591	0.333653	-0.24654	Pernik	7.665243	-0.03129	1.692097
Brusartsi	5.730475	-0.65848	1.486004	Perushtitsa	6.345917	-0.91271	0.248661
Burgas	7.68929	0.370395	-0.22816	Petrich	7.013516	-0.34801	0.501487
Byala	5.631084	-0.23351	0.109884	Peshtera	6.837134	0.028029	0.974824
Byala	6.373685	-0.24358	0.385748	Pirdop	6.777283	-0.47029	1.109026
Byala Slatina	6.744302	-0.76738	0.634633	Pleven	7.067872	-1.0337	0.135608
Varna	7.392668	0.326336	-0.01326	Plovdiv	7.72707	-0.09821	0.236855
Veliki Preslav	6.630567	-0.10325	-0.20994	Polski Trambesh	6.669524	-0.18597	-0.02777
Veliko Tarnovo	7.191096	0.176014	0.003942	Pomorie	6.723524	-0.02792	1.081906
Velingrad	6.379363	-0.15199	3.064675	Popovo	6.587407	-0.98564	-0.10677
Venets	5.881417	-0.83167	-0.52658	Pordim	6.631212	-0.02712	-0.13656
Vetovo	6.660488	-0.19392	0.454829	Pravets	5.831485	0.377384	-0.25417
Vetrino	6.113064	-0.08154	0.320575	Primorsko	6.241401	0.072852	-0.08916
Vidin	6.736319	-0.50912	1.934038	Provadiya	6.542853	0.024538	-0.02102
Vratsa	7.265511	-0.93648	0.490432	Parvomay	6.979709	-0.09067	0.580797

Municipalities	K1	K2	K3	Municipalities	K1	K2	K3
Valchidram	6.070983	-0.53729	0.467567	Radnevo	6.454449	0.15526	-0.23753
Valchidol	6.021944	-0.1233	0.206652	Radomir	6.533384	-0.4708	0.417991
Varbitsa	5.987393	-0.34622	0.465978	Razgrad	7.026394	-0.13481	0.37896
Varshets	6.180697	0.158887	0.111318	Razlog	6.862764	-0.43233	0.476762
Gabrovo	7.251856	0.298982	-0.18272	Rakitovo	6.696407	-0.37883	1.084788
General Toshevo	6.545529	-0.41196	-0.00397	Rakovski	6.896916	0.204187	-0.75171
Georgi Damyanovo	5.452442	-0.64246	1.209153	Rila	5.515043	-0.13576	1.938599
Glavinitsa	5.835466	-0.05495	-0.01286	Rodopi	6.923275	-0.92187	0.583296
Godech	5.680931	0.438165	-0.42909	Roman	5.784569	-0.63505	0.300486
Gorna Malina	6.177281	-0.26058	0.832481	Rudozem	5.678762	-0.01463	1.822019
Gorna Oryahovitsa	6.996041	-0.18562	0.117118	Ruen	6.485327	-1.01207	-0.37151
Gotse Delchev	7.018487	-0.18944	0.360659	Ruzhintsi	5.701579	-0.75208	1.221658
Gramada	5.778056	-0.40037	0.869111	Ruse	7.645504	0.202574	-0.13733
Gulyantsi	6.527957	-0.52552	0.489429	Sadovo	6.714426	0.074826	0.079974
Gurkovo	6.259612	0.159042	-0.03374	Samokov	7.284874	0.417449	-0.2985
Galabovo	6.532494	-0.09276	0.179164	Samuil	5.652474	-0.46591	0.809294
Garmen	6.466263	-0.2534	-0.09577	Sandanski	6.810051	-0.47509	0.676647
Dve Mogili	6.119083	0.128016	0.494213	Sapareva Banya	6.62696	-0.71197	0.972826
Devin	6.156434	-0.3055	1.228481	Satovcha	6.52171	-0.04634	0.261015
Devnya	7.04385	-0.14521	-0.68798	Svilengrad	6.556365	0.10666	0.037396
Dzhebel	5.359678	0.019686	-0.02795	Svishtov	6.962064	-0.47234	-0.00377
Dimitrovgrad	7.091338	-0.01794	0.091837	Svoge	6.86553	-0.05871	-0.03658
Dimovo	5.267692	-0.79276	4.740573	Sevlievo	6.655316	0.518393	-0.32917
Dobrich	7.897765	-1.35115	0.55623	Septemvri	6.048969	-0.62832	1.486329
Dobrichka	6.046138	-0.65418	0.681507	Silistra	6.930219	-0.98542	1.10766
Dolna Banya	6.175575	-0.36443	0.454088	Simeonovgrad	6.253187	-0.94276	1.206299
Dolna Mitropoliya	6.671824	-2.10802	1.647642	Simitli	6.093962	-0.76583	2.69943
Dolni Dabnik	6.393049	-1.41973	0.40234	Sitovo	5.730844	-1.12834	0.298914
Dolni Chiflik	6.623131	-0.5629	0.932712	Sliven	7.108635	-0.01861	1.123861
Dospat	5.844144	0.14571	3.586851	Slivnitsa	7.003019	-0.83353	0.401068
Dragoman	5.671951	-1.40248	0.079167	Slivo Pole	6.343926	0.358502	-0.54382
Dryanovo	6.289146	-0.19222	0.218375	Smolyan	7.170336	-0.2278	0.983642
Dulovo	6.585196	-0.15745	1.078738	Smyadovo	6.278097	-0.31146	-0.37861
Dupnitsa	6.964414	-0.15825	0.730694	Sozopol	6.110797	-0.19289	0.82485
Dalgopol	6.273972	-0.64029	0.522415	Sopot	6.758143	-0.61946	1.159518
Elena	5.718831	-0.55595	0.318632	Sredets	6.564766	-0.9847	0.214046
Elin Pelin	7.383157	-0.02588	0.236482	Stamboliyski	6.955289	-0.14729	0.835569
Elhovo	6.477963	0.115619	-0.14256	Stambolovo	5.223176	-1.231	2.068295
Etropole	6.613706	0.00691	-0.03869	Stara Zagora	7.477518	-0.47566	-0.00426
Zavet	6.17697	-0.28315	0.265871	Sofia Capital Municipality	7.775814	-0.29819	0.786188
Zemen	5.319287	-0.50191	0.597669	Strazhitsa	6.056414	-0.63271	0.120274
Zlataritsa	5.539959	0.492707	-0.35688	Straldzha	6.144265	0.077362	-0.0456
Zlatitsa	6.446025	0.512429	-0.7463	Strelcha	6.360101	-0.00292	0.237469
Zlatograd	6.396329	0.174716	0.780441	Strumyani	5.785832	-0.26377	2.081688
Ivaylovgrad	6.06659	-0.70206	0.124395	Suvorovo	6.185808	-0.48498	-0.40644
Ivanovo	6.067494	0.287295	-0.29561	Sungurlare	5.777623	-0.01033	1.292401
Iskar	6.302522	-0.16303	0.307117	Suhindol	5.352619	-0.98692	0.858195
Izperih	6.547443	-0.01571	0.496908	Saedinenie	6.484867	0.308749	-0.42691
Ihtiman	6.713321	-0.11415	-0.08765	Sarnitsa	6.076841	0.487047	-0.4495
Kavarna	6.423542	0.065345	0.177671	Tvarditsa	6.793549	-0.02623	0.075539
Kazanlak	7.392759	-0.10787	0.268777	Tervel	6.208036	-0.05647	0.32861
Kaynardzha	5.971394	-1.00629	1.106048	Teteven	6.67047	-0.33675	1.392227
Kaloyanovo	6.454622	0.058331	-0.05794	Topolovgrad	6.757148	-0.51032	-0.19837

Municipalities	K1	K2	K3	Municipalities	K1	K2	K3
Kameno	6.669971	0.247929	-0.32211	Treklyano	3.944205	-0.34861	0.717437
Kaolinovo	6.28108	0.082546	0.056389	Troyan	6.934418	0.269388	-0.26109
Karlovo	6.833429	0.038855	1.010008	Tran	5.961026	-0.54247	0.619728
Karnobat	6.985028	-0.2243	-0.14701	Tryavna	6.373793	0.475092	-0.39228
Kaspichan	6.288536	0.283976	-0.35302	Tundzha	6.496737	-0.00514	-0.15495
Kirkovo	5.614499	-0.17787	0.609442	Tutrakan	6.278081	0.024731	0.101371
Knezha	6.880776	-0.14016	0.100897	Targovishte	7.362907	-0.02288	-0.00999
Kovachevtsi	4.859659	-0.5084	0.51024	Ugarchin	5.741737	-0.59423	0.005386
Kozloduy	6.769865	0.185464	-0.13894	Hadzhidimovo	6.580562	-0.00301	0.040676
Koprivshtitsa	5.946254	-0.08155	-0.15793	Hayredin	5.631599	-0.30755	0.683816
Kostenets	6.462419	0.079553	0.9913	Harmanli	7.021553	-0.00795	0.373195
Kostinbrod	6.909038	-0.52725	-0.03615	Haskovo	7.475389	-0.00978	0.010454
Kotel	6.133654	-0.79143	0.702655	Hisarya	6.685675	-0.12817	0.45072
Kocherinovo	5.728517	-0.32772	1.465289	Hitrino	6.25013	-0.8673	-0.6058
Kresna	6.06779	-0.51128	1.267922	Tsar Kaloyan	6.047167	-0.69899	2.17894
Krivodol	5.854693	-0.91111	1.90518	Tsarevo	6.616861	-0.36198	0.0338
Krichim	6.792283	-0.5408	0.442802	Tsenovo	5.892824	0.039777	-0.45851
Krumovgrad	5.776261	-0.08827	-0.79929	Chavdar	6.157356	0.678152	-0.44696
Krushari	5.544103	-0.38296	0.937558	Chelopech	6.309541	0.642763	-0.37196
Kubrat	6.778777	0.148312	0.152168	Chepelare	5.953742	-0.14108	1.231821
Kuklen	6.172605	0.024397	-0.3008	Cherven Bryag	6.591781	-0.90924	0.672557
Kula	5.870269	-0.28666	0.367381	Chernoochene	5.383279	0.449494	-0.65661
Kardzhali	6.601079	-0.10038	1.981727	Chiprovtsi	5.426126	-0.13268	0.609309
Kyustendil	7.214501	-0.88628	1.058641	Chirpan	6.697478	0.018001	-0.42718
Levski	6.575619	-0.53575	0.254734	Chuprene	5.202942	-0.22616	0.667769
Lesichovo	5.582277	-0.54543	1.148255	Shabla	5.964186	-0.3035	0.159972
Letnitsa	6.06849	-0.38977	-0.03161	Shumen	7.464816	0.189869	0.017942
Lovech	6.698282	0.066612	0.321852	Yablanitsa	6.108416	-0.30386	0.079227
Loznica	6.09076	-0.49192	1.108091	Yakimovo	5.92349	-0.67004	0.785816
Lom	7.161165	-1.05605	1.679906	Yakoruda	6.094853	0.499336	-0.65753
				Yambol	7.488391	0.230026	0.063688

ИКОНОМИЧЕСКИ ИЗСЛЕДВАНИЯ
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COMPOSITE INDICATORS FOR THE EVALUATION OF THE COMPETITIVENESS OF AN INDUSTRIAL ENTERPRISE (The Case of the Wine Industry)

Competitiveness management is both a subject, a goal and a challenge in the research and expertise of many scientists, analysts, researchers and managers. With its multidimensional and multilevel structure defining it, the category is regarded as a foundation for the functioning of both individual economic units and entire sectors and economies of countries. Recognizing that competitive enterprises are a major drive of the nation's competitiveness (Garelli, 2002), the focus is on the microeconomic aspects of the category, with a reasoned focus on industrial enterprises. All this determines the evaluation of the company's competitiveness as particularly significant, both theoretically and practically. In this regard, the present study presents an algorithm for the construction of composite indicators for its evaluation, as well as the results of its testing in micro and small enterprises from the wine-producing industry in the Plovdiv region.
JEL: L10; M21; L66; C01

Introduction

The issue of competitiveness evaluation is of particular importance and relevance for the development of the Bulgarian economy and specifically for the wine industry. The typical growing competition in the wine market, generated both by the entry of new competitors and the imposition of new consumer tastes and preferences, implies the necessity for its research with regard to Bulgarian wine producers (who are mostly SMEs). Although "a large part of structural funds are aimed at supporting SMEs innovations" (Stoyanova, Madjurova, Raichev, 2019), the problems related to the competitiveness of the enterprises from wine industry are among the priorities, as it is a traditional and significant sub-sector for the Bulgarian economy.

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In this regard, this publication presents the results of a study, whose **subject** is the development a methodology for the construction of composite indicators for the evaluation of the competitiveness of industrial enterprises, as well as the potential for its enhancement (see more in Dimitrova, 2019).

The object of the study is the micro and small enterprises of the wine industry in the Plovdiv region.

The main objective is to propose a model (algorithm) for the evaluation of the competitiveness of the industrial enterprise (competitive status) and the opportunities for its enhancement (competitive potential) and to present the results of its testing in micro and small enterprises from the wine-producing industry in the Plovdiv region.

As a multidimensional and multi-aspect concept, the measurement of company competitiveness is realized through the utilization of a system of factors and indicators, which is not uniform and unified. For the purposes of this research, the indicators that are considered to be key in the study of the competitiveness of wine enterprises are used.

The proposed methodology is developed through the selection, systematization, (re)structuring and complementation of existing methodologies and indicators, adapted to the characteristics and specifics of the research object and the assigned research tasks. She is builds on the views and models of Porter (Diamond Model for Competitive Advantage, Model of Five Competitive Forces, Value Chain model) and McCarthy (Model Marketing Mix (4P)), trying to integrate them so as to cover as far as possible the leading aspects of the activity of the industrial enterprise and the environment in which it operates.

Its substantial contribution is the methodology for construction of aggregate composite indicators (incl. the statistical method) for assessing the competitiveness of an industrial enterprise and the attractiveness of the industry, such as:

- By constructing an aggregate composite indicator for evaluation of the competitiveness of an industrial enterprise, it is possible to comprehensively evaluate its competitive status. It is generated by the competitiveness advantages through the tools of management and the marketing mix.
- At the same time, by drawing up an aggregate composite indicator for assessing the attractiveness of the environment, the potential of the sector is identified as an opportunity to increase the company's competitiveness. It is derived from the integration processes in the sector and the implementation of joint and related activities between organizations.

In this sense, the proposed methodology further develops and refines existing methodologies for assessing the competitiveness of an industrial enterprise.

1. Study methodology

An empirical study was carried out among micro and small enterprises from the wine industry in the Plovdiv region to accomplish the above objective. An online survey

(structured interview) was conducted through the fisn.uni-plovdiv/survey platform of the Faculty of Economics and Social Sciences at the Paisii Hilendarski University of Plovdiv. An evaluation of expert opinion is used, since the respondents are persons holding managerial positions (owner, manager, marketing manager).

Applied evaluation methods are: marketing, comparative, situational, sectoral, diagnostic, expert, graphic and nomographic (Veleva, Ruseva, 2016).

For the purpose of examining the competitiveness of an industrial enterprise, a factor analysis is used as a statistical method.

Target group – According to information provided by the NSI, in the territory of the Plovdiv region as of 2016 (reference as of December 2017)[3], there are 34 wine-producing enterprises with code 11.02 – Production of wine from grapes from NACE 2008. Of these, 33 meet the criteria: for micro- (21 enterprises) and for small- (12 enterprises). Presented in percentage: of all wine-producing enterprises in the Plovdiv region, 97% are micro- and small enterprises, of which 64% micro- and 36% small.

According to the EAVW Report (EAVW, 2016) for 2016, there are 251 functioning wine producers in Bulgaria. Based on this, wine-producing enterprises in the Plovdiv region occupy 13.5% of all such enterprises in the country.

Micro and small wine producers are observed as a strategic group with the following general characteristics: enterprises of the same type[4], operating in the same area, sell similar products, follow similar strategies, satisfy the needs of the same consumers (markets), use the same suppliers, intermediaries and other partner organizations, with regard to the similar activities they pursue.

The thus formed strategic group defines the choice of the target group for the study. Out of it, 25 enterprises were identified (due to a lack of information and a connection to the others). It is assumed that 25 wine-producing enterprises, which meet the criteria for a micro and small enterprise, form the statistical population for the survey and their number is sufficient to obtain information regarding the specifics and characteristics of the studied object and to guarantee the significance of the obtained results.

2. Stages in the construction of a research model

The model of the study involves several stages in which the process of studying the competitiveness of an industrial enterprise goes through, incl. determining the competitive status and identifying its competitive potential.

Based on the understanding that the competitiveness of an enterprise:

- Defines its capabilities;

[3] The information from the NSI is presented for the purposes of the current study and is accurate as of (12.2017).
[4] They meet the criteria for micro and small enterprises.

- Unlocks its potential;
- Visualizes (illustrates) the results of its activity,

in this study, the category is simultaneously observed as an *economic* (in view of the results of the successful functioning of the industrial enterprise as measured by a set of quantifiable economic indicators) and *management tool* (as a set of management decisions related to the choice of development strategy, structure, value chain management, etc.). Thus, competition, and thus its ability to compete[5], manifests itself simultaneously as a factor and a consequence of enterprise activity (Shmelev, Vaganov, Danchenok, 2004).

1. An analysis of the external environment in which enterprises operate in order to diagnose the opportunities and threats that exist and to reveal the attractiveness of the industry in which enterprises operate. This brings out the competitive potential existing in the environment, including**:**

1.1. Analysis of the Macroeconomic Environment – through the **Porter's Diamond Model for Competitive Advantage** (Porter, 1998, 2004) – one of the leading tools for assessing competitiveness.

The choice of the model is dictated by the following essential motives:

- the established concept of terroir[6] in wine making, which is fundamental for the creation of comparative advantages – **the determinant 'Factor conditions**';
- a focus on consumers and the formation of an **internal demand** aimed at meeting their needs;
- **Company Strategy, Structure and Competition,** i.e. structure in which the enterprises of the industry operate and manage their activities, incl. the development and implementation of appropriate strategies for competitive positioning and development as a condition for enhancing their competitiveness;
- **Related and Supportive Industries –** with a focus on emerging new types of competitive relationships – cooperating between competitors and pursuing joint activities.

1.2. An Analysis of the Microeconomic Environment where, through **Porter's Model of Five Competitive Forces** (Porter, 1980, 2010) (current competitors, potential competitors, consumers, suppliers, substitute products), an industry analysis is made to verify the degree of attractiveness of the industry in terms of competitiveness of the enterprises (in regard to their ability to counteract the competitive forces) and their positioning in a competitive environment.

[5] Author's addition.

[6] „terroir" is a combination of all those characteristics that define the character of a wine – the location, climate, soil, exposure (on a hill, in the plain), water, including peculiarities such as the character and mentality of people living in the area, cultural features, land cultivation and wine production, etc. – Vinoblog site, https://www.vinoblog.eu/osnovni-polozheniya/what-is-terroir/, 15.11.2019.

2. An Analysis of the Internal Environment that brings out its strengths and weaknesses, from which significant advantages over competitors can be identified. To this end, the emphasis is placed on the managing activities under the **Value Chain model** (Porter, 1998, 2004), with a marketing focus – on the **Marketing Mix (4P) Model** (McCarthy, 1960), focusing on the marketing concept to deliver value to consumers in order to receive value back from them. The competitive advantages thus formed are considered as fundamental for the determination of the competitive status of micro and small wine-producing enterprises.

Table 1

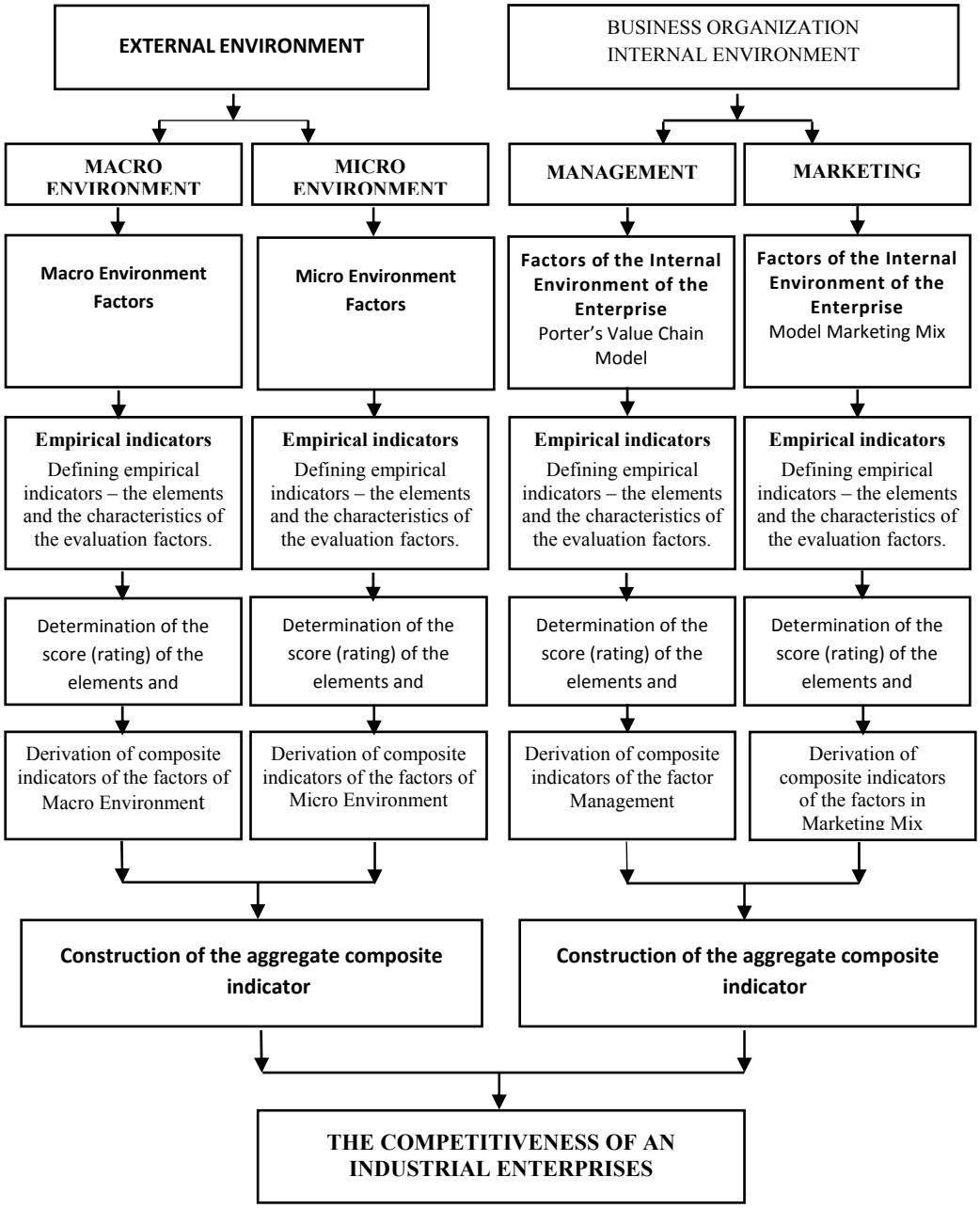
Toolkit for the construction of aggregate composite indicators for the evaluation of the competitiveness of an industrial enterprise

Factors	Aggregate composite indicators	Composite indicators	Empirical indicators (elements, characteristics)
Factors of the External Environment	Macro Environment	Factor conditions	terroir (climate, soil, varieties, accessibility, limited, price); supplies and raw materials (access to raw materials and supplies, quantity required, quality, price, timely deliveries); intellectual resources (know-how, research, R&D, patents, licenses, databases); human resources (qualification, education, experience, skills, cost of labour); infrastructure (location, communication, information and logistics systems); capital resources (size and cost of capital available for financing)
	Competitive Forces – Micro Environment Porter's Model Five Forces for the identification and analysis of the five competitive forces that shape the wine-producing industry	Barriers to entry into the industry/Threat of new entrants	capital requirements; product differentiation; image and imposed trademark; access to technology; access to raw material and material suppliers; access to intermediaries and distribution channels; economies of scale; access to finance
		Competitive rivalry	number of equal competitors; diversity of competitors; operating costs; image of competitors; industry growth; differentiation of competitors
		Power of buyer	number of significant users; brand loyalty; consumer tastes and preferences; proximity to users
		Power of supplier	number of significant suppliers; the threat of forward integration; transfer costs to other suppliers; the contribution of suppliers to quality
		Threat of substitution	threat of substitute products; availability of products with similar characteristics (substitutes)
Factors of the Internal Environment of the Enterprise	Management	Management	manufacturing experience and efficiency, technological, skills, company strategy, personnel, supply, finance (financial strength)
	Marketing Mix	Product	product characteristics (range, modifications); quality (taste, aroma, color); trademark; packaging (bottle, stopper); packing; labeling
		Price	base price, price discounts, price reductions, payment terms
		Place	built own delivery channels; speed, rhythm, continuity of delivery; maintaining stocks
		Promotion	company and product image; advertising; PR activities; participation in wine forums and exhibitions; organizing tastings; supply of wine tourism; participation in wine promotion and development projects

Source: Author's research work.

Figure 1

Model (algorithm) for the research of the competitiveness of an industrial enterprise



Source: Author's research work

Based on the analysis of the external and internal factors, the enterprise determines its competitive status and the opportunities for its enhancement – its competitive potential.

Result indicators based on expert opinion regarding the performance of the enterprise are used to determine the *competitive status*. Factor indicators are used to identify and reveal existing reserves and unused opportunities in the environment in which the businesses operate. They are taken as a basis in shaping the *competitive potential* of the wine-producing enterprises, and their utilization would increase their competitiveness.

Using the described analysis models, the factors that are considered key to the object of the study are identified. Table 1 presents the tools for the construction of aggregate composite indicators for the evaluation of the competitiveness of an industrial enterprise (competitive status) and the attractiveness of the industry (competitive potential) in view of enhancing its competitiveness.

Figure 1 presents the enterprise competitiveness research model, with clearly defined stages of the research process, including:

1. Selection of key evaluation factors.
2. Defining empirical indicators – the elements and the characteristics of the evaluation factors.
3. Determination of the score (rating) of the elements and characteristics of the factors.
4. Derivation of composite indicators of the factors.
5. Construction of the aggregate composite indicators for the determination of the attractiveness of the industry (competitive potential) and the competitive status of micro and small wine-producing enterprises.

The proposed research model includes the evaluation of the factors of the external and internal environment. It shows the logical sequence in the two main stages of its implementation:

- determination of *the competitive status*, which is revealed by the strengths and weaknesses of the enterprise and identifies the main sources for the construction of competitive advantages;
- the opportunities (attractiveness) of the environment in which it operates – to identify its *competitive potential*.

3. Methodology for the construction of an aggregate composite indicator for the evaluation of the competitiveness of an industrial enterprise

The aggregate composite indicator for the evaluation of the competitiveness of an industrial enterprise (competitive status) and the attractiveness of the industry (in order to verify its competitive potential) is formed on the basis of 'composite indicators' (Keskinova, 2018) for each of the set factors, which in turn, aggregate the estimates of their elements and characteristics derived in the model.

The composite indicators of the factors can be constructed at equal or different weights of the empirical indicators, called the elements (and characteristics) of the factors. Equal weights are used when all output indicators are equally 'valuable' for the composite indicator or there is no empirical or statistical basis for their differentiation (OECD, 2008). In the conceptual model of the present study, such an approach (for equal weights) is excluded because:

First: the use of equal weights when aggregating indicators between which there is a high correlation would result in duplicate reporting and they would be given an unreasonably high weight in the composite indicator.

Secondly: the aim is to differentiate those elements and characteristics of the factor that are leading in the formation of competitive advantages for micro and small wine-producing enterprises.

One option, in this case, is to reduce the empirical indicators to an independent (uncorrelated) subset, i.e. only low-dependency indicators should be selected. The other is to introduce weights that give less weight to the dependent indicators.

The limited number of empirical indicators and the presence of collinearity (high correlation between many of them), in most cases, makes the first option inapplicable and requires the use of weights. These weights are obtained via factor analysis that extracts latent variables – intermediate composite indicators, based on the correlation between the initial empirical indicators.

There are various methods for the extraction of factors. In this study, Principal component analysis (PCA) is used in which the resulting factors, called components, are considered as a linear combination of the associated variables.

The first stage in the construction of an aggregate composite indicator is to determine the applicability of PCA in deriving the weights, which are to be used to weigh the estimates of the elements and the characteristics of the factor.

The first step includes:

- Checking for dependence between the variables – the empirical indicators (elements, characteristics) of the factor defining the composite indicator. The check is carried out via Bartlett's Test. The hypothesis tested (Ho) states that the variables in the correlation matrix are independent. For PCA to be applicable, (Ho) must be rejected at a significance level of less than 0.05 (Sig. <0.05). Another way to a relationship between variables is to use Cronbach's Alpha coefficient to measure their internal consistency. A high Alpha value is an indicator that the initial indicators measure the same latent variable sufficiently well. The coefficient is not a measure of one-dimensionality, i.e. at high Alpha value, there can be multidimensionality.
- Kaiser-Meyer-Olkin measure calculation – a statistical indicator of the adequacy of the sample with respect to the private correlation between the variables, and specifically whether it is small. The sample is considered adequate if the KMO value is greater than 0.50.

The second stage is to determine the number of latent components – intermediate composite indicators. The standard procedure is to select components that have Eigenvalue ≥ 1 and contribute commutatively to explain over 60% of the total variance.

The third stage is to determine the weights of the empirical indicators (variables) that will be used to construct the estimate of the composite indicator.

The weight for each empirical indicator is obtained by multiplying the following two weights:

- The weight of the empirical indicator in the intermediate composite indicator. It is calculated by the ratio l_i^2/L_j ', where l_i is the Component Loadings from Rotated[7] component matrix, and L_j' is the sum of l_i^2 only for the variable defining components[8];
- Weight of the intermediate composite indicator calculated with the ratio $L_j^{'}/\sum L_j^{'}$.

The fourth stage is to calculate the estimate of the composite indicator by weighting the arithmetic mean of the estimates for the empirical indicators and their weights.

The fifth step is to define the aggregate composite indicator as the arithmetic mean of the estimates for the composite indicators.

The algorithm is used to define composite indicators for each of the environmental factors. As a result, these factors are identified, and they are key both to the formation of competitive advantages and the competitive status of the enterprise and to the attractiveness of the environment, in view of the opportunities it provides for enhancing competitiveness (competitive potential). For these, the factors with a higher average score are determined. Conversely, lower scores, and therefore lower factor values, is an indicator of weakness or the existence of a problem.

4. Application of the methodology for the construction of an aggregate composite indicator for the evaluation of the competitiveness of micro and small enterprises from the wine-producing industry in the Plovdiv region

The questionnaire for conducting a structured interview with the owners/managers of the wine-producing enterprises of the studied population (see Dimitrova, 2019) is defined based on the presented research model, which includes the factors, their elements and characteristics (accepted as empirical indicators for assessing the competitiveness of the industrial enterprise). Each empirical indicator involved in constructing a composite

[7] The rotation, in the current case – Varimax, aims to associate each variable with as few components as possible, and if possible with only one.

[8] OECD (2008, p. 90) uses Li – the sum of li2 for all variables, whether or not related to the component. In this case, the sum of the final weights of the variables will not be 1 and will depend on the relative proportion of Li' in Li. This is not a problem when constructing a single composite indicator, but it is a problem when they are more numerous and are compared. For this purpose, Li' is used in the present study. The other option is to use Li, but the coefficients obtained will be recalculated so that their sum results in 1. The results will be identical.

indicator is evaluated on a five-point (score) scale, e.g. from 1-weak to 5-excellent, from 1-very small to 5-very large; from 1 highly unattractive to 5 highly attractive, etc.

As a result of the collected empirical information, 11 composite indicators and 2 aggregate composite indicators are formed, which participate in the evaluation of the factors of the external and internal environment at a higher level

In this section, the methodology for the calculation a composite and aggregate composite indicator will first be outlined with an example, after which the main results of the aggregate composite indicators will be presented.

4.1. Construction of an aggregate composite indicator for the evaluation of the attractiveness of the industrial environment

The attractiveness of the industrial (external) environment is evaluated on the basis of a composite indicator of "Factor conditions" and an aggregate composite indicator of competitive forces. We will focus on building the latter as an example of applying the methodology for building aggregate composite indicators.

Before the example, we will repeat the introduced concepts. A composite indicator (CI) is one that is built on the basis of empirical indicators and as such, it is a composite indicator of the first degree (the lowest degree of generalization). The aggregate composite indicator (ACI) is built on the basis of already constructed composite indicators or of lower aggregate composite indicators.

The Aggregate Composite Indicator Competitive Forces (ACI_{CF}) is based on five composite indicators – threat of new entrants (CI_{TNE}), competitive rivalry (CI_{CR}), power of buyer (CI_{PB}), power of supplier (CI_{PS}), threat of substitution (CI_{TS}).

Table 2 contains the empirical indicators, on the basis of which each of the five composite indicators is constructed; scores – the arithmetic mean values of the estimates of the units in the sample, measured on a scale of 1-low to 5-excellent for the 'Power of buyer' indicators, while the rest are on the scale of 1-strongly unattractive to 5-strongly attractive; the weights calculated by PCA, with which the scores are weighted when calculating the composite indicator.

The adequacy of the application of PCA to determine the weights of the empirical indicators is revealed by the values of the statistical characteristics in Table 3 (see section 3, first stage).

Out of the five composite indicators, we will present the construction of the composite indicator for the evaluation of the 'Competitive rivalry' factor. The result of the PCA, applied to the empirical indicators for this factor with an extraction method based on eigenvalue greater than 1 is one factor (component) that explains a very small proportion of the variance – 56%. The desire to explain the largest possible percentage of variance leads to the choice of a two-component solution. The second component will add another 34% to the variance explained, i.e. a total of 90% for both factors, despite its lower initial eigenvalue value (0.838).

Table 2

Factor 'Competitive forces' – empirical indicators (elements and characteristics), score and weight

Barriers to entry into the industry/Threat of new entrants			Competitive rivalry			Power of buyer			Power of supplier			Threat of substitution		
Empirical indicator	Score x_i	Weight w_i	Empirical indicator	Score x_i	Weigh w_i	Empirical indicator	Score x_i	Weigh w_i	Empirical indicator	Score x_i	Weigh w_i	Empirical indicator	Score x_i	Weigh w_i
Capital requirement	2,65	0,102	Number of equal competitors	3.10	0.136	Number of significant users	3.05	0.268	Number of significant suppliers	3.20	0.226	Threat of substitute products	2.50	0.500
Product differentiation	3.25	0.165	Diversity of competitors	3.55	0.149	Brand loyalty	3.90	0.266	Threat of forward integration	2.80	0.263	Availability of products with similar characteristics (substitutes)	2.45	0.500
Image and imposed trademark	3.75	0.131	Operating costs	3.20	0.177	Consumer tastes and preferences	3.90	0.229	Transfer costs to other suppliers	2.85	0.276			
Access to technology	3.80	0.081	Image of competitors	3.10	0.196	Proximity to users	3.20	0.238	Contribution of suppliers to quality	2.95	0.235			
Access to raw material and material suppliers	3.65			3.30	0.196									
Access to intermediaries and distribution channels	3,25	0,135	Differentiation of competitors	3.10	0.146									
Economies of scale	2.85	0.081												
Access to finance	3.00	0.138												
$\sum x_i w_i$	3.30		$\sum x_i w_i$	3.22		$\sum x_i w_i$	3.51		$\sum x_i w_i$	2.94		$\sum x_i w_i$	2.48	

Source: Author's research work

Table 3

PCA and Cronbach's Alpha coefficient results applied to the elements of each of the five competitive forces

Statistical characteristic	Theoretical limits	Barriers to entry into the industry	Competitive rivalry	Power of buyer	Power of supplier	Threat of substitution
Bartlett's Test	Sig.<0.05	0.000	0.000	0.050	0.000	0.000
Kaiser-Meyer-Olkin measure	KMO > 0.5	0.501	0.808	0.544	0.784	0.500
Min Eigenvalue	1.0	1.043	0.838	1.229	3.405	1.752
Extraction Sums of Squared Loadings – Cumulative %	Min 60	81.253	89.817	76.806	85.113	87.613
Components	-	3	2	2	1	1
Cronbach's Alpha coefficient	$\alpha > 0.6$	0.783	0.931	0.584	0.931	0.858

Source: Author's research work.

The source information for calculating weights is loadings (l_i) from the rotated[9] component matrix Varimax, in which the coefficients are sorted by size (an automatic option in IBM SPSS Statistics 25). For each empirical indicator of the two components, a proportion of the variance explained by it is calculated out of the total variance explained with the component. For this purpose, the following are calculated: 1) Squared loadings (l_i^2); 2) Sum of squared loadings (L_i)[10] for the component-related empirical indicators; 3) % of Variance (l_i^2/L_i). All these calculations are made only for the component-related empirical indicators.

The first of the two intermediate composite indicators (components in PCA) includes 'industry growth' (X5) with weight 0.293=0.901/3.070, 'operating costs' (X3) with weight 0.266=0.816/3.070 and 'differentiation of competitors' (X2) and 'diversity of competitors' (X6) respectively with weights 0.223=0.684/3.070 and 0.218=0.670/3.070. The second intermediate composite indicator includes 'Image of competitors' (X4) with weight 0.590=0.901/1.527 and 'number of equal competitors' (X1) with weight 0.410=0.625/1.527.

The two intermediate indicators are aggregated with weights equal to the relative proportion of the variance explained by them: 0.668 = 3.070 / (3.070 + 1.527) for the first and 0.332 = 1.527 / (3.070 + 1.527) for the second.

Table 4

Defining a composite indicator for the 'Competitive rivalry' factor

Empirical indicators (factor elements)	Code	Loadings (l_i)		Squared loadings (l_i^2)		% of Variance (l_i^2/L_i)	
		1	2	1	2	1	2
Industry growth	X5	**0.949**	0.178	0.901		0.293	
Operating costs	X3	**0.903**	0.296	0.815		0.266	
Differentiation of competitors	X2	**0.827**	0.398	0.684		0.223	
Diversity of competitors	X6	**0.818**	0.483	0.670		0.218	
Image of competitors	X4	0.196	**0.949**		0.901		0.590
Number of equal competitors	X1	0.493	**0.791**		0.625		0.410
Sum of squared loadings (L_i)				3.070	1.526		
% of variance explained by component						0.668	0.332

Source: Author's research work; i – component number.

The thus composite indicator 'Competitive rivalry' has the following linear expression:

$$CI_{CR} = (X5*0.293 + X3*0.266 + X2*0.223 + X6*0.218)*0.668 + (X4*0.590 + X1*0.410)*0.332$$

$$= 0.196*X5 + 0.177*X3 + 0.149*X2 + 0.146*X6 + 0.196*X4 + 0.136*X1 = 3.22$$

[9] Rotation Method: Varimax with Kaiser Normalization.

[10] In the case of more than one component, this sum is smaller than 'rotation sums of squared loadings' from table 'Total Variance Explained' from SPSS output.

The weights[11] of the empirical indicators are the coefficients in the transformed equation after the parentheses are opened.

The value for the composite 'Competitive Rivalry' indicator can be obtained in two ways. The first is to calculate it for each sample unit and then calculate their arithmetic mean. The second is to calculate it from the sum of the products of the scores and their respective weights - $\sum xi * wi$.

After calculating the other four composite indicators, the aggregate composite indicator 'Competitive forces' is obtained as an arithmetic mean of their values:

$$ACI_{CF} = (CI_{TNE} + CI_{CR} + CI_{PB} + CI_{PS} + CI_{TS})/5 = (3.30 + 3.22 + 3.51 + 2.94 + 2.48)/5 = 3.09$$

The higher value for both the composite indicator as well as the aggregate composite indicator attests to the higher attractiveness of the environment with respect to the given factor. This identifies those factors that are identified as key to shaping the competitiveness of the enterprise as they identify the capabilities of the environment in which it operates.

4.2. Results of the applied model for the evaluation of the competitiveness of a micro and small enterprises from the wine-producing industry

To evaluate the competitiveness of micro and small enterprises in the wine-producing industry, an aggregate composite indicator is calculated that summarizes the values of the aggregate composite indicators of the internal and external environmental factors.

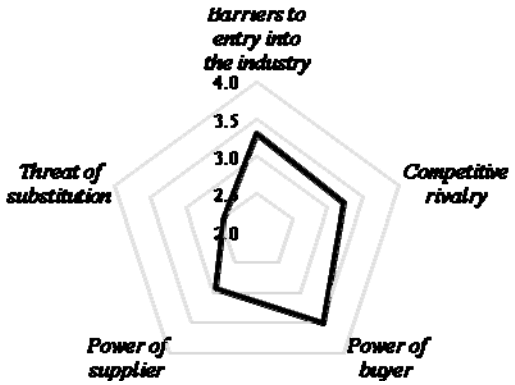
The aggregate composite indicator of environmental factors determines the attractiveness of the industry for the competitiveness of micro and small wine-producing enterprises and represents a mean of the composite indicator 'Factor conditions' and the aggregate composite indicator for 'Competitive forces'. The value of CI 'Factor Security' is 3.46 and the ACI 'Competitive Forces', whose construction we presented in section 4.1, is 3.09. Thus, ACI 'External Environment' has a value of 3.27. On the given scale: from highly attractive (5) to highly unattractive (1), **a score of 3.27 defines the industry as neutral** in terms of its attractiveness for the operation of micro and small wine-producing enterprises and the shaping of their competitiveness.

The Competitiveness Polygon (Figure 2), depicting the values of the composite indicators included in the ACI 'Competitive forces' modelled on the competitive forces operating in the industry, reveals that the leading factor (with the highest score) in shaping the competitiveness of the micro and small wine-producing enterprises, is the factor 'Power of buyer' – 3.51. Given a scale of 1 to 5, the industry is attractive in terms of that factor. The lowest is the factor 'Threat of substitution' – 2.48, which makes the industry unattractive relative to it. This confirms the importance of using the marketing concept to deliver value to consumers in order to gain value from them.

[11] Once again, we note that the weighting is only used to correct the overlapping information between two or more correlating indicators and is not a measure of theoretical significance.

Figure 2

Polygon of the Competitive Forces operating in the industry



Source: Author's research work.

In order to test the explanatory power of the composite indicators constructed in the study, a link between them and other variables should be sought (OECD, 2008, p. 39). In this case, these are the variables that differentiate the leaders[12] from the other wine-producers in the studied population.

Leaders in sales revenue and profit (Figure 3) rely heavily on analysis and comparison with competitors, while other wine producers place emphasis on the benefits generated by the barriers to entry into the industry. The leaders' evaluation is also higher in terms of the strength of the suppliers and substitute products, which testifies to the strategic direction they have set for imposing a competitive product and diversification and integration strategies.

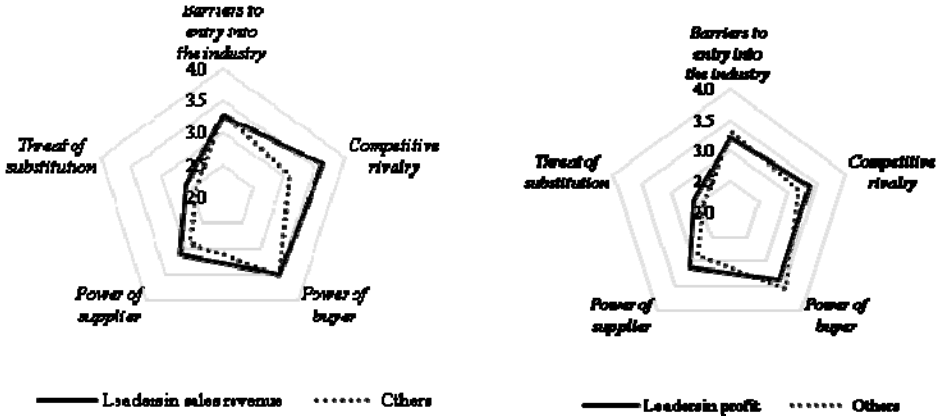
There is a tangible difference in the power of evaluation of the factors of the industrial environment by the leaders in fixed assets in comparison with the other wine producers. The reasons can be found in their investment opportunities (on the basis of available assets), in absorbing the opportunities of the business environment and in counteracting competitors – current and potential.

The in-house analysis part of the study aims to identify the main sources for the generation of competitive advantages and the determination of the competitive status of micro and small wine-producing enterprises (their competitiveness at the time of the survey).

[12] In terms of sales revenues, profits and fixed assets, according to information provided by the NSI for the purposes of the study.

Figure 3

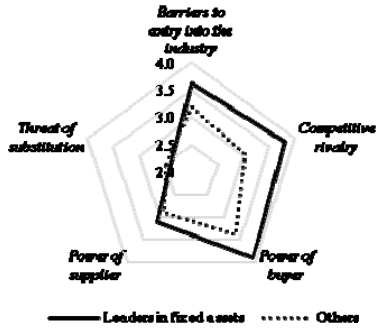
Polygon of the competitive forces, comparative analysis by sales revenue and profit



Source: Author's research work.

Figure 4

Polygon of the competitive forces, comparative analysis by fixed assets.



Source: Author's research work

For this purpose, an aggregate composite indicator for the evaluation of the competitiveness of micro and small enterprises in the wine-producing industry is derived, which is defined as the arithmetic mean of the composite indicators of the internal environment factors: a composite indicator of the management factor and an aggregate composite indicator of the marketing mix.

The value of the composite indicator of the factor 'Management' is 4.06,[13] which in the accepted scale for the evaluation of the degree of utilization of this factor for the generation

[13] 1 (to a very small degree) to 5 (to a very large degree).

of competitive advantages, certifies that micro and small wine-producing enterprises rely heavily on the management tools in the formation of its competitive advantages.

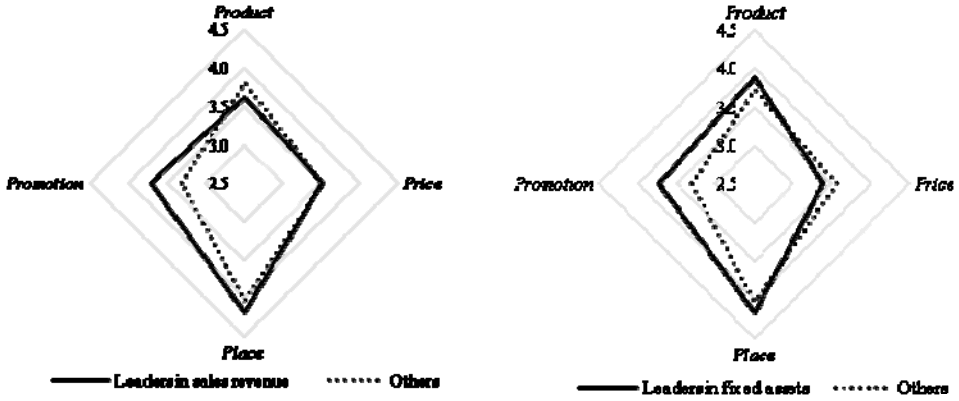
To define the aggregate composite indicator of the marketing mix, the constituent indicators of its elements – product, price, place (distribution) and promotion – are successively defined.

The composite indicator of the Marketing mix factors (4P) is calculated as the arithmetic mean of the composite indicators of its elements – Product (3.76), Price (3.51), Place (4.07) and Promotion (3.41), and has a value of 3.69. In the adopted scale, the evaluation of approximately 4 certifies that micro and small wine-producing enterprises rely heavily on the tools of the marketing mix in the formation of competitive advantage.

Of all the instruments (factors) of the mix, the highest rating is given to the 'Place' sub-mix, covering product sales activities. Emphasis on the distribution strategy is also observed in the leaders in the industry as well as in the other wine producers, but with some specifics (see figures 5 and 6).

Figure 5

Factors for the generation of competitive advantage, comparative analysis by sales revenue and fixed assets



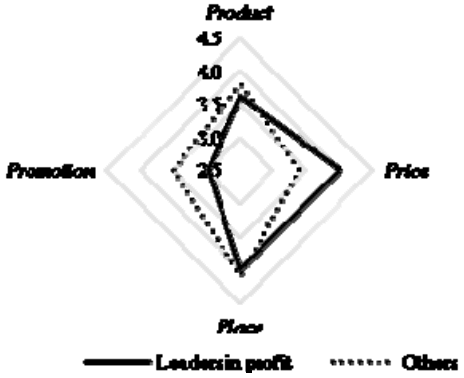
Source: Author's research work.

In shaping their competitive advantages (or their competitiveness), leaders in sales and fixed assets rely primarily on value-added activities, with the highest average being given to the 'Promotion' and 'Place' factors. There are differences in the valuation given to the factor 'Product' for the generation of competitive advantages, which is higher among fixed assets leaders.

Profit leaders rely on the factor 'Price' and, to a lesser extent, on 'Place' than other wine-producing enterprises. This explains their strategic focus of achieving the highest profitability among their competitors through price.

Figure 6

Factors for the generation of competitive advantage, comparative analysis by profit



Source: Author's research work.

The value of the aggregate composite indicator for the evaluation of the competitiveness of micro and small enterprises in the wine-producing industry is (4.06 + 3.69) / 2 = 3.88 and shows that micro and small wine-producing enterprises rely heavily on the factors of the internal environment in the formation of competitive advantages and increasing their competitiveness.

Conclusion

The proposed model (algorithm) for the evaluation of the competitiveness and derivation and simultaneous monitoring of the values of the aggregate composite indicators, allows for an in-depth study and analysis of the competitiveness of industrial enterprises (competitive status) and the possibilities for its enhancement (competitive potential).

The results of the study prove that competitiveness is an ability of differentiation for the micro and small wine-producing enterprises – both a goal, a means, a challenge, and a direction for development and result of their activity, which substantiates its importance for the industry as a whole. Differentiation is aimed at creating and maintaining competitive advantages derived through corporate management, with a focus on the marketing mix toolkit, relying on the marketing concept of value creation. This is fundamental in the formation of the competitive status of wine-producing enterprises.

There is a competitive potential in the wine-producing industry, whose proper establishment and successful development would assist in increasing its competitiveness on a global scale. Such a potential was identified in the implementation of existing and 'gaining momentum' good practices in the sub-sector, in the tendencies formed in the development of the sector, in the opportunities for promotion and sale of Bulgarian wine on the international markets, in carrying out joint (related) activities in the development of wine tourism and the imposition of regional wines and the region's identity on the global wine market.

Applicability

This model could also be approbated in other sectors of the economy when examining the competitiveness of the industrial enterprises operating therein.

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ИКОНОМИЧЕСКИ ИЗСЛЕДВАНИЯ
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CHALLENGES OF THE NATIONAL INNOVATION SYSTEM FOR THE APPLICATION OF OPEN INNOVATION PRACTICES IN THE REPUBLIC OF NORTH MACEDONIA

Nowadays, products become increasingly complex, their development and production is a result of the application of a wide range of external ideas, technologies and knowledge. In the complex economy, it is impossible for any single enterprise to keep abreast of all modern technologies. In the production process enterprises include development of specialized knowledge assets, using a wide range of knowledge from different areas. At the same time, enterprises make their specialized knowledge assets available for usage by the other actors. Those activities are referred as open innovation practices. The great interest in applying the open innovation practices is a result of the positive impact that open innovation has on the enterprise performance and on the overall economic system as a central element in the modern knowledge-based societies. However, for successful implementation of the open innovation practices, which is essentially based on the cooperation between the key actors within the national innovation systems, government, academy and the business sector, there is a need for significant institutional support at a national level, a developed innovation system and a particularly developed system for technology and knowledge transfer. Hence, the paper primarily analyzes the institutional factors (national innovation system), with a view to the institutional and financial support in cooperation and knowledge transfer. At the same time, an analysis of the innovation of the Macedonian business sector is made, with particular emphasis on the application of open innovation practices in terms of the representation of the key model dimensions in the enterprises. On the basis of the analysis made, conclusions are presented and measures are proposed to improve the environment for applying the open innovation practices in the Macedonian business sector.
JEL: O36; O38; L52

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1. Introduction

Enterprises cannot protect and isolate themselves from the rapid changes that take place in the everyday environment: the competition is becoming stronger, the knowledge is constantly expanding, the research and development investments are significantly increasing, and at the same time the product and technology life cycle is becoming shorter. The application of the open innovation through the use of knowledge from different sources enables optimization of the time period of transformation of the knowledge into innovation and commercialization of the innovation to the market (Savitskaya et al., 2010).

The open innovation model enables enterprises to improve their innovative performances through the usage of knowledge from external sources, as well as to realize financial benefits of placing internally developed technology on the market, which cannot be used within the enterprise because it does not fit into the current business model of the enterprise (Chesbrough, 2003; Gassmann and Enkel, 2004).

An important element of the knowledge-based economy is the use of intellectual knowledge in the process of creating material values. However, the knowledge itself does not lead to growth and development, the national innovation system enables the creation of new knowledge and transformation of the new knowledge into innovation and its commercialization. Since in the open innovation model, the innovation development is a result of the cooperation within the business sector and between the business sector, the academic community and other relevant parties, consequently the open innovation model is not important only for the business sector but for the economy as a whole. The establishment of an efficient national innovation system is a crucial factor in applying the open innovation practices.

Practically in the paper, the focus is on examining the relevant factors that influence the innovativeness of the Macedonian business sector, with particular reference to their impact on the application of open innovation practices. In particular, in the paper the focus is put on: the current situation of the Macedonian innovation system, i.e. the impact of the current innovation policy and the existing financial instruments in supporting the introduction of innovation, with particular reference to supporting investments in the open innovation practices, knowledge transfer and cooperation between the business sector, the academic community and other relevant participants of the national innovation system. At the same time, an overview of the innovation of the business sector in North Macedonia is made. Particular emphasis is placed on examining the representation of the key dimensions of the open innovation model in enterprises, in order to understand the current situation in introducing the open innovation practices in the country.

2. Theoretical background

The term open innovation was first introduced by Chesbrough (2003) and it strongly stimulated the interest of the researchers and the practitioners in the business sector. Open innovation is defined as the flow of ideas that come from different sources with the goal of their practical application Chesbourg (2003) or as a methodology for measuring and

implementing cooperative solutions, by involving all stakeholders in an interactive process (Carayannis and Campbell, 2011). The open innovation enables enterprises to use a wide range of knowledge coming from consumers, suppliers, universities, laboratories and even the competitors.

The combination of this diverse knowledge through the open innovation process increases the possibility of finding creative solutions that lead to larger, high technological, radical innovation, different from the innovation introduced through the traditional model and which at the same time have even greater positive impacts on the enterprise performance (Chesbrough at al. 2011).

Hence, the essence of the open innovation lies in treating the enterprise in the research and development process as an open system, which enables an inflow and outflow of knowledge, to be used to accelerate the internal activities of the enterprise in introducing the innovation and in expanding the market for successful introduction and commercialization of the innovation (Chesbrough, 2006).

Based on the different knowledge flows, three types of open innovation have been defined (Chesbourg and Bogers 2014):

- Outside – in (input) open innovation, the innovation is introduced through an inflow of external knowledge into the enterprise, so that the external sources of knowledge are used in the internal processes within the enterprise;
- Inside – out (output) open innovation, the innovation is introduced through an outflow of knowledge from the enterprise, the knowledge in the enterprise is enhanced through the external processes of commercialization;
- Coupled open (joint) open innovation, the innovation is introduced combined through an inflow of knowledge into the enterprise and commercialization activities, i.e. it is a combination of the aforementioned types of open innovation.

In terms of the enterprise size, mostly the large, high technological and internationally competitive enterprises apply the open innovation model. Although the open innovation is not very used in small and medium-sized enterprises, the model of open innovation is very important for their performance, because these enterprises are facing with lack of financial resources for conducting internal research and development activities, for developing new products and their commercialization, and the open innovation can largely help in overcoming these deficiencies.

The open innovation practices first were applied in the high technological industries Wang et al. (2015), that is, in the software, electronics, telecommunications, pharmacy and biotechnology industries, yet the software and electronics industries stand out as industries that base their growth mainly on using the open innovation practices (Chesbrough at al., 2011). In recent years, however, the application of the concept of open innovation has been applied in other industries as well.

The open innovation has several primary dimensions (Ebersberger et al. 2011, p. 29):

1. identifying the external information (searching);

2. interactive knowledge development and transfer (cooperation);
3. market-based sources (external expenditures of innovation) and
4. commercialization of the external technologies (licensing out).

The positive impact of applying the open innovation model in the direction of reducing the operating expenditures of the enterprise, improving the internal processes and efficient use of new knowledge, is the reason behind the growing acceptance of open innovation as an effective strategy for accomplishing growth and improvement of the performance of enterprises (Scott and Chaston, 2013).

These tendencies are also confirmed in the EU annual reports on open innovation strategy and policy[3], which show that there has been an increase in the level of openness in the EU countries, followed by increased sophistication and complexity in introducing innovation (Curly and Salmelin, 2013).

According to the open innovation model, the innovations are developed as a result of inter-organizational cooperation; therefore the conditions for cooperation are very important for the application of open innovation models, i.e. the setting up of national innovation systems. According to Freeman (1987), the national innovation system is a network of private and public sector institutions that, through interaction, initiate, introduce, modify and distribute innovation. The National Innovation Systems (NIS) is a framework that explains the difference in the level of innovation of countries, through the different level of institutional support that they provide for introducing innovation (Lundvall, 1992; Nelson, 1993). NISs emphasize the idea that the flow of knowledge and technologies between individuals and organizations is crucial to the innovation process. Within the NIS there are a number of factors that influence this flow of knowledge, but among the most significant is the existence of efficient institutions. One of the key institutions in the individual NISs are the institutions for the protection of intellectual property rights, which by regulating the intellectual property rights have a major impact on the process of distribution of knowledge. In addition, institutions providing state aid for the introduction of innovation, in particular through the establishment of instruments that facilitate the cooperation in the innovation process, are important for the application of open innovation practices.

3. National Innovation System in North Macedonia – institutions and measures to support cooperation and knowledge transfer

The economic growth, the level of competitiveness and innovation of a country, and in particular the quality of using the available research and development resources in relation to the potential of the country, depend on the national innovation system (Cvetanovic et al. 2017). The existence of a national innovation system is particularly important for small countries such as North Macedonia, because these countries do not have at disposal large research capacities. Since 2008 in the country have been taken systemic measures in order to establish a comprehensive National Innovation System. In 2008, the Parliament of the

[3] Open Innovation Strategy and Policy Group (OISPG)

Republic of Macedonia adopted a law on technological development that defined the legal framework for the establishment of incubators and technology parks. Since then, four main strategies have been adopted in the country that define the activities to improve the innovation and industrial development, and which are the basis for the construction of the Macedonian NIS (SEE Project FINNO, 2014).

The first strategy is the Strategy for Intellectual Property of the Republic of Macedonia 2009-2012. The strategy aims to strengthen the legal framework in the field of protection of the intellectual property rights, their effective and efficient implementation, development of the capacities of the individual holders and the business community for protection and enforcement of the intellectual property, as well as raising public awareness of the benefits of intellectual property (Government of the Republic of Macedonia, 2009).

The second strategic document is the Industrial Policy of the Republic of Macedonia 2009-2020, which is a national document for strengthening the Macedonian industry and economy.

The third document is the Program for Scientific Research and Technological Development of the Republic of Macedonia. Having in mind that scientific research and development is the key prerequisite for the development of knowledge-based economies, the development priorities defined in this document are the key prerequisite for the country's progress in this field.

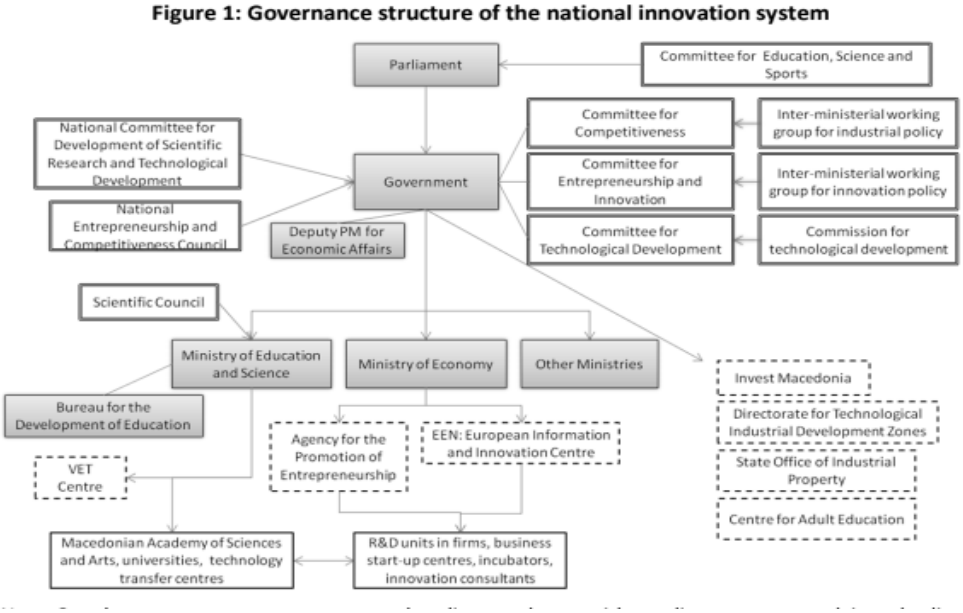
The fourth and most important strategic document, part of the Macedonian NIS is the Strategy for Innovation and Technological Development (2012-2020). The strategy aims to transform the national economy into a knowledge-based economy, capable and competitive on the global market, with skilled labour force and innovative enterprises. In the strategy, the competitiveness of the business sector is identified as the key factor in achieving economic growth by increasing the knowledge and introducing innovation. The main strategic goals are: increasing the propensity of the business sector to innovate, strengthening the human resources to introducing innovation, creating a regulatory environment to support the innovation and increasing the flow of knowledge among the stakeholders in the innovation process (Government of the Republic of Macedonia, 2012). In addition to the above mentioned strategic documents, other strategic documents and programs are also part of the Macedonian NIS.

An important document in the Macedonian NIS is the Law on Innovation Activity, adopted in 2013, which regulates the innovation activities, the principles of commercialization of the output of innovation and the interactions between different stakeholders in the innovation process. A particularly important segment of the Law is the definition of the organizational forms for infrastructure support to the innovation activities. Such organizational forms are: technology business incubators and accelerators, science and technology parks and technology transfer centres. In order to systematically monitor the development of innovations and their commercialization, in parallel with the adoption of the Law, an Entrepreneurship and Innovation Committee has been established. The Committee is composed of a President and 16 members, the Chairman of the Committee is the Prime Minister, and members are the relevant ministers or their deputies (Law on

Innovation Activity, 2013). The institutions as part from the national NIS are identified in the Strategy for Innovation and Technological Development 2012-2020 (Figure 1).

Figure 1

Governmental structure of the National Innovation System



Source: Strategy for Innovation and Technological Development of the Republic of Macedonia in the period 2012-2020, p. 12.

In addition to the competent ministries, other significant institutions that are part of the Macedonian NIS which are responsible for supporting the innovation and the technological development of the business sector are: Agency for Promotion of Entrepreneurship, Agency for Foreign Investment and Export Promotion, Directorate for Technological and Industrial Development Zones (Free Zones Authority), Fund for Innovations and Technology Development, State Office of Industrial Property. Within the Macedonian NIS, 28 support measures for the introduction of innovation and technology development of the business sector have been identified, which are implemented through the programs of the relevant ministries, agencies or funds, and which have been implemented by the end of 2018. In 2018, EUR 23.18 million have been allocated to the business sector through the institutions that are part of the Macedonian NIS, intended to support the introduction of innovation and technological development. The majority of the funds (96.6%) have been implemented through the Fund for Innovation and Technology Development (FITD), and the rest of the funds have been implemented through the Ministry of Economy (3.3%) through the Competitiveness, Innovation and Entrepreneurship Support Program (MoE-CIEP) and the smallest share of the funds has been implemented through the Agency for Promotion of Entrepreneurship of the Republic of North Macedonia (0.1%) (FITD, 2019).

FITD is a relatively new institution, part of the NIS, which main goal is to provide financial support to innovation activity in micro, small and medium-sized enterprises, to achieve accelerated technological development based on knowledge transfer, research and development and innovations, in order to improve the competitiveness of the enterprises (http://www.fitr.mk/).

The OECD, in its 2018 Policy Outlook: Competitiveness in South-East Europe, has identified five sub-dimensions for assessing technologies, innovation, investments and exports.[4] The second sub-dimension (2) Public-private knowledge transfer and linkages is closely linked to the current situations in the NIS for the introduction of open innovation in the business sector. The rating of this sub-dimension is made through the presence of innovation vouchers, technological development and innovation support grants, innovative clusters and science and technology parks. The main assessment of this sub-dimension for the Republic of North Macedonia is that there is a weak cooperation between the business sector and the academic community, accompanied by a high brain drain rate (OECD, 2018).

Innovative vouchers designed to support the already weak cooperation between the business sector and the academic community has not yet been introduced. Their introduction is expected to be made through the FITD in the 2019-2020 Action Plan as part of the Strategy for Innovation and Technological Development 2012 -2020.

In the work programs for 2018, the institutions that are part of the NIS do not have included grants intended for supporting the cooperation between the business sector and the academic community. Most of the agreements between the academic community and the business community involve the performance of a specific activity within a project. One of the main reasons for this low level of cooperation are the complicated administrative procedures, because the approval of the cooperation agreements and the payments often go through the universities, and not through the faculty itself, which complicates the procedure. The FITD Instrument of co-financed grants for innovation commercialization supports the cooperation between the business sector and the academic community. SMEs as applicants for the grants may have a higher education or scientific research institution as a consortium partner, it is even considered an advantage in applying for these grants. Also, within the Instrument of co-financed grants for technological development, the scientific and research institutions can be engaged as contractors in the process of adapting and introducing modern and innovative technologies in the SMEs. The Ministry of Education and Science does not award grants intended for supporting the cooperation between the business sector and the academic community. As a result of these identified weaknesses, the OECD recommends in the future to increase the "triple-helix" events that would emphasize the need and importance of strengthening the cooperation, and at the same time, this cooperation would be adequately supported by awarding innovative vouchers and projects (OECD, 2018).

[4] The five sub-dimensions are: 1) Innovation in the enterprises, 2) Public-private knowledge transfer and linkages, 3) Human resources for introducing innovation, 4) Investment promotion, and 5) Export assistance/ facilitation.

Clusters as one of the modern forms of networking, knowledge exchange and innovation development are not very developed in North Macedonia. The key weakness in the existing clusters in the country is the insufficient potential for innovation development. Since enterprises in the country do not have high benefits from the cluster membership, they are not willing to pay large membership fees; consequently, the clusters are not sustainable in the long run. Although there is a governmental support for clusters, it is very small and is not aimed at supporting the scientific and research activities within the cluster.

In the 2017 study on the Macedonian business sector innovation capacity, conducted by the Knowledge Management Center it was identified that there is a very weak infrastructure support for SMEs in introducing innovation, such as the existence of technology transfer centres, technology parks and centres of excellence, whose primary role is connecting and exchanging knowledge between the business sector and the academic community (Innoplatform, 2017). A feasibility study for the establishment of a Science and Technology Park is ongoing. SEEU TechPark was opened in 2013 within the South-East Europe University (SEEU), aiming to connect the business sector with the academic community, and in 2017, projects by 23 companies were supported. The Technology Transfer Office has not been open yet as part of NIS, but its establishment is planned in the near future through a World Bank project. As a part from the Macedonian NIS there is established a Center for Technology and Innovation Transfer in the scope of the Faculty of Electrical Engineering and Information Technologies, which is a potential candidate for the Center for Excellence in the Western Balkans (FITD, 2019).

Concerning the protection of the intellectual property rights as one of the key components of open innovation, the analysis shows that in the future there is a need for changes in the conditions for the patenting and commercialization procedures of innovation. The changes are particularly addressed to the intellectual property rights which are not clearly defined, and which in particular show their weaknesses in projects involving multiple partners, for example from the academic and from the business community.

4. Analysis of the innovation and application of the open innovation practices in the Macedonian business sector

4.1. Analysis of the innovation of the Macedonian business sector

The Macedonian business sector, which today comprises more than 70 000 active business entities, indicates a modest innovativeness, which according to the State Statistical Office (SSO) data for the last reference period (2014-2016) is 37.4% (Table 1).

Table 1

Innovative enterprises by size, in North Macedonia

2014-2016					
Enterprises by size	Total	Innovative (number)	%	Non-innovative (number)	%
Total	**3.114**	**1.166**	**37.4**	**1.949**	**62.6**
Small	2.448	871	35.6	1.577	64.4
Medium-sized	552	232	42	321	58.2
Large	114	63	55.3	51	44.7

Source: SSO, 2018.

According to the size of the enterprises the highest innovation activity is observed in the large enterprises (55.3%), followed by the medium-sized enterprises (42%) and last are the small enterprises (35.6%).[5]

In terms of sectoral distribution, the enterprises in the sectors Information and communications and Financial and insurance activities are rated as the most innovative (SSO 2018). Within these two sectors, 56.3% and 52.1%, respectively, of the enterprises are innovative.

The lowest innovation activity in the analyzed period is shown by the enterprises in the sector Water supply; wastewater disposal, waste management and environmental remediation activities. The share of innovative enterprises in the total number of enterprises in the sector is only 22.1% (SSO, 2018).

At the same time, very low innovation activity was registered in the enterprises from the manufacturing sector, where the share of innovative enterprises in the total number of enterprises in this sector amounts to 36.2%. In the Manufacturing sector, the most innovative are the large business entities, where the share of the large innovative enterprises in the total number of large enterprises accounts for more than 50% (SSO, 2018). This situation is understandable, especially considering that the Manufacturing sector accounts for about 30% of the total number of medium-sized and large enterprises in the country.

The modest innovation determines modest results from the innovation activity of the Macedonian business sector, especially in terms of the intellectual property rights, as one of the most relevant, direct indicators of the innovative and economic business performance. According to the assessments in the European Commission (EC) Annual Report on the progress of the Republic of North Macedonia in the process of EU accession from 2019, in the field of protection of the intellectual property rights, the Republic of North Macedonia, as in the previous period, remains "moderately prepared" (European Commission, 2019).

From the point of view of the sectoral distribution of enterprises, in the reference period 2014-2016, out of the total of 164 accomplished intellectual property rights, 82 belong to the Manufacturing sector, 19 to the Information and Communications sector and 5 to the Financial and Insurance activities sector (Eurostat, 2019).

[5] Micro enterprises are excluded from the SSO surveys because the innovative activity in them, with few exceptions, is absent, i.e. it does not exist.

4.2. Analysis of the Representation of the Key Dimensions of the Open Innovation Practices in the Macedonian Business Sector

In order to examine the application of the open innovation practices in the Macedonian business sector, an analysis of the data obtained through the SSO survey – Innovation and Innovation Activities of the businesses entities was made for the last available reference period 2014-2016. From the survey are identified data that can be used to analyze the extent of the open innovation application among the Macedonian business sector as measured by the representation of the key dimensions of open innovation previously mentioned in the paper. The key principle of open innovation is the wide distribution of knowledge. Even highly competitive enterprises with quality human resources need to be linked to external sources of knowledge, because the large researches are often too complex to be performed in a single enterprise. External sources of knowledge other than universities and laboratories include specialized companies, individual researchers, clients, competitive enterprises in the sector of activity, etc. The analysis related to the first dimension – *The identification of external information* indicates the dominant use of internal sources of information within enterprises in the Macedonian business sector, during the innovation process. Of the total number of product and/or process innovative business entities (861), for 47% the use of internal sources of information from different sectors within the enterprise is of high importance for successful implementation of the innovation activities (Table 2). Only a small percentage of the enterprises have considered that the use of external sources of information and knowledge in the implementation of the innovation activities is of high importance. Concerning the external sources, enterprises mostly learn from equipment suppliers (30.5%) and from the private sector clients (26.6%), whereas the use of information from consultants, laboratories and universities and other higher education institutions is very low, 5.7% and 3.1% respectively. The analyzed data indicate a very low level of usage of the external knowledge necessary for implementation of innovation activities.

Table 2

Share of enterprises that have considered the use of information sources of great importance in the implementation of innovation activities, 2014-2016

	Number of enterprises	%
Within the enterprise or enterprise group	406	47.2
Suppliers of equipment, materials, components or software	263	30.5
Clients or costumers from the private sector	229	26.6
Clients or costumers from the public sector	59	6.9
Competitors or other enterprises in the sector	91	10.6
Consultants, commercial labs	49	5.7
Universities or other high institutions	27	3.1

Source: Eurostat, 2019.

Cooperation is a very important element in the open innovation model. Cooperation agreements are concluded between enterprises or organizations for the development of specific products, technologies or processes. There are different agreements, from bilateral projects to complex projects, which include networks for cooperation at the industry level.

However, there are generally three types of cooperation: horizontal, between enterprises of the same sector of activity; vertical, between entities at different levels of the supply chain, such as between suppliers and customers, and lateral cooperation that links the business sector to the academic community.

The analysis of the second dimension – *The interactive knowledge development and transfe*r, indicates a low level of cooperation in the innovation process among the Macedonian business sector. The analysis made shows that most of the enterprises develop the innovation independently, over 75%, which is an indicator of the low efficiency during the innovation process and the great efforts that enterprises should make in introducing innovation, rather than using the benefits of the open cooperation. Analyzed by the types of cooperation, the Macedonian business sector is dominated by the vertical cooperation, i.e. over 81% of the enterprises with concluded agreements cooperate with suppliers of equipment and materials in the innovation process (Table 3). As in the case of the use of information, also in terms of the cooperation, the data again indicate the low level of lateral cooperation, i.e. poor cooperation of the business community with the academic community. Even in cases when there is a cooperation between the academic and the business community, it is often unofficial and frequently refers to the appointment of students or PhD students on the practical work in enterprises, but very rarely the cooperation refers to cooperation for innovation development, by using an expert assistance from the academic community.

Table 3

Participation of the innovative enterprises that have cooperated in introducing innovation, by types of cooperation partners, 2014-2016

	Number of enterprises	%
Product and/or process innovative enterprises	861	
Any types of cooperation	210	24.4
Other enterprises within the enterprise group	82	39.0
Suppliers of equipment, materials, components of software	171	81.4
Clients or costumers form the private sector	115	54.8
Clients or costumers from the public sector	51	24.3
Competitors or other enterprises in the same sector	62	29.5
Consultants or commercial labs	47	22.4
Universities or other higher education institutions	48	22.9

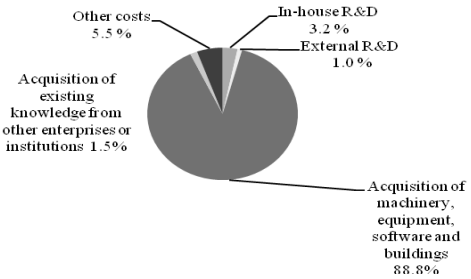
Source: Eurostat, 2019.

In order to reduce the expenditures and risk in the process of research and innovation development, enterprises reduce the internal research and development expenditures at the expense of increasing the external innovation expenditures. In order to explore the third dimension that relates to *Market-based sources*, data have been used from the question on the types of expenditures realized during the innovation process. As it can be seen from Chart 1, in the total realized expenditures, the largest share is for the acquisition of equipment, machinery and software (88.8%). The expenditures for external research and development are very low (3.2%), whereas the expenditures for the acquisition of practical

knowledge from other enterprises or organizations are slightly above 1% of the total expenditures.

Chart 1

Expenditures of innovation activities in 2016

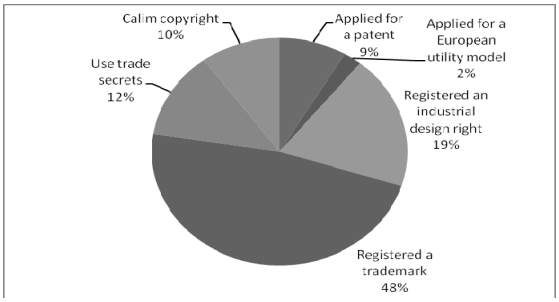


Source: SSO, 2018.

Intellectual property is considered as a product of the classical model of innovation and its role is mostly defensive. Without intellectual property rights, the innovator does not have any financial benefits due to the imitator, and will not have any incentive to innovate in the future. However, in the open innovation model, intellectual property is one of the central elements, because the intellectual property moves to and from the enterprise, thus enabling the exchange of knowledge, and is also used as an indicator for assessing the enterprise innovativeness. The figures presented for the last fourth dimension – *The commercialization of the external technologies* indicates the low usage of intellectual property rights. Only 14% of the innovators in the analyzed period have commercialized their innovations, i.e. they have registered their intellectual property rights. From the data presented in Chart 2, it can be seen that the most frequently used form of intellectual property in North Macedonia is the trademark (48%) and the least used form is patent (9%).

Chart 2

Share of types of registered intellectual property rights in the Macedonian business sector, 2014-2016



Source: Eurostat, 2019.

4.3. Distribution of sectors of economic activity into clusters (open innovation sector cluster and closed innovation sector cluster)

In the following section, a cluster analysis of the Macedonian business sector has been made, in order to group the sectors into clusters according to the characteristics of the innovation models they apply. As in the previous part of the paper, again, the source of data is SSO survey Innovation and innovation activities of the businesses entities, for the reference period 2014-2016. The cluster analysis has been made in the SPSS program using the type of K-Means cluster analysis with a predefined fixed number of groups (clusters), i.e. for the purposes of the analysis two groups of clusters have been defined (a cluster of sectors that introduce open type of innovation and a cluster of sectors that apply the traditional introduction of innovation). The indicators used by dimension have been analyzed in the previous paragraph and are presented in more detail in the Annex.

Before conducting the cluster analysis, it has been taken into account that the values of the variables used in the cluster analysis differ, and therefore standardization of the variable used has been made. With the standardization, the values of the variable are in the interval [0,1] and in this way are more suitable for conducting the analysis.

In Table 4 presented the cluster analysis results. Based on the variable used, it can be concluded that only one sector of the Macedonian economy, which is, the manufacturing sector, applies an open innovation practices. All other sectors and departments apply closed types of innovation, i.e. in the process of innovation, they mainly rely on their own resources and capacities. The enterprises in the manufacturing sector during the innovation process do not rely only on their own resources and knowledge, but are focused on utilizing external technologies and knowledge and market research. The introduction of market-oriented innovation is leading to greater efficiency in the innovation activity of the enterprise part of the manufacturing sector.

Table 4

Cluster analysis results – distribution of sectors and departments in clusters

Cluster Membership

Case Number	Sector	Cluster
1	B Mining and quarrying	1
2	C Manufacturing	2
3	D Electricity, gas, steam and air conditioning	1
4	E Water supply; sewerage, waste management and remediation activities	1
5	46 Wholesale trade, except of motor vehicles and motorcycles	1
6	H Transportation and storage	1
7	J Information and communication	1
8	K Financial and insurance activities	1
9	71 Architectural and engineering activities; technical testing and analysis	1
10	72 Scientific research and development	1
11	73 Advertising and market research	1

Source: Authors calculations

5. Conclusions and recommendations

The analysis made in the paper that focuses on the Macedonian National Innovation System (NIS), the innovativeness of the Macedonian business sector and the usage of open innovation practices, points to the following situations:

- The existence of numerous institutions within the Macedonian NIS and the overlapping of many of their functions and competences, at the same time accompanied with the existence of a number of measures (currently 28 active measures) intended to support the innovativeness of the business sector, dispersed in different programs and under the authority of different bodies, often creates confusion among their users.
- This situation, together with the identified low efficiency of NIS in transferring knowledge and the low level of cooperation between the government, the business sector and the academic community, determines a modest innovativeness of the Macedonian business sector (around 37%) and an extremely low prevalence of open innovation practices in the country.
- According to the results of the cluster analyzes, there is a significant share of open innovation in North Macedonia only in the Manufacturing sector. Enterprises from other sectors in the innovation process mainly rely on their own knowledge and / or internal research and development.
- The NIS of North Macedonia at the same time faces significant challenges in the field of intellectual property rights, both from the aspect of the established legal regulation and from the aspect of the modest results of the realized intellectual property rights. Given the recent EC assessments pointing to the country's "modest preparedness" in the area of protecting the intellectual property rights and their exceptional importance in encouraging the national innovation performance, it becomes clear that it is extremely important to take urgent measures to improve the situation in this area.

Recommendations

In order to improve the identified weaknesses in the Macedonian national innovation system and to establish adequate infrastructure for applying of the open innovation practices among Macedonian business sector, we propose the following measures:

- Straightening the cooperation among institutions part from the NIS, merging the active measures intended for supporting innovation and increasing the available funds by measure.
- Improving the legal framework in the field of protection of intellectual property rights by introducing clear intellectual property rights, which are particularly important for projects that involve more partners and its harmonization with the European legislation.
- Intensifying the process of building innovative infrastructure, i.e. establishing science and technology parks, technology transfer centers, centers of excellence, etc., which are

one of the key elements of NIS necessary for strengthening the cooperation, creating and transferring knowledge in the direction of improving the innovative and competitive performance of the economy as a whole.

- Strengthening the cooperation of the academia with the industry, i.e. involving the academic community in the, so-called, third mission, which implies activities to meet social needs and market demands, in addition to the activities related to the educational and scientific and research activities.
- Increasing the awareness of the business sector representatives about the benefits of implementing the open innovation practices, in order to start businesses active cooperation and knowledge transfer during the innovation process.
- Active participation of the enterprises in clusters and strengthening of the innovation component of the Macedonian clusters, i.e. putting the clusters in function of encouraging the innovation and competitive performance of the businesses.

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Annex

Source of information	Within the enterprise or enterprise group
	Suppliers of equipment, materials, components or software
	Clients or costumers from the private sector
	Clients or costumers from the public sector
	Competitors or other enterprises in the sector
	Consultants, commercial labs
Cooperation	Universities or other high institutions
	Other enterprises within the enterprise group
	Suppliers of equipment, materials, components of software
	Clients or costumers form the private sector
	Clients or costumers from the public sector
	Competitors or other enterprises in the same sector
	Consultants or commercial labs
	Universities or other higher education institutions
Types of expenditures	In-house R&D
	External R&D
	Acquisition of machinery, equipment, software and buildings
	Acquisition of existing knowledge from other enterprises or institutions
	Other expenditures
Registered intelectually property and rights	Applied for a patent
	Applied for a European utility model
	Registered an industrial design right
	Registered a trademark
	Use trade secrets
	Cleim copyright

ИКОНОМИЧЕСКИ ИЗСЛЕДВАНИЯ
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APPLICATION OF THE TOPSIS METHOD FOR PRELIMINARY ASSESSMENT OF TECHNOLOGICAL TRANSFER OPTIONS

In modern times, the business success of enterprises is increasingly the result of the development of science and the accelerated introduction of new advances. Innovations is becoming the key to success. Under these conditions, the importance of technology transfer is also becoming a main "strategic way of meeting the challenges of globalization in business" (Mayer and Blaas, 2002). With the increasing importance of technological transfer, increases the interest in the theoretical elucidation and empirical research of various aspects of its implementation in enterprises.
In view of the above, the aim of this paper is to propose a method for the preliminary assessment of alternative technology transfer options based on the use of the TOPSIS method (The Technique for Order of Preference by Similarity to Ideal Solution) (Hwang and Yoon, 1981). It allows an initial assessment and selection of technological transfer options on the base of preliminary selected important criteria. As a result, businesses can reduce the number of options that will later be subject to a more in-depth assessment, from the list of already selected ones, by choosing only those who have good potential and are in their capabilities. In this way the experts' efforts are focused and their work, concerning the selection of a transfer option in which to invest, is also significantly relieved.
JEL: O32

Introduction

Nowadays, the exchange of technological knowledge is of utmost importance to businesses. In the context of a globalizing economy and trade liberalization, it is becoming the engine of their economic development (Manfield, 1975; Grossman and Helman, 1991; Romer, 1990).

Deepening globalization leads to more intensive and complicated competition between companies. In addition, the rapidly evolving scientific and technological progress and

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the world-wide "knowledge economy" dynamize the competitive struggle and pose new challenges for them. Changes in needs and requirements of consumers, as well as the rapid pace at which current knowledge, techniques and technologies become obsolete make their competitive positions unstable. New requirements for their functioning appear, at the basis of which is the necessity for constant and rapid changes and improvement. Business success is increasingly the result of the development of science and the rapid introduction of new advances. Innovations are becoming the key to success. The relative importance of intangible assets, of the social and cultural capital, as conditions for accelerated innovation and renewal, grows. Less and less can be relied on cheap natural resources and labour.

At the same time, the development of science cannot be only the doing of a single person, separate laboratory, research organization, university or state. It is the collective deed of millions of people from various nations. In these conditions, the innovative activity of enterprises cannot rely solely on their own strength, but also on outside achievements. The enterprise will make use of them through technological transfer, which is becoming a main "strategic way of meeting the challenges of globalization in business" (Mayer, Blaas, 2002). Coe and Helman, as well as a number of other authors (Coe, Helman, 1995; Griffith et al., 2004), emphasize that new knowledge flows that do not recognize boundaries become a main source for productivity gains.

Through the introduction of technological transfer, businesses not only benefit from the knowledge, experience and technical advances of others but also accelerate and increase the effectiveness of their own innovation activities. They acquire technological knowledge tried out in practice, which reduces mistakes and failures. Through the acquisition of new advances at the appropriate stage of their life cycle, they overcome the initial, lengthy, highly risky and very expensive stages of their development. This reduces investment for innovation and ensures success. There is no need to maintain large research departments. At the same time, new knowledge is accumulated in enterprises and it positively impacts not only its innovation activity but also its overall activity. The transfer of new technologies in enterprises is also related to the replacement of obsolete products, increase in effectiveness through the introduction of improved technological methods, new equipments, cheaper components, etc., attracting engineers and consumers, meeting the specific technological requirements of consumers (Larson, Wall, Norstrom, Crnkovic, 2006) and others. As a result, important competitive advantages are created and maintained and high competitiveness is achieved (Belderbos, Van Roy, Duvivier, 2012).

Enterprises often face various opportunities for technological transfer. They will evaluate each of these options and choose the best for themselves in accordance with their resource constraints and the desire to achieve maximum business results. Therefore, the assessment of alternative technological transfer options is of great importance for making informed decisions for the choice of options. It helps to properly target investments and achieve high firm competitiveness. Without its implementation, it is not possible to plan properly the innovation activities and maximize economic results.

The assessment allows to determine the expected impact of each possible transfer option and the innovation, as a result of its implementation, on the business performance of the enterprise and to make comparisons with other alternative transfer options. On its basis, the strengths and weaknesses of the transfer alternatives are analyzed. Through its help to analyze various alternatives for managerial decisions, it also becomes a condition for developing and choosing development strategies.

Unfortunately, the problem of assessment of alternative technological transfer options in enterprises is still not satisfactorily resolved. The analysis of the specialized literature has shown that there are many opinions on the ways in which it has to be carried out, but none of them has been accepted by all authors (Smits, Leyteh, 1988; Tran, Daim, Madu, 1988; McGrath, MacMillan, 2000, etc.). Firstly, there is still no single opinion on the evaluation criteria; secondly, there is no consensus on the indicators to assess the levels reached on these criteria, and thirdly, the methodologies used to make the assessments are objectionable. Moreover, the prevailing part of the methodological studies concerning the evaluation and selection of technological transfer options are related to international transfer from industrially developed countries to developing countries (Cohen, Levinthal, 1989; Girma, 2005; Fu, Pietrobelli, Soete, 2010; Eaton, Kortum, 1999; Xu, 2000, etc.).

The problem concerning the assessment and selection of alternative technological transfer options has not been satisfactorily resolved in the business practice of enterprises as well. Various methods ranging from general expert judgment to the use of formalized algorithms are used. Formalized methods are mainly used to evaluate and select variants of the transfer of physical objects (products, machines and equipment, components, facilities, plants, etc.) and of some new methods and processes. They are rarely used to evaluate patents, software products, and design. They cannot be applied for judging the transfer of new documentation, useful information and knowledge. They are usually incomplete because they are based on assessing and comparing only the technical characteristics and the price of new advances. They rarely take into account their full potential impact on the enterprise in the long run.

It can be concluded that, despite its practical significance, the problem of accurate assessment and selection of variants of new technologies for the needs of enterprises is not yet fully resolved. The lack of accurate and easy to use tools is most noticeable in business practice, where solutions for the implementation of new technologies are often taken without thorough analysis and justification.

In view of the above, the aim of this paper is to propose a method for the preliminary assessment of alternative technology transfer options based on the use of the TOPSIS method (The Technique for Order of Preference by Similarity to Ideal Solution) (Hwang, Yoon, 1981). It allows an initial assessment and selection of technological transfer options on the base of preliminary selected important criteria. As a result, businesses can reduce the number of options that will later be subject to a more in-depth assessment, from the list of already selected ones, by choosing only those who have good potential and are in their capabilities. In this way the experts' efforts are

focused and their work, concerning the selection of a transfer option in which to invest, is also significantly relieved.

Methodology

1. Overview

The "technological transfer" category is not new, but there is still no commonly accepted definition of it. This is mainly due to its complexity, the lack of agreement on the content of the transfer objects, the different points of view it is characterized (Chen, 1996, Spivey et al., 1997, Bozeman 2000). In view of this, for the purposes of this paper, the following working definition will be adopted here, which is in line with the subject of the study and focuses on the transfer between organizations:

Technological transfer is a complex, iterative process of informed, purposeful, normal and contractual interact between two or more organizations to transfer and apply new and useful information and knowledge, methods and processes, documentation, patents, software products, design, physical objects (products, machinery and equipment, components, facilities, factories, etc.) in the host organization, leading to an increase of its knowledge base and/or innovation to achieve its corporate goals (Velev, Atanasova, 2013).

Every enterprise learns from the achievements of others and perceives new advances. But not every innovation in the environment is suitable for transfer and absorption. The one thing that is appropriate for one enterprise is inappropriate for another. Moreover, the different options for a possible technological transfer require a different amount of investment and would have a different effect on business performance. Consequently, and because of their resource constraints, enterprises must take management decisions for the choice of such transfer options that lead to maximum business results. Errors can be fatal. In order to be correct, these decisions must be based on previously made estimates.

The method outlined herein is based on the use of the TOPSIS method, developed by Hwang and Yoon (Hwang, Yoon, 1981). It is one of the most commonly used methods for the multicriteria analysis of solution variants. Its use determines and selects the best alternative to a solution that is at least remote from the ideal solution and furthest from the worst decision on selected criteria. For the purpose of the preliminary assessment of technological transfer variants, the application of the TOPSIS method undergoes some adaptation.

The proposed method can be further developed by changing or adding criteria, as well as by adjusting their relative weights for transfer assessment. Its practical applicability can be facilitated and enhanced by appropriate programming of computing procedures and the use of computer equipment.

2. Choice of criteria for preliminary evaluation of technological transfer options

The first and one of the most important problems in making all assessments is the right choice of judgment criteria. In view of the fact that the main purpose of this paper is to demonstrate primarily the method of preliminary evaluation it should be noted that it does

not pretend for the most detailed list of the proposed criteria. However, the criteria proposed here are broad enough and can be used by all businesses. They can be completed on a case-by-case basis, depending on the particular transfer and the objectives of the involved enterprise.

The preliminary assessment process begins with the identification of the needs of enterprises to put in new technologies through transfer. These necessities arise from the need to continually improve and maintain high competitiveness. The specific requirements of technological transfer and related innovations are discovered through periodic analysis of emerging issues in enterprise operations, environmental changes, and development strategies. The analyses are focused on:

- Outside environment (special attention is paid to regulatory regulation). This analysis should show the trends of change and the resulting opportunities and threats to the enterprise.
- Markets (including: consumers, competitors, commercial intermediaries, technology development, new practices and production methods, changing needs, emergence of new products, etc.);
- Efficiency of the business in terms of used equipment, methods and technologies for production and provided services, need for product improvement, etc.
- The enterprise's prospects and plans for development and improve of its competitiveness, etc.

As a result of these analyzes, the potential and necessary changes and innovations are determined to solve the company's problems, to take advantage of the existing or emerging favourable opportunities, to prevent the existing or emerging threats, to increase the efficiency of the enterprise's activity. Usually, these problems are solved through the use of the technological transfer.

Once an enterprise has determined its needs for new technologies, it explores the possibilities of implementing technology transfer, i.e. the transfer of knowledge and innovation, on the basis of which corporate innovations will be resolved to solve the problems encountered and to achieve higher economic results and competitiveness. For this purpose, it examines the new developments offered by universities and research organizations and the existing new advances in other organizations around the world. Sources of information can be used, such as: articles, reports, specialized publications, conferences, seminars, internet sites, social networks, etc.

The result of the study is to develop an expanded list of technological transfer opportunities that match the company profile and could provide solutions to its problems and ensure its improvement. These variants would lead to innovations that are of varying importance to the enterprise. Some of them are mandatory for implementation and must be done urgently. Such are, for example, those caused by changes in legal regulations – changes in the mandatory requirements to the equipment used, technological lines, methods and approaches to production and service, safety and working conditions, etc. An enterprise can not continue its business if it does not comply with those changes by making the necessary

innovations. However, not all changes in the legal regulation require strictly binding and urgent measures to change. Innovation in this case is desirable to improve the business, but could be postponed for later.

Desirable, but not strictly binding, with a possibility of some delay in time, are the innovations and the technological transfer necessary for their implementation, caused by changes in the market conditions (changes in the requirements of the consumers, changes in the behavior of competitors, new requirements of the intermediaries, new practices and strategies emerged, etc.).

Such are the innovations brought about by other innovations carried out or taking place in the enterprise. Similarly, is the state of the transfer of new technologies stemming from the aim to improve the business performance of the enterprise – to increase the competitiveness of products, increase sales, improve the quality of operations and increase staff productivity, reduce costs and more.

Due to the varying degree of importance of innovation for the enterprise, the technological transfer options for their provision, outlined in the developed list, also have a different priority for implementation. This priority must be determined and taken into account when assessing and determining the sequence of the transfer. The priority groups, according to the degree of importance or necessity for the transfer, are: Priority group 1 – strictly obligatory for implementation because of the necessity of changes in the activity of the enterprise imposed by new regulatory requirements; Priority group 2 – mandatory for implementation in order to reflect the changes in the market conditions, a significant problem in the enterprise or because of the necessity of other kinds of innovation; Priority Group 3 – these are desirable but not mandatory transfers, concerning the improvement of the business performance of the enterprise.

Variety of options for the implementation of each of the priority technological transfer groups are possible. These alternative options need to be further assessed in order to select the most effective for the enterprise. It has to invest in them.

The evaluation is carried out in two stages – preliminary and final evaluation.

Preliminary judgment should reject the alternative options for technological transfer that do not meet pre-selected but relatively general criteria. As a result, a short list of selected alternative transfer options is developed, sorted by priority groups, which will be a subject for further detailed assessment in order to select the most suitable for transfer in the enterprise. In the preliminary assessment, all technological alternatives are evaluated according to the following criteria:

1. Capacity (capabilities) of an enterprise to take advantage of that technology

The capacity of an enterprise to benefit depends on the complexity of the new technology and its absorption capacity, including its innovation, production and market capacities. For this purpose, it is assessed:

- the scientific and innovative potential (capabilities) of an enterprise to develop and further develop new advances to the readiness for implementation/use;

- the potential of an enterprise to incorporate innovation – this includes the presence of qualified personnel, experience, availability of premises, availability of the necessary production facilities, equipment, etc.);
- the potential of the enterprise to use the new advance (incl. to produce it and marketing the results of the implemented innovation) – this includes the presence of qualified personnel, experience, the opportunity to supply specialized materials and parts, the possibility of finding partners and signing the necessary contracts, company reputation and image, etc.).

2. Expected results

The preliminary assessment of the expected results of each transfer variant is made by one or more of the following sub-criteria:

- expected sales growth;
- expected increase of the competitiveness of the products/services;
- expected improved compliance with standards;
- expected increase of the labor productivity in the enterprise;
- expected decrease of the product cost in the enterprise;
- expected improvement of the financial results of the enterprise.
- expected increase of the flexibility of the enterprise activity;
- expected improvement of environmental protection;
- expected improvement of the quality of the management and marketing activity, etc.

3. Required investment funds:

- acquisition cost;
- necessary funds to achieve new advance;
- necessary funds for implementation, incl. the preparation of personnel and investment in ancillary conditions.

4. Necessary time to take advantage:

- necessary time to develop the new advance;
- time needed to implement innovation.

5. Other:

- terms of payment;
- included staff training;
- restrictive conditions for using the acquired new advance placed by the seller;

- the expected degree of internal resistance;
- risk (probability of success/failure), etc.

The preliminary assessment of the technological alternatives might be realized using the main criteria, all or part of their sub-criteria. Sub-criteria assessment will be more precise because of their larger number and specificity, but this would greatly increase the work of the experts and the time to make the assessment. It is preferable to carry out the assessment only by basic criteria. This will be accurate enough to pre-screen only the most inappropriate alternatives for the enterprise. Later, the other alternatives will be subject to much more precise final judgment and choice.

3. TOPSIS method for multi-criterial preliminary assessment of technological transfer variants

The application of the TOPSIS method for prior assessment of technological transfer options requires the following steps:

3.1. Develop a matrix of solutions

For this aim, let Ai (i = 1, ... n) denote the alternative technological transfer options to be evaluated, and Cj (j = 1, ... m) the system of evaluation criteria. On this basis, a matrix of Dnxm solutions can be developed. It specifies the level of each alternative considered by each of the selected evaluation criteria, represented with Xij. The matrix has the following form:

	C_1	C_2	….	C_m
A_1	X_{11}	X_{12}	….	X_{1m}
A_2	X_{21}	X_{22}	….	X_{2m}
….	….	….	….	….
A_n	X_{n1}	X_{n2}	….	X_{nm}

3. 2. Normalize the decision matrix

Normalization is performed using the following formula:

$$y_{ij} = \frac{Xij}{\sqrt{\sum_{i=1}^{n} X_{ij}^2}}$$

In this way a new, normalized matrix Rnxm is obtained with the following form:

	C_1	C_2	….	C_m
A_1	Y_{11}	Y_{12}	….	Y_{1m}
A_2	Y_{21}	Y_{22}	….	Y_{2m}
….	….	….	….	….
A_n	Y_{n1}	Y_{n2}	….	Y_{nm}

3. 3. Calculate the weighted matrix

The levels of the indicators in this matrix are weighted with the different importance of the evaluation criteria. This is necessary because the individual criteria have a different significance for the evaluating enterprise. For this purpose, the coefficients of importance (weights) of each of the criteria Wj (j = 1, ... m) are determined and the values of the indicators from normalized matrix are corrected (by multiplication). This gives a new matrix Znxm (i = 1 ... n; j = 1 ... m) having the following form:

	C_1	C_2	….	C_m
A_1	Z_{11}	Z_{12}	….	Z_{1m}
A_2	Z_{21}	Z_{22}	….	Z_{2m}
….	….	….	….	….
A_n	Z_{n1}	Z_{n2}	….	Z_{nm}

Where: Zij = Yij . Wj

3. 4. Identify the Positive Ideal Solution (PIS) and the Negative Ideal Solution (NIS) to the problem

PIS is the solution (the technological alternative) with the best meanings for each evaluation criterion, and NIS – the solution (the technological alternative) with the worst meanings. They are defined as follows:

PIS = max Zij when the higher value of the corresponding criterion shows a better state and PIS = minZij when the lower value of the given criterion shows a better state.

NIS = min Zij when the criterion requires maximization of value and NIS = max Zij when the value of the relevant criterion is minimized.

3. 5. Determine the distance of each of the evaluated technological alternatives from PIS and NIS

The distances of the evaluated technological alternatives from PIS and NIS are denoted by Di+ and Di- respectively. They are determined by the following formulas:

$$D_i^+ = \sqrt{\sum_{j=1}^{m}\left(Z_{ij} - PIS_j\right)^2},\ i=1\ldots n,$$

$$D_i^- = \sqrt{\sum_{j=1}^{m}\left(Z_{ij} - NIS_j\right)^2},\ i=1\ldots n$$

3. 6. Determining the rank index

The Rank Index shows the relative proximity (likeness) of each alternative to PIS – the best state. It is calculated for each alternative by the following formula:

$$RC_i = \frac{D_i^-}{D_i^+ + D_i^-}, \; i=1...n$$

The level of RCi is defined within the range from 0 to 1, i. $0 \leq RCi \leq 1$.

3. 7. Technological transfer alternatives are ranked by the RCi levels in descending order. This determines the best of them. I.e. this alternative, which minimizes its distance from PIS and maximizes it against NIS. Therefore, the higher value of RCi indicates a better estimate of the corresponding alternative.

For the purpose of a preliminary evaluation of technological transfer options, some additions to the TOPSIS method are also needed. These are related to the determination of Xij and the coefficients of the importance of the individual evaluation criteria Wj.

Estimates of the various criteria for prior evaluation of technological alternatives are in different units of measurement. Some of them are directly measurable by supplier data, but others can only be determined by expert judgment. Therefore, in order to ensure uniformity between them, all data should be converted into grades. The grades vary from 1 to 7. Grade 1 is the lowest level and shows the worst compliance of the relevant criterion, and a level of 7 – excellent match.

When the value of alternatives can not be directly measured by a relevant criterion, the experts involved provide expert judgment within that range. When the parameters of the alternatives are measurable, their conversion into grades is as follows:

a) in cases where a large number of alternatives are evaluated and compared:

$$БО\ i_К = 6 \times \frac{(СТ\ i_К - СТ\ i\ min)}{(СТ\ i_{max} - СТ\ i\ min)} + 1,$$

where:

БО $i_К$ – grade of the i-th parameter for the k-th alternative;

СТ $i_К$ – value of the i-th parameter for the k-th alternative;

СТ i_{max} and СТ i min – respectively the maximum and minimum value of the i-th parameter for the whole set of analyzed alternatives.

b) in cases where only two alternatives are evaluated and compared:

The alternative with the higher value of the parameter gets a grade 7, the evaluation of the other alternative is determined by the formula:

$$БО\ i_К = 6 \times \frac{СТ\ i_К}{СТ\ i\ max} + 1,$$

In the preliminary assessment, each of the participating experts assess the analyzed technological alternatives in the range from 1 to 7 for each of the criteria used. For criteria that require minimization of values (for example: the necessary investment funds, the level of current costs, etc.), the higher grade for Xij is placed on the alternatives of lower level on the criterion and vice versa, the alternatives with a higher level on the relevant criterion is given a lower grade. Thereafter, the assessments are summarized to determine the corresponding grades of Xij. This can be done in the following way:

Let Ek (k = 1 ... K) denote the experts taking part in the preliminary assessment, and with Tik – the grades within the range from 1 to 7, which the k^{th} expert gives to the Ai alternative according to the relevant evaluation criterion. The following table can be used for each criterion Cj:

Table 1

Determining the meanings of Xij for the technological alternatives considered under the jth criterion of assessment

Алтернативи Ai	Експерт 1 E_1	Експерт 2 E_2	…….	Експерт K E_K	Xij
A_1	T_{11}	T_{12}	….	T_{1K}	$X_{1J}=\sum_{k=1}^{K} T1k/K$
A_2	T_{21}	T_{22}	….	T_{2K}	$X_{2J}=\sum_{k=1}^{K} T2k/K$
…..	…	…	….	….	……..
A_n	T_{n1}	T_{n2}	….	T_{nK}	$X_{nJ}=\sum_{k=1}^{K} Tnk/K$

When determining the coefficients of importance Wj of the individual evaluation criteria, the following conditions must be met:

$$(0 \le Wj \le 1)$$

and $\sum_{j}^{m} Wj = 1$

The following table can be used:

Table 2

Determing the coefficients of importance Wj of the evaluation criteria

Criteria Cj	Expert 1 E_1	Expert 2 E_2	…….	Expert K E_K	Wj
C_1	I_{11}	I_{12}	….	I_{1K}	$W_1=\sum_{k=1}^{K} I1k$
C_2	I_{21}	I_{22}	….	I_{2K}	$W_2=\sum_{k=1}^{K} I2k$
…..	…	…	….	….	……..
C_m	I_{m1}	I_{m2}	….	I_{mK}	$W_m=\sum_{k=1}^{K} Imk$
Overall:	1	1	…	1	1

Because of the peculiarities of the method used here for identifying Xij, some modification is needed in the way in which the Positive Ideal Solution (PIS) and the Negative Ideal

Solution (NIS) of the problem are determined. PIS is defined only as the solution (the technological alternative) with the best Zij values for each evaluation criterion, ie PIS = max Zij, and NIS as the solution (the technological alternative) with the worst Zij value in each of criteria, ie. NIS = min Zij.

4. Approbation of TOPSIS method relevancy for preliminary evaluation and selection of technological transfer options

The main purpose here is to demonstrate the practical applicability of the presented approach for preliminary evaluation and selection of technological transfer options. A real industrial enterprise has been chosen for the algorithm approbation. Its main activity is the production of railings of various types. In order to overcome the management's concern that the information may be used in an unfavourable way for the enterprise, the authors made a confidentiality commitment. For this reason, we use the provisional name of the enterprise "X" Ltd. The information required for the approbation was obtained with the help of executive director (owner) of the enterprise, director and production manager of the plant.

As a result of a situation analysis carried out in ""X" Ltd., the following main problems were identified in the company's activity:

- a bottleneck in the production of railings (powder painting sector) due to the limited capacity and functions of the available powder painting equipment;
- low customer satisfaction due to delayed orders.

In order to achieve higher business results and competitiveness of the company, together with the director and the production manager, an in-depth study has been made of the techniques and technologies available on the market able to remove the existing bottlenecks in production and the resulting difficulties in enterprise operations. For this purpose, web sites of companies and representatives of companies – sales representatives offering equipment and technologies, meeting the needs of "X" Ltd., have been researched. Selected are those, whose technical characteristics correspond to the most of the company's needs. As a result of the survey, a list of 3 possible technological transfer options has been prepared, on the basis of which company innovations can be made to solve the above problems. The list contains the following options:

- Option 01. Purchase of 2 powder coating booths "Non-transition" type, Figure 1(a) – for a painting of smaller size parts in relatively small batches and various colors, dimensions: width – 1500 mm; height – 2485 mm; depth – 1900 mm. Clear working opening – 1440 x 1530 mm. Power – 2.2 kW. Required quantity of compressed air – 20 Nm/h. Price 80 000 lv./num.
- Variant 02. Purchase of 1 powder coating booth of "Transition" type, Figure 1(b) – for the painting of medium and large batches of parts with maximum dimensions of 450 x 1300 mm. Also available with two working places. Dimensions: Width – 1500 mm; height – 2485 mm; depth – 1900 mm. Working opening – width 500 mm; height – 1530 mm. Power – 2.2 kW. Required quantity of compressed air – 20 Nm/h. Wood effect. Price 120 000 lv./num.

- Variant 03. Purchase of 1 "Open type" powder coating booth, Figure 1(c) – intended for the painting of large-scale parts or of a complex configuration which do not allow them to pass through the openings of the "Transition" types. Dimensions: Width – 1500 mm; height – 2485 mm; depth – 1900 mm. Power – 2.2 kW. Required quantity of compressed air – 20 Nm/h. Wood effect. Price 170 000 lv./num.

Figure 1

Powder coating booths

a) *b)* *c)*

The available powder painting technique does not have the necessary capacity for the company and is a bottleneck in its production. It is precisely for the elimination of this major problem that there is a need for a technological transfer – the purchase of a new powder coating booth. This gives reason to assume that this technology transfer (one of the listed options) is mandatory for implementation and falls under Priority Group 2.

In view of its resource constraint and the desire to achieve maximum business results, the firm must evaluate each of the possible transfer options. The evaluation is carried out in two stages – preliminary and final evaluation. Preliminary judgment should reject these alternative options for technological transfer that do not meet pre-selected and fairly common criteria. The aim is at an early stage to reject the alternative options that are not appropriate for the company. The remaining options will later be subjected to a detailed assessment in order to select the most suitable of them for transfer in the enterprise.

In this case, the following general criteria have been used in the preliminary assessment of the technological alternatives:

1. Capacity (capabilities) of an enterprise to benefit from the technology;
2. Expected results;
3. Required investment funds;
4. Necessary time to take advantage;
5. Other considerations.

The preliminary assessment of technological transfer options was carried out on the basis of these criteria and with the application of the TOPSIS method. The options are assessed by three internal experts (owner, director and production manager).

The sequence of steps specified in the methodological part of this paper is used:

4.1. Develop a matrix of solutions

For this purpose, the alternative technological transfer options are denoted by Ai (i = 1, ... 3) and the criteria to be evaluated with Cj (j = 1 ... 5).

To develop the decision matrix, it is necessary to define Xij's grades. Each of the experts Ek (k = 1-3) taking part in the preliminary assessment indicates their grades for each of the criteria ranging from 1 to 7. The following feature is considered: for the criteria requiring the minimization of values (for example here are Criterion 3 Required Investment Funds and 4 Required Time to Benefit), a higher value for Xij ranging from 1 to 7 is placed on alternatives of lower value on the criterion and vice versa, on alternatives with a higher value on relevant criterion a lower grade is given.

Grades for each individual criterion are given in a series of tables with the following form:

Table 3

Defining the grades of X_{i1} for technological alternatives on the criterion "Capacity (capabilities) of the enterprise to take advantage of the specific technology"

Alternatives Ai	Expert 1 E_1	Expert 2 E_2	Expert 3 E_3	X_{i1}
A_1	7	7	6	6.67
A_2	7	6	5	6.00
A_3	6	5	4	5.00

Similarly, the values of Xij on the other criteria are determined. On this basis, the matrix of D3x4 solutions has been developed, which has the following form:

	C_1	C_2	C_3	C_4	C_5
A_1	6.67	6.50	7.00	6.00	5.33
A_2	6.00	6.50	6.33	6.00	6.33
A_3	5.00	6.33	5.67	6.00	5.67

4.2. Normalize the decision matrix

Normalization was performed using the formula:

$$y_{ij} = \frac{Xij}{\sqrt{\sum_{i=1}^{n} Xij^2}}$$

Thus, the normalized matrix R3x4 is obtained with the following form:

	C_1	C_2	C3	C_4	C_5
A_1	0.587481498	0.582383	0.635792	0.57735	0.531338
A_2	0.621673543	0.582383	0.574937	0.57735	0.631026
A_3	0.518061286	0.567151	0.514991	0.57735	0.565232

4.3. Calculate the weighted matrix

The evaluation criteria have a different importance for the enterprise. For this purpose, we first determine the coefficients of importance (weights) of each of the criteria Wj (j = 1, ... m).

Table 4

Determination of the coefficients of importance Wj of the evaluation criteria

Criteria Cj	Expert 1 E_1	Expert 2 E_2	Expert 3 E_K	Wj
C_1	0.1	0.12	0.1	0.107
C_2	0.4	0.35	0.3	0.35
C_3	0.3	0.3	0.4	0.333
C_4	0.1	0.1	0.08	0.093
C_5	0.1	0.13	0.12	0.117
Overall:	1	1	1	1.00

With the values of Wj (j = 1, ... m), the values of the parameters of the normalized matrix are corrected (by multiplication). Thus, the weighted matrix Z_{3x4} having the following values was obtained:

	C_1	C_2	C3	C_4	C_5
A_1	0.063	0.204	0.212	0.054	0.062
A_2	0.066	0.204	0.191	0.054	0.074
A_3	0.055	0.199	0.171	0.054	0.066

4.4. Identify the Positive Ideal Solution (PIS) and the Negative Ideal Solution (NIS) to the problem

In view of the method used here for determining Xij, PIS is the solution (the technological alternative) with the best Zij meanings for each evaluation criterion, i.e. PIS = max Zij, and NIS is the solution (the technological alternative) of the worst meaning of Zij on each of the criteria, i. NIS = min. The defined meanings of PIS for each of the assessment criteria are:

	C_1	C_2	C3	C_4	C_5
A_1		0.204	0.212	0.054	
A_2	0.066				0.074
A_3					

The NIS values are:

	C_1	C_2	C3	C_4	C_5
A_1					0.062
A_2				0.054	
A_3	0.055	0.199	0.171		

4.5. Determine the distance of each of the evaluated technological alternatives from PIS and NIS

The distances of the evaluated technological alternatives from PIS and NIS are denoted by Di + and Di- respectively. Using the formulas already defined, their values are calculated:

	D_i^+	D_i^-
A_1	0,012377	0,041779
A_2	0,020549	0,026586
A_3	0,043084	0,004072

4.6. Determining the rank index

The Rank Index shows the relative proximity (likeness) of each alternative to PIS – the best state. It is calculated for each alternative, and its values are in the range between 0 and 1, i. $0 \leq RCi \leq 1$. For the specific case they are:

RC1 = 0.77145;

RC2 = 0.564045;

RC3 = 0.086357.

4.7. Technology transfer alternatives are ranked by the RCi values in a descending order

Alternative A1: RC1 = 0.77145;

Alternative A2: RC2 = 0.564045;

Alternative A3: RC3 = 0.086357.

The higher value of RCi shows a better estimate of the alternative, because it minimizes its distance from PIS and maximizes it against NIS. Therefore, alternative A1 is the best of the three analyzed. It should be selected for further evaluation. It is also advisable alternative A2 to undergo such evaluation, due to the value of RC2, which is close to the best.

From the approbation of the TOPSIS method application for preliminary evaluation and selection of technological transfer options, it can be concluded that the algorithm is applicable in the economic practice. It can be successfully used to evaluate alternative technological transfer options and to elect those of them that have the highest potential to improve business performance. It can help a number of management decisions related to effective technological transfer implementation in enterprises and activation of their innovation activity in order to increase their competitiveness.

Conclusion

The aim of this paper is to propose a method for the preliminary assessment of alternative technology transfer options based on the use of the TOPSIS method (The Technique for Order of Preference by Similarity to Ideal Solution) (Hwang and Yoon, 1981). It allows an

initial assessment and selection of technological transfer options on the base of preliminary selected important criteria. As a result, businesses can reduce the number of options that will later be subject to a more in-depth assessment, from the list of already selected ones, by choosing only those who have good potential and are in their capabilities. In this way, the experts' efforts are focused and their work, concerning the selection of a transfer option in which to invest, is also significantly relieved.

Approbation of the method has confirmed that it is applicable in business practice. It can help to take a number of management decisions related to the implementation of effective technological transfer in enterprises and to stimulate their innovation activity in order to increase their competitiveness.

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ИКОНОМИЧЕСКИ ИЗСЛЕДВАНИЯ
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THEORETICAL, QUALITATIVE AND QUANTITATIVE ASPECTS OF MUNICIPAL FISCAL AUTONOMY IN BULGARIA[3]

Scientific research in the field of municipal financial policy covers a wide range of issues which include the issues analysed in this paper, viz. the theoretical foundations and the qualitative aspect of regional fiscal autonomy. The article explores the approaches to assessing the fiscal autonomy of local governments. The results of a detailed critical analysis conducted by the authors outline the merits and demerits of the normative and the positive approaches and justify the need for a balanced approach for assessing local fiscal governance. This approach is based on the idea that the process of extending the fiscal powers of local governments is part of a more general trend for public sector reforms to promote the principles of subsidiarity. The balanced approach was used for a qualitative and quantitative assessment of the fiscal autonomy of local governments in the Republic of Bulgaria. Empirical data were analysed to assess the financial capacity and relative position of Bulgarian municipalities in comparison with similar structures within the European Union (EU). The general conclusion is that the legislative measures for the implementation of the principles of local self-government are not sufficient for the achievement of an optimal ratio of local to state budget fiscal revenues.
JEL: H71; H72

Introduction

The policy of increasing the fiscal autonomy of local governments as a measure to optimize the vertical financial relations in the public sector increases the economic efficiency, on the one hand, and public welfare, on the other. This is why the last decades of the twentieth century and the first of the twenty-first century are characterized by a strong interest in theoretical issues regarding the revenue autonomy (including revenue from taxes) of local authorities.

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In this regard, the **subject** of this research paper is the fiscal autonomy of local governments and its **object** are the effects of tax autonomy and the characteristics of its implementation in Bulgaria. The research subject and object define the following **research thesis**: the assessment based on the balanced approach and an empirical analysis shows that of the fiscal autonomy of Bulgarian municipalities is limited, which leads to the conclusion that it is not related to the degree of spending autonomy and the scope of spending responsibilities of municipalities. The **aim** of the study is to perform a critical analysis of the issues related to the current approaches to assess municipal tax autonomy and to use the results to define the characteristics and to identify the possibilities for improving the national fiscal governance in accordance with the requirements for efficiency, transparency and accountability. This aim is achieved within the framework of a modern conceptual and balanced approach through the following major tasks:

- To perform a critical theoretical analysis of the normative, positive, and balanced approaches for assessment of regional tax assignment;
- To perform a qualitative assessment of the fiscal autonomy of Bulgarian municipalities and to analyse the related fiscal obligations of local governments;
- To analyse the main quantitative indicators characterizing the financial capacity of Bulgarian municipalities and assess their position in comparison with peer structures in the EU.

The research methodology includes scientific research approaches and methods based on the systematic approach as a global point of view considering all characteristics of the studied object. It also includes the methods of theoretical, empirical and structural analysis, the historical approach as well as the methods of comparison, analysis and synthesis, induction and deduction, and observation. The research is based on publications of Bulgarian and foreign authors and open-access publications and data.

1. The Balanced Approach as a Tool for Assessment of Local Fiscal Governance

The theoretical grounds of the traditional normative theory of federalism and the "public choice" approach are debatable (the theoretical foundations of the *traditional normative theory* were laid by the research of C. Tiebot, W. Oates and R. Musgrave and is also known as *TOM (Tiebot-Oates-Musgrave model)* **(**Musgrave, 1983; Bird, 2000; Martinez-Vazques, 2007). For example, R. Musgrave's theory that the stabilization and distribution policy of the state should be implemented only by the central government does not take into account the possibility for regional asymmetrical shocks and underestimates the influence of the external sector and the problems arising from the lack of access to perfect information. A less extreme approach would be to allow for some (and by far not leading) role of local governments in -implementing growth promotion measures and social inclusion incentives. This means that the issue regarding the right level of fiscal autonomy of the local governments needs further analysis.

Oates's decentralization theorem that formalizes the basic efficiency argument for the decentralized provision of certain kinds of public goods (i.e. participation of local governments in welfare allocation) is subject to certain criticism. Note that the problematic issues are not related to the assumptions underlying his theory, viz. the implicit assumption that the central government is constrained to provide a uniform level of output across all jurisdictions and the assumption about the existence of territorially determined consumer preferences. In the real world, Oates's theorem holds, because these assumptions tend to accurately reflect the reality in most countries. It suffices to take into consideration inter-regional disparities in income levels, resource allocation, and economic development to prove the existence of inter-jurisdictional consumer preference differences. On the other hand, the lack of sufficient information regarding the demand across the various jurisdictions and the legislative barriers to the preferential allocation of welfare to some jurisdictions at the expense of others, logically constrains the central government to provide a uniform level of output across all jurisdictions. The problems that arise from the theorem should be sought elsewhere. They boil down to the fact that it is virtually impossible to define clearly and unambiguously the expenditure responsibilities of the central government and the local governments. Specifically, the main issue is related to the exact set of public goods (e.g. services such as education, healthcare, and social security), which, regardless of any efficiency considerations, must be provided as a uniform level of output across all jurisdictions. This problem has a direct bearing on the fiscal powers of local governments.

Charles Tiebout's model is the keystone in the concept of G. Brennan and J. Buchanan (Brennan & Buchanan, 1983; Brennan & Buchanan, 1980). However, it completely ignores the potential spillover effects of inter-jurisdictional competition and the practical difficulties of establishing a local tax system that can cover in full the spending obligations of the local government. Inter-jurisdictional competition may result in serious allocative distortions and, hence, to lower the efficiency on a national level (although at the same time it may result in an increase in public well-being at regional level). Regarding taxation, inter-jurisdictional competition often results in taxation spillover and preferential treatment of residents at the expense of non-residents. Moreover, an extreme level of fiscal decentralization, which creates both horizontal and vertical competition, will, *ceteris paribus*, narrow the scope and efficiency of the central government's fiscal policy. The assumptions in both Tiebout's model (including the presence of perfect mobility across jurisdictional boundaries, access to complete information, lack of externalities) and the Leviathan model[4] (including a uniform and monolithic central government and rulers who strive to maximize their political influence) further limit the cognitive scope of the two concepts.

Criticism of both the TOM approach and the public choice theory are not limited to expressing doubts about the logic underlying the works of R. Musgrave, W. Oates, C.

[4] The theoretical concept of Brennan and Buchanan is often referred to as the Leviathan hypothesis. In a purely Biblical sense, Leviathan is a mythical creature which symbolizes the power of matter (Nature) which humiliates men. However, the concept of G. Brennan and J. Buchanan is based on the treatise of T. Hobbes published in 1651 (see Hobbes; Civil, 1971). Hobbes defines Leviathan as the power of state over individuals (the state authority assumes the role of a "mortal god".

Tiebout, and J. Buchanan. In fact, the main problem of the analysed approach is its normative essence. The TOM model analyses allocation of fiscal powers with the presumption that it is carried out through responsible, socially sensitive and cost-effective planning. Alternatively, the model of G. Brennan and J. Buchanan deals with the same issue by suggesting the need to limit the power of a "public entity that seeks to maximize its revenue". Both approaches deal with the normative question "What should be done" rather than analyse the actual allocation of fiscal powers. Thus, the normative essence of the two approaches makes them markedly static. The recommended allocation of tax revenue and spending as a responsibility of the central government or the local governments is considered optimal at all times despite the fact that taxation in the public sector and its vertical units are undergoing significant evolution. This is why, within the normative approach, the applicability of many modern tax innovations (e.g. regional multiphase taxation) is very limited or even impossible.

Both the TOM approach and the Leviathan model of tax assignment optimization are unacceptable because of their normative character. It is logical to assume that the specific characteristics of each country are important and therefore the appropriate allocation of tax levying powers (in accordance with the allocation of spending responsibilities) cannot be determined following a purely theoretical approach. On the contrary, the influence of factors such as history, traditions, constitutional system, institutional development, etc. should be taken into account in all cases.[5]

The analysis of the characteristics of the normative approach leads to the conclusion that it can hardly explain the real-world systems or provide realistic forecasts. As C. McLure rightfully wrote: "it (the normative approach – L.N.) does not help much to understand why tax assignment is what it is or how it might change in the future." (McLure, 2001).

Regardless of the criticism and the shortcomings of the normative approach, it should be used as a starting point for analysing the fiscal aspects of the financial decentralization. Both the TOM approach and the Leviathan model proved indisputably the need for fiscal revenue autonomy of the local governments and provided the tools (although incomplete) for assessing the optimal (in terms of efficiency) vertical allocation of responsibilities and powers in the public sector.

The positive approach to regional tax assignment (in terms of its institutional, political, economic, and legislative interpretation) can be criticized in several aspects. Its shortcomings can be grouped into several categories.

First of all, lack of assessment criteria and the assumption that all tax systems and any tax assignment powers are set historically and institutionally and are therefore optimal in the circumstances, make the analysis incomplete and potentially incorrect. Trying to ignore the impact of scientific advances and scientific arguments as a factor in evolution and instead overestimating the effects of external factors on the system is logically unjustified, because

[5] This opinion is shared by S. Ivanov, who wrote: "Neither theory nor practice has provided a universal, invariable, or best solution to the questions "Which public institution should provide and what public services? and "What ratio of the volume of public goods should be provided by the state and municipalities?". This is a matter of traditions, preferences, public attitudes." (Ivanov, 1999).

external factors are often in the form of a new idea or new explanation of an already existing problem. Although controversial in the context of a purely philosophical discussion, the argument that changes are caused by external shocks but decisions and specific consequences are determined by existing ideas, is not ungrounded.[6] A detailed analysis of the institutional aspect of the positive approach raises further doubts about its applicability in terms of its predictive power (i.e. if the institutional change is a function of unknown and incidental circumstances, it is therefore unpredictable) and the potential of such highly abstract and history-based approach to be applied to present-day problems of the developing and the Eastern European countries (the transition from a colonial or planned economy to free-market economy allows the implementation of new, historically and institutionally unburdened practices).

Secondly, an approach based entirely on political economy concepts is considered as biased. Indeed, politicians and bureaucrats can hardly be defined as people whose single aim is to maximize the public well-being, but it is also true that they could be driven by factors that go beyond winning the next elections and retaining their privileges. On the other hand, the vote of the consumers of public goods (voters and taxpayers) is influenced by both objective (i.e. purely fiscal) considerations and subjective preferences. Voters often behave irrationally. This can be explained with the fact that most state policy decisions "have indirect and lagged effects on the average citizen's welfare." (Donahue, 1997). The lack of complete, accurate and freely accessible information regarding the activities of politicians and bureaucrats makes their choice even more irrational.

The above facts significantly narrow the scope of political analysis and thus hinder the adoption of an optimal fiscal policy. Moreover, the politico-economic approach, which is inherently biased towards fiscal centralization, cannot give an explanation of the existence of decentralized fiscal systems in countries such as Brazil, India, Canada, some Scandinavian countries, and autocratic societies.

Thirdly, the normative approach recommends a total fiscal decentralisation, which is practically inapplicable in small unitary states. The approach is built on the assumptions that local government spending should be subject to clear, precise and comprehensive regulations, that there should be constitutional provisions regarding tax assignment, an agile and effective judicial system and no transaction costs incurred in the negotiation process. Only under the above conditions would the doctrine inspired by R. Coase lead to the establishment of an efficient and rational tax system.

Considering the advantages, disadvantages and constraints of the normative and the positive approaches discussed above, this paper proposes the development of a *balanced approach to the problems of regional tax assignment*. The proposed approach is based on the assumption that the process of fiscal decentralization is a component of a broader trend for reforms in the public (both profit and non-profit) sector towards the principles of liberal

[6] This view is supported by M. Friedman, who stated that "Only a crisis – actual or perceived – produces real change. When that crisis occurs, the actions that are taken depend on the ideas that are lying around. That, I believe, is our basic function: to develop alternatives to existing policies, to keep them alive and available until the politically impossible becomes the politically inevitable." (Friedman, 1982).

democracy and subsidiarity. The balanced approach addresses the issue of local fiscal autonomy under certain assumptions (or prerequisites for the success of such a policy), which include (Bahl, 1995):

- Institutional framework, including popularly elected local officials, an efficient local tax administration, an effective and transparent auditing and control system;
- Economic factors – enough skilled labour, access to materials, and capital to expand public service delivery when desired, efficient cost management, an income-elastic demand for public services;
- Legislative factors, including constitutional provisions for local self-government and local sources of tax revenue, regulations regarding the principles and calculation of the transfers from the central budget, some local discretion in shaping the local budget and local tax rates.

Summarizing the above assumptions of the balanced approach, it can be inferred that the local fiscal autonomy issue stems from and is to be discussed in terms of:

- Decentralization (political, administrative, and fiscal);
- A justified assignment of spending responsibilities between the national and the subnational governments.

Political *decentralization* can be discussed in terms of a number of different concepts[7] , but in general, it requires popularly elected local officials with powers to make independent and legally binding decisions in all political aspects. Administrative decentralization "re-distributes authority, responsibility and resources among different levels of government" (Von Braun, Grote, 2000). As a component of this process, fiscal decentralization has to do with "the degree of fiscal autonomy and responsibility given to subnational governments" (Bahl, 1995, p. 2) and the establishment of "a system of assignment of tax revenues and expenditures between the national and subnational governments." (Brown, Jackson, 1991). In a broader context, the process of fiscal decentralization is related to its objectives (usually to increase the efficiency of public sector functions) and the possibilities for their

[7] This opinion is shared by D. Treisman, who discusses a wide range of practical implications of the political decentralization. According to him, *structural decentralization* refers simply to the number of tiers of government. From this point of view, the countries with three tiers of government (federal, regional, and local) should be defined as more decentralized compared with countries with two tiers of government. *Decision decentralization* focuses on the scope of issues on which subnational governments can decide autonomously. The degree of decision decentralization depends on the constitutional provisions regarding policymaking by subnational governments. Another decentralization concept – *resource decentralization* – refers to how government resources (revenues, manpower) are distributed between central and subnational tiers. Often, the degree of political decentralization is defined in terms of the method by which subnational officials are selected. This concept is known as *electoral decentralization* – if subnational officials are elected by local communities, the system is more decentralized than if all local officials are appointed by the central authorities. In some systems (confederate states), the local communities have the right to veto on the decisions of the central government or must ratify constitutional amendments. Such legislatures are defined as more *institutionally decentralized*. (Treisman, 2000).

achievement (usually through inducing inter-regional competition). In the context of this study, financial decentralization is considered an essential element of the local governance system and a prerequisite for fiscal autonomy.

A clear assignment of *expenditure responsibilities* is the first step in the process of establishing an efficient and effective system of fiscal relationships between the central government and the subnational governments. The current normative theory of fiscal federalism (Martinez-Vazques, 2007) gives a justified priority to the clear assignment of functional responsibilities among different levels of government to all other issues related to decentralized finances, revenue assignments, transfers, and local indebtedness.

The basic principles that an ideal assignment system should reflect are:

- economic efficiency;
- fiscal equity;
- political accountability, and
- administrative efficiency.

The practical implementation of these principles (ACIR, 1974) is the second fundamental condition for a successful fiscal decentralization.

The main concepts underlying the proposed balanced approach can be summarized as:

- Decentralization requires that subnational jurisdictions have their own sources of fiscal revenues. Functional assignments should be made to jurisdictions according to the type and scope of the services they provide.
- There are no universal rules for establishing an ideal regional fiscal system. The assignment of fiscal powers should be carried out in accordance with the requirements for economic efficiency, equity, and macroeconomic stability. However, the related legislative framework should take into account the specific historical, political, and institutional characteristics of the country.
- The assignment system must comply with the principles of accountability and transparency in order to provide the best services to the citizenry. This implies that subnational jurisdictions should be given the possibility to pursue their own fiscal policies (thus ensuring transparency) and imposes the need for central regulation and legal control to comply with the rules of sound budgetary policy (thus ensuring responsibility and accountability).
- Subsidies from the national budget should be used to overcome regional disparities (including fiscal and administrative capacity differences) and provide equal access to basic public goods and services. The mechanism for transferring funds from the central government to the subnational authorities, as well as the rules for inter-municipal collaboration, should promote efficiency and avoid moral risk and fiscal illusion problems.

The balanced approach to the problems of regional tax practice is an attempt to find a compromise between a purely normative approach, which would formulate and impose general rules that are not feasible and the positive models, which are not based on evaluation analyses and thus have limited cognitive role. *Although the balanced approach is methodologically normative, it expands the analysis of regional tax practice to include non-economic factors*.

2. Quantitative and qualitative evaluation of the fiscal autonomy of Bulgaria's municipalities

2.1. Parameters of municipal fiscal autonomy in Bulgaria

The types of taxes that shall accrue to the municipal budgets and the assignment of functional spending powers to municipalities in the Republic of Bulgaria are provided for by the *Local Taxes and Fees Act (LTFA)* (2019). The municipal taxes include:

- real estate tax;
- succession tax;
- donation tax;
- tax on onerous acquisition of property;
- transport vehicle tax;
- licence tax;
- tourist tax;
- tax on passenger transport by taxi;
- other local taxes as determined by a law.

The Municipal Councils determine by ordinance the amount of the taxes under the terms, according to the procedure, and within the range established by LTFA (2019) (Art. 1, Para.2). This provision has two important aspects:

1) as a self-governance authority, the Municipal Council is authorized to determine local tax rates;
2) the powers of the Municipal Council are limited by the law.

A brief and non-exhaustive analysis of the legislation regarding local self-government in terms of the scope of local taxes provides the information needed for a *qualitative evaluation of the parameters of fiscal autonomy of Bulgarian municipalities* (see Table 1). The information presented in the table shows that local governments are not authorized to levy their own taxes, define the tax base, grant tax exemptions and reliefs, and yet they can set some tax rates and are given some revenue collection rights.

Table 1

Comparative analysis of the theoretical possibilities and the current practice regarding the main parameters of local fiscal autonomy in Bulgaria

Parameter	Theoretical possibility	Current practice
Levying of taxes	Possibility for assignment with statutory constraints or a shortlist of optional local taxes.	Bulgarian municipalities are not authorized to levy their own taxes
Tax base definition	There are two options: a statutory definition of the bases taxable by the national and the subnational jurisdictions or a shared tax system.	Bulgarian municipalities are not authorized to define the tax base.
Tax rate definition	Tax rates can be set by the local governments freely or within certain statutory constraints.	Bulgarian municipalities set the local tax rates within statutory defined upper and lower limits.
Granting of tax exemptions and reliefs	Exemptions and reliefs may be based on the tax base and/or tax rate and/or the outstanding amount of tax	Bulgarian municipalities are not authorized to grant tax exemptions and reliefs
Tax collection	There are four options: a central revenue service, local services, a mixed tax collection service and a decentralized approach	Each tier of governance in the public sector has a tax collection service authorized to collect different types of taxes

Objectivity, indeed, dictates that to grant the local governments the right *to levy new or repeal existing taxes* is a risky decision, which requires central regulations to avoid introducing economically inefficient and resource-distorting taxes, and to ensure the functioning of the single national (domestic) market. Therefore, the fact that Bulgarian municipalities are not given such powers does not limit their fiscal autonomy.

Giving the local governments the right to define the tax base is a legislative solution whose impact on the scope of local revenue power is more important than levying of taxes. Note that although in some developed countries (e.g. the USA, Canada, Switzerland) the subnational jurisdictions have such powers, they often do not take full advantage of them and prefer to use the tax base defined by the central government with some locally-defined modifications. This, as well as the fact that the defining of the tax base by the municipal authorities is often economically inefficient[8], lead to the conclusion that tax assignment to local jurisdictions must not be pursued at all costs. Therefore, the practice in Bulgaria in this respect does not (or at least not drastically) violate the principles of fiscal decentralization and regional tax autonomy.

In view of the above considerations, *the degree of municipal tax autonomy in Bulgaria should be discussed in terms of the rights given to the local jurisdictions to set the local tax rates and grant tax exemptions and reliefs*. Of course, there are regulatory constraints on these rights in a number of countries around the world and such constraints can be

[8] In many developing countries, the assignment of tax base definition to local governments has resulted in tax spillovers and high costs related to aligning the tax provisions of the separate local jurisdictions (see Section Two).

explained from a theoretical point of view. However, within the process of fiscal decentralization and local self-governance in the Republic of Bulgaria, the inability of the municipalities to grant *tax exemptions and reliefs* at their own discretion is unjustified. Moreover, the analysis of the LTFA provisions clearly shows the negative impact of the current system on the volume of budget revenues. Allegedly, the aim of this legislative solution is to ensure equal treatment of tax objects and taxpayers on a national scale. However, it is worth noting that the same effect can be achieved without limiting the fiscal autonomy of municipalities by enforcing national regulations regarding the tax base and a list of legitimate tax exemptions.

Local *tax rate assignment* is the most important component of regional tax revenue autonomy. In Bulgaria, the lower and upper limits of the annual local tax rates are provided for with amendments of the LTFA. Such a practice has certain advantages as well as disadvantages. On the one hand, it undoubtedly provides a certain degree of municipal fiscal autonomy and creates basic (but not sufficient) conditions for better financial responsibility and political accountability. On the other hand, it creates at least three types of problems, such as:

1) the specific lower and upper limits for the local tax rates;

2) regulatory sustainability;

3) restrictions imposed by the national government.

The first problem stems from the practical impossibility to justify lower and upper tax rate limits that are objective and acceptable for all municipalities. Currently, these limits are set as projections based on historical data and do not take into account the actual fiscal needs of municipalities or the changes in the economic situation on a national scale. The problem is aggravated further by the existing economic, demographic and social disparities among the separate local jurisdictions. The second problem is related to the fact that the upper and lower limits are modified too frequently in our country. This creates problems for the strategic planning and rational behaviour of taxpayers as well as local governments.

Of particular interest is the third of these issues, because it concerns the fundamental question of whether central regulations are needed. This question is usually discussed in terms of the statutory provision for a tax rate threshold. Some experts believe that "the idea of financial decentralization ... is compromised because municipalities can only increase the rates of the local taxes and fees." (Активно гражданско общество за успешна и прозрачна администрация, 2008, p. 3). We should point out that this view does not take into account the fact that many Bulgarian municipalities actually set tax rates above the threshold provided for by the LTFA, which means that they are not willing to reduce the local tax rates. Moreover, the benefit of such a policy is that in conditions of permanent budget deficits, higher tax rates provide the revenue needed to finance key public goods and services. Therefore, by setting rates above the statutory thresholds, municipalities demonstrate their intention to be independent from the subsidies from the central government and assume the related political risks. Another popular argument against the thresholds is based on the fact that they limit the possibilities for attracting investment and for influencing the local business environment. Although such an opinion is not completely

ungrounded, it does not consider the goal of these thresholds, which is to prevent unfair tax competition and provide incentives for non-fiscal rivalry among the municipalities (e.g. by improving the performance of municipal administration, introducing "one-stop shop" and e-services, etc.) Indeed, the statutory-defined span between the lower and the upper tax rate limits is broad enough to allow some fiscal competition.

The above arguments against lower tax rate limits and their questionable usefulness mean that there is no universal solution. What is interesting is that tax rate ceilings are generally considered appropriate (probably for social or populist reasons). We believe that the current system should be criticised from a principled, theoretically sound and general point of view and should therefore focus on the very idea of central control over property, patent and tourist tax rates. The advantage of absolute local autonomy is that it solves the problems with the assignment of specific rates and with their temporal stability (assuming that the municipal council will not change the rates annually).

The analysis of the parameters in Table 1 is indicative of the degree of municipal revenue autonomy and clearly outlines the areas in which local authorities have fiscal powers. However, the qualitative characteristics of the local tax system in the Republic of Bulgaria should be considered in yet another context as well (Table 2). The theoretical analysis in the preceding sections focuses on the following major questions:

- to what extent the taxes levied in the Republic of Bulgaria can be categorized as sources of own revenue for the local governments;
- to what extent the taxes levied in the Republic of Bulgaria can be categorized as exclusively local, typically local, or parallel;
- what is the type of the Bulgarian system of tax assignment;
- what forms of local taxation are used in Bulgaria;

For the purpose of our study, *own revenue for the local governments* is the revenue that meets the following two basic criteria:

1) it is provided for by the current legislation;
2) its sources, size, and spending are controlled to a large extent by the local government.

From this point of view, the tax revenue to the municipal budgets in Bulgaria should be considered own revenue, because it meets the above criteria, i.e. local taxes are provided for by the current legislation (the LTFA) and municipal councils have a completely independent control over the spending of the collected tax revenue. Also, they can more or less control the size of the local budget revenue because they are authorized to collect the revenues from all local taxes provided for by the LTFA and to set their rates (within the statutory limits). However, they cannot influence the tax base and thus do not have full control over the nominal amount, the sources, and the structure of their tax revenue, but such a *full* control is not required for categorizing a certain type of revenue as own revenue.

The analysis of the main provisions of the national legislation in the field of municipal taxes leads to the conclusion that they cannot categorically be placed in any of the above *theoretical groups of local taxes*. Undoubtedly, the local taxes levied in our country are not

exclusively local, because municipal councils neither have the right to impose new and repeal existing taxes nor to determine the tax base and set their own tax rates. This fact should not be considered a demerit, since, as we already pointed out, the exclusively local taxes following the model of the United States (and to some extent that of Switzerland) are not appropriate for a small unitary state. Strictly speaking, municipal taxes in the Republic of Bulgaria cannot be categorized as typically local, since they only meet the conditions for municipalities to receive the full amount of revenue, to spend the revenue at their discretion, and to collect the taxes. It should be noted, however, that the powers of the central government vested in the Parliament as a legislative authority are much greater than those of the municipal councils. The limits on both the tax base and the tax amount as well as any reliefs or exemptions and all fiscal procedures are statutory.

Table 2

Other fiscal autonomy parameters – a comparative analysis of the four theoretical constructs and the actual local taxes in Bulgaria

Parameter	Theoretical interpretation	National practice
Classified as a source of own revenue	Statutory defined own revenue; Its sources, amount, and spending is controlled by the local governments	Local taxes in Bulgaria can be considered sources of own revenue for the municipalities
Classification in terms of taxing power	According to the extent of taxing power of the municipalities, taxes are classified into exclusively local, typically local, parallel, and shared	Local taxes in Bulgaria can be classified as "typically local with statutory limits"
Tax assignment model	The models can be classified as extremely centralized, extremely decentralized, and mixed. The mixed model can be organized according to 6 approaches	Bulgarian municipalities operate according to a mixed model with the centralized assignment. The model is partially applied
Forms of local taxation	In unitary countries with a statutory VAT the local taxes should include: property tax and income tax	The main source of own revenue for the Bulgarian municipalities is the property tax. The tourist tax is turnover-based

Despite these doubts, municipal taxes in the Republic of Bulgaria meet most of the theoretical criteria for the group of autonomous (typically local) taxes. For the purposes of this study, they can be defined as "*typically local taxes within statutory limits*." In terms of the OECD's Classification (as of 2019), the municipal taxes in our country should be considered as a specific case of Type B2 levies (the recipient SCG can set the tax rate, and a higher level government does set upper and/or lower limits on the rate chosen).

There is no parallel taxation in Bulgaria, which logically means that municipalities cannot impose surcharges on the taxes collected by the central government. Not only is this a disadvantage, but also there is no tax sharing along with the vertical levels of the public sector. Although such taxes cannot be classified as sources of own revenue for the local governments, they can generally be used for corrections of fiscal distortions (both horizontal and vertical).

The specific statutory provisions classify Bulgaria' *tax assignment model* in the mixed models' group. The existing types of local taxes are indicative of the actual fiscal independence of the local governments and the degree of their responsibility to the local citizens. The local tax structure and techniques in the Republic of Bulgaria lead to the conclusion that taxes on property and change in ownership of property are sources for own fiscal revenue for the municipalities, i.e. the central government has assigned in full property taxation to the local governments. The license tax is levied on certain activities and tourist tax is based on turnover. The decision to assign the revenue from the three groups of taxes to the municipal authorities is logical and theoretically justified – they meet the optimality criteria because they are levied in proportion to the consumption of local public goods, their collection is relatively easy, and they do not affect the fiscal, monetary, and trade policy of the central government. Therefore, such a regulatory provision has a highly positive effect.

The nub of the problem with the structure and techniques of local taxation in the Republic of Bulgaria lies elsewhere. It stems from the fact that apart from the taxes discussed above, all other taxes levied in our country are collected and spent entirely by the central government. This means that all *major* sources of fiscal revenue are used by the central government, which defines the related tax bases, rates, and reliefs and spends the revenue entirely on its own discretion. The main flaw of Bulgaria's fiscal system is that municipalities are deprived of direct or indirect (through revenue sharing) access to the revenue from individual and corporate income taxes as well as VAT and excise duties. The fact that the revenue from taxes on consumption, such as VAT and excise duties, is collected and spent by the central government is understandable for a small, unitary country. In terms of economic efficiency, the corporate income tax should also be centrally regulated. However, there is no reason why the revenue from those taxes (or any of them) should not be shared directly by the sub-national governments since the revenue from consumption taxes and the corporate income tax is the main source of the government subsidies to the municipal budgets. A direct sharing of the revenue from VAT, excise duties and income taxes is just one of the options for changing the financial relationships between regional levels of government. Another and definitely more appropriate (own) source of revenue for the local governments is the individual income tax. The current practice whereby they cannot share the revenue directly from this type of tax is unjustified and subject to improvement. In fact, the individual income tax can easily be collected as a parallel tax.

The limited scope and the specific types of local taxes in our country have some more important disadvantages. On the one hand, this system makes the municipalities fiscally dependent on central transfers and thus deprived of incentives (and real opportunities) for efficient and responsible governance in the interest of the local residents. On the other hand, only the revenue from the licence tax and the tax on the onerous acquisition of property are based on economic results from the activities of the taxed entities. In this context, municipal budget revenue is relatively independent from the quality of local government, thus further compromising the benefits (economic, political and socio-cultural) of public sector decentralization.

Overall, the analysis of tax assignment parameters (levying of taxes, setting of tax bases, rates, and reliefs) and the specific forms of local taxation leads to the conclusion that the *qualitative autonomy of Bulgarian municipalities is very limited*. The main arguments for this conclusion are not related to the lack of statutory rights in respect of some of the parameters (including tax collection and determining the tax base) but rather to:

1) the limited scope of the statutory local taxes;

2) the statutory upper and lower limits of the local tax rates.

The qualitative assessment of the local tax revenues leads to the conclusion that the tax system of the Republic of Bulgaria does not comply with the declared intention to implement the principles of local self-government and regional economic initiative. Moreover, the centralized approach to taxation runs counter to the subsidiarity principle of the European Charter of Local Self-government.

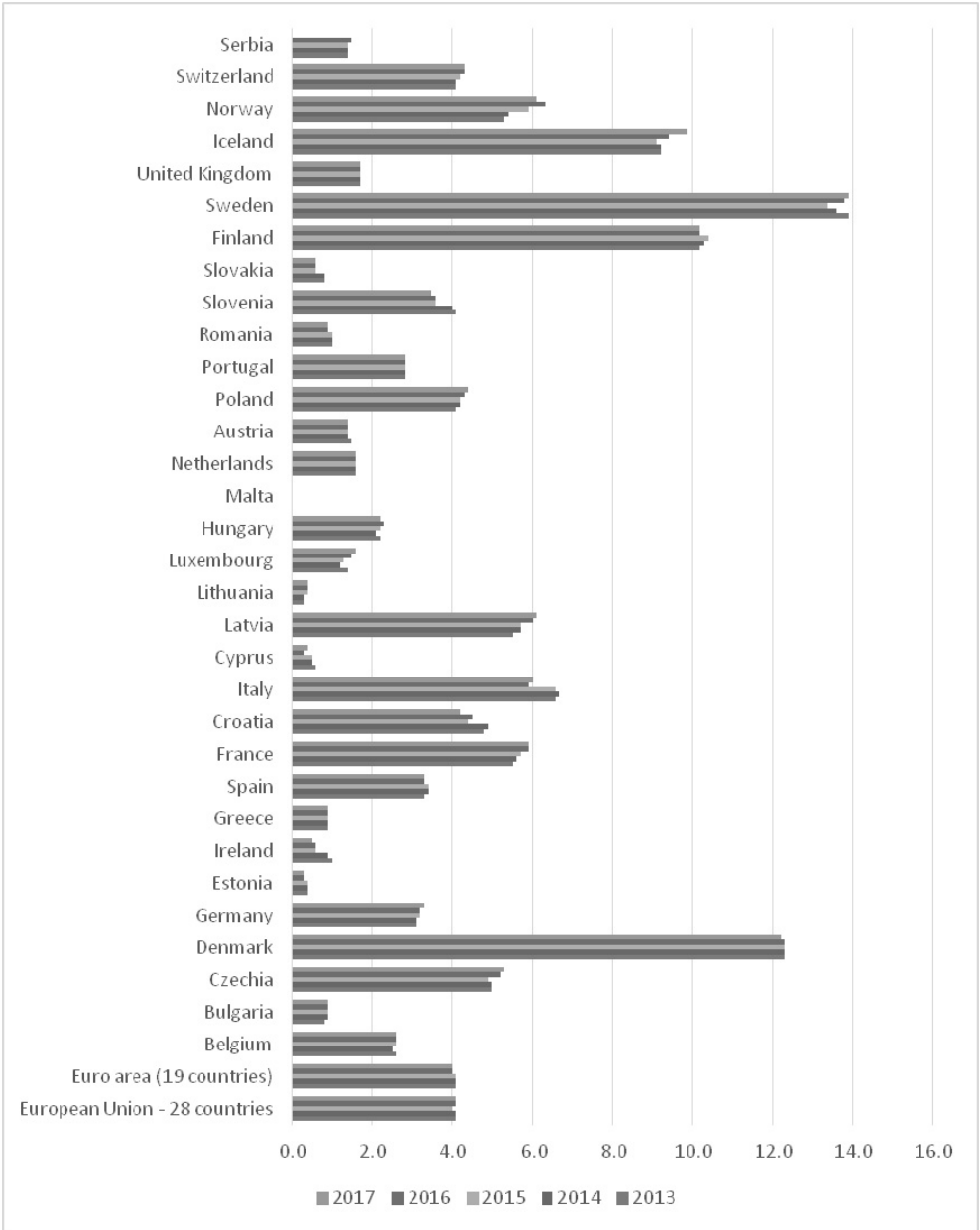
It should be objectively taken into account that the system of distribution of tax powers between the central government and the municipalities adopted in Bulgaria, although contrary to the spirit of the LSLAA and the intentions set out in the Decentralization Strategy and the Program for its Implementation, is a possible option for improving the vertical fiscal relationships. However, the system adopted in our country is feasible only when the local governments are responsible for the provision of a limited range of public goods and services for which they spend a relatively small amount of their budgets. Therefore, the *amount of municipal budget spending* is of primary importance. Limited revenue autonomy and significant spending responsibilities make Bulgarian municipalities highly dependent on central transfers. The above considerations lead to the conclusion that we need to reorganize the system of tax assignment in order to provide local governments with more tax revenue.

2.2. Comparative analysis of Bulgarian municipalities' financial autonomy

The narrow scope of the statutory local taxes and the limits regarding their rates affects the actual amount of local budget revenues and their relative share of GDP. According to Eurostat (see Figure 1 with the last updates as of 19 July 2019) from 2008 to 2017 the revenue from local taxes as a percentage of GDP in the Republic of Bulgaria varied between 0.7% in 2010 to 0.9% in 2017. In 2008, it reached 0.9% of the GDP and remained unchanged over the last four years of the survey period (2014 through 2017). At the same time, in 2017 the same index was 13.9% in Sweden and 12.2% in Denmark and much lower in Lithuania (0.4%), Estonia (0.3%) and Slovakia (0.6%). The EU-28 average in 2017 was 4.1%, compared to 3.9% in 2008. Therefore, local tax revenue as a percentage of GDP in Bulgaria for the period 2014-2017 was 4.5 times lower than the EU-28 average, i.e. Bulgaria's municipal budgets receive 4.5 times less revenue as a percentage of GDP compared to the average EU-28 Member State. In 2008, the Bulgarian municipalities received 4.3 times less revenue as a percentage of GDP compared to the average local revenue-to-GDP level in the EU-28 Member States. This indicates a rather negative trend of widening of the gap between Bulgaria and the other EU Member States instead of the expected "catching-up".

Figure 1

Local government revenue (incl. taxes and social security contributions) as a percentage of GDP (2013-2017)



Source: Eurostat, Last update 19 July 2019 (Eurostat, 2019).

According to the statistical data shown in Figure 1, the EU Member States may be classified into three groups. The first group comprises the countries whose local revenue-to-GDP ratio is above the European average. This group includes Sweden, Denmark, and Finland.

The second group comprises the countries whose local income-to-GDP ratios are below the European average. In 2017, this group includes Estonia (0.3%), Ireland (0.5%), Greece (0.9%), Cyprus (0.4%), Lithuania (0.4%), Slovakia (0.6%) and Bulgaria.

The third group comprises the countries whose local revenue-to-GDP ratios are close to the European average. This group includes France (5.9%), Germany (3.3%), Croatia (4.2%), Italy (6.0%), Latvia (6.1%), Poland (4.4%), Slovenia (3.5%), the Czech Republic (5.3%), and Spain (3.3%).

Indicative of the limited tax autonomy of local authorities in the Republic of Bulgaria is the ratio of municipal revenues to the total amount of state revenues. According to Eurostat data (see Figure 2 with the last updates as of 19 July 2019), the share of municipal revenue in the total receipts from taxes in the Republic of Bulgaria varies from 6.7% in 2008 to 7.4% in 2017 while the EU-28 average ratio was 11.0% in 2008 and 10.7% in 2017. The highest ratios in 2017 were reported for Denmark (33.9%), Sweden (24.9%), and Finland (21.7%.) This means that the tax revenue of the Bulgarian municipalities as a percentage of the total tax revenue was between 1.6 (in 2008) and 1.4 (in 2017) times lower than the EU-28 average. Regardless of this fact, the trend regarding this index is positive. At the same time, the same ratio in Sweden and Finland is more than twice as high as the EU-28 average, and the ratio of Denmark is three times above the European average. In 2017, low ratios were reported for Malta (0.4%), Cyprus (1.6%), Ireland (2.3%), and Greece (3.8%).

According to the share of municipal revenues in their total tax revenues, the 28 EU Member States may be classified into three groups. The first group comprises the countries whose ratios are above the EU-28 average, i.e. Denmark, Sweden, Finland, Italy, and Poland. Iceland and Norway, which are not members of the EU, also have ratios that are higher than the EU-28 average.

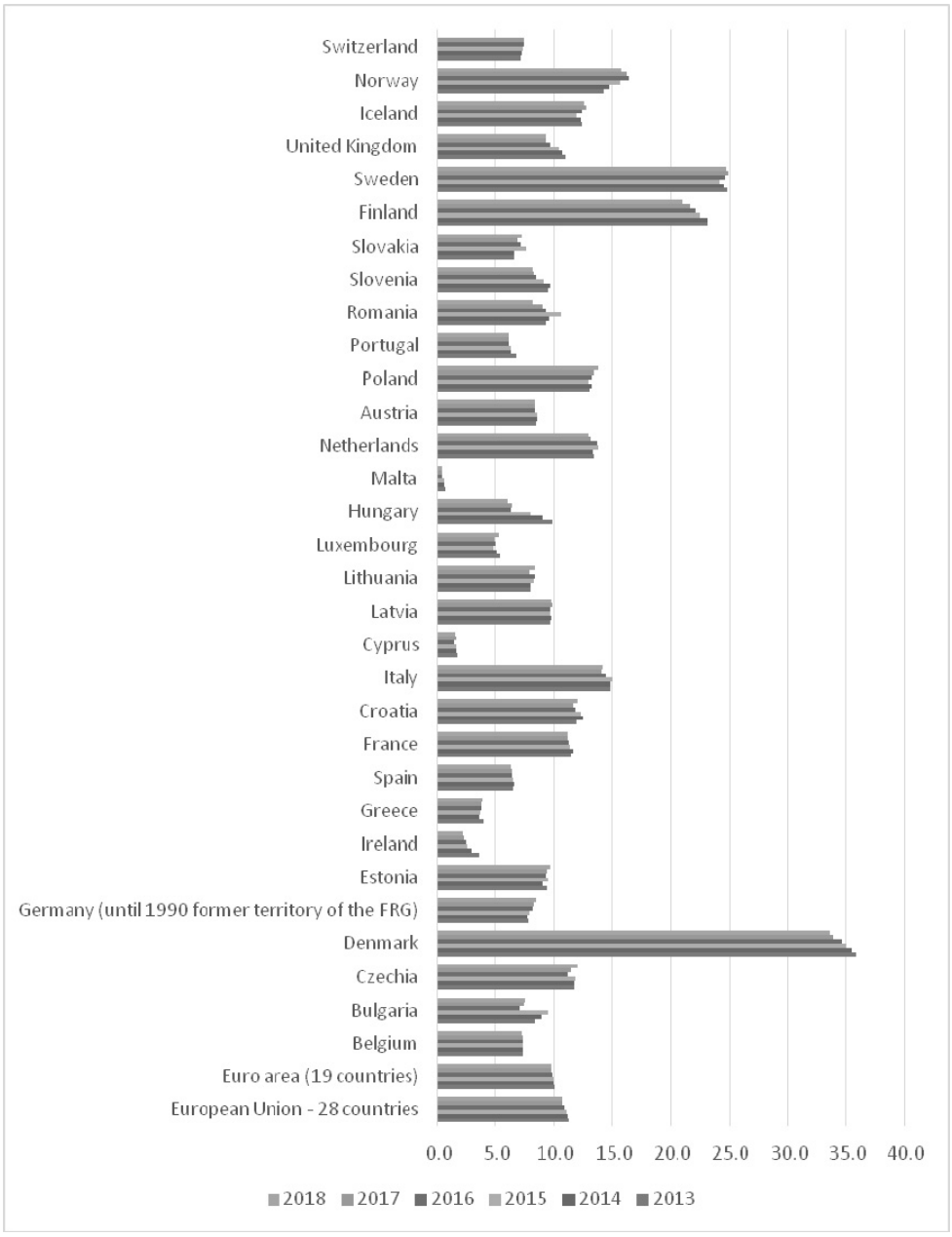
The second group comprises the countries whose ratios are lower than the EU average, i.e. Malta, Cyprus, Ireland, Luxembourg, Greece, Slovakia, Portugal, and Bulgaria.

The largest is the group of countries whose ratios are close to the European average, i.e. Estonia, France, Croatia, Latvia, Austria, Romania, Slovenia, Austria, Czech Republic, and the United Kingdom.

The comparative analysis of some key fiscal autonomy indicators of the EU member states shows that the countries with ratios that are higher than or close to the EU-28 average are able to provide local public goods and services with higher quantity and quality. Both the ratio of local revenues to GDP and the share of municipal revenue in the total government revenue in Bulgaria are lower than the European average, which shows that not only in qualitative but also in quantitative terms, the autonomy of Bulgarian municipalities is limited.

Figure 2

Share of municipal revenue in the total government revenue(incl. social security contributions), % (2013-2018)



Source: Eurostat, Last update 19 July 2019 (Eurostat, 2019).

2.3. Specific measures for reorganization of the system of local government responsibilities and powers

A distinct feature of the current system of vertical allocation of expenditure responsibilities is the *pronounced imbalance between municipal responsibilities regarding their functions and the current system of state-delegated transfers*. In this respect, it should be noted that local functions are financed by own source revenues and an equalization subsidy, while the lack of centrally defined cost standards (except for two types of activities – childcare facilities and home social patronage) allows for an autonomous local policy. Delegated functions are fully funded with a subsidy that ensures that state standards are met, but due to the fact that it does not take into account the territorial origin of the funds, it does not create incentives for effective and efficient local governance. Another feature of the system of vertical allocation of expenditure responsibilities is the *imbalance between the scope of local and state-delegated activities* – the former represent a small part of municipal responsibilities and therefore the broad powers over their exercise and characteristics do not indicate a high degree of local autonomy. This fact was emphasized in the report on Bulgaria at the Congress of Local and Regional Authorities in the EU, which states that "as long as that imbalance persists, the financial autonomy of municipalities will be reduced." (Перейра & Совенс, 2011, стр. 15). The situation requires measures to expand the range of local functions. This can be achieved in two ways: 1) by transferring to municipalities some of the functions that are currently a responsibility of the central government; and 2) reducing the share of delegated activities in the structure of local government-funded functions. The second option is considered a priority, but nonetheless, the other options should not be regarded as mutually exclusive. Thus, local public goods should be provided and funded by the government that is closest to the citizens (Стоилова, 2009, с. 11-16). Therefore, the division between delegated powers and authorities' own powers should be reconsidered.[9] This is logical, given the fact that the currently delegated functions meet all requirements for local functions. However, the restructuring of municipal activities should be accompanied by an increase in the relative share of municipal tax revenues, both as a share of GDP and as a share in the total government revenue.

Expanding the scope of local government powers, as already mentioned above, would create conditions for real spending autonomy while respecting the principles of subsidiarity. However, for the sake of cost-effectiveness, local costs should be financed by local sources. For this reason, the recommendation on the granting of greater responsibilities at the disposal of the municipal authorities should be supplemented by an analysis of the possibilities for *expanding their sources of own revenue*. There are several factors to consider in this respect. First of all, the revenue potential of municipal property (income from rents and privatization) is limited. Although there are certain possibilities for increase of the revenue from rents, which is possible and advisable, and there are also unused public-private partnership opportunities, these sources cannot provide sufficient funds to cover the cost of local functions. The revenue from fees and service charges, on the other hand, are intended to finance the provision of specific local public goods and should not be

[9] For more details and arguments for abolishing the division between delegated powers and authorities' own powers, see Programme for Implementation of the Decentralization Strategy 2010-2013 (Съвета по децентрализация на държавното управление, 2010).

used as a tool for effective taxation. This means that the system of local taxation should be improved and new types of tax should be levied.

According to the provisions of the LTFA, municipal councils should determine with ordinances the amount of the local taxes per unit of tax base within certain statutory limits set by the central government. This provision has both merits and demerits. It is true that Bulgarian municipalities were the last local governments in the EU that were given the right to determine themselves the amount of their local taxes. However, it is true that this is a positive step towards municipal self-government and financial independence of local governments in Bulgaria. The provision was enforced after an amendment to the Constitution and, accordingly, to the LTFA, and is an important condition for the adoption of all forms of decentralization. However, it is criticised with regard to the lower tax rate limit. The main argument against this limit is that it does not allow the municipalities to reduce certain taxes and therefore provide tax reliefs for some of the local citizens. However, it should be noted at the outset that, all other things being equal, a reduction in own revenue would require an increase of the equalization subsidy and thus affect the redistribution of funds from the state budget. Therefore, a tax relief for a certain group of citizens will increase of the tax burden for the rest of the citizens of the Republic of Bulgaria. The argument that local tax rates below the statutory lower limit would attract foreign investments is ungrounded as well. The lower limit gives equal opportunity to all municipalities to compete for foreign investments. The same result could be achieved even if there were no such limit, since their rivalry for foreign investments would set the local tax rate at a certain optimal level. Therefore, the authors believe that the tax rates should not be reduced below the limit provided for by the LTFA.

The objective analysis of the statutory tax rate limits shows that the tax burden actually depends on the upper limit rather than the lower one. The simple fact that statutory upper limits are provided for leads to the conclusion that the citizens are protected from the uncontrolled reduction of their disposable income.

A disadvantage of the current LTFA is the fact that municipal tax revenue is not related to the economic activities of municipalities. While the conflicting interests of the local and central governments are not in the interest of the whole country, in this particular case, the negative effects are borne by the local governments. This, on the one hand, the low relative share of own revenues to total municipal revenues, limits the financial capacity of local governments and calls into question the achievement of the goals set in the decentralization strategy and program. Another negative factor is the low relative share of municipal revenues from own sources in the total municipal revenue, which limits the financial capacity of the local governments and hinders the implementation of the decentralization objectives set in the national Decentralization Strategy and the programme for its implementation. For example, according to Decentralization Strategy 2016-2025, “Measure 1, Priority 2 of Strategic Objective 1 was not implemented “Improvement of the regulatory framework of local taxes and fees”, including the conversion of part of the state personal income tax into a local tax” (Министерство на регионалното развитие и благоустройството, 2016, с. 31). Considering these facts, it is logical to conclude that "one of the aspects of tax autonomy of local authorities is the ability of municipalities (local structures) to have sufficient financial resource to pursue goals, activities, and projects

independently, without government support and funding" (Павлова-Бънова, 2018, стр. 13), i.e. municipal revenue should be increased through statutory provisions for new revenue sources, including:

1. Parallel personal income taxation.
2. The revenue from the tax on rental income or other consideration for the use of rights or property should be collected by the municipality on whose territory is located the leased property.

The key benefits from these new sources of municipal revenue are;

First. They provide municipal revenue in proportion to the number and size of the businesses that operate on the territory of the municipality, which is important for several reasons, including:

- Municipalities are interested in increasing the number of jobs on their territory, which is directly related to the scope of activities of the local businesses;
- Municipalities are interested in increasing the personal income of their citizens;
- The growth of local businesses and the related increase of personal income improve the quality of life of the local citizens and their purchasing power, which has a positive effect for the development of local business.

Second. They create incentives for a comprehensive and timely collection of the individual income tax and the tax on rents and increase the control over their administration.

Third. They would increase the share of revenue from own sources in the total municipal revenue and thus increase the financial autonomy of the local government.

Fourth. They would reduce the imbalance between the functional responsibilities and the revenue of the municipalities;

Fifth. They creates conditions for improvement of the scope and quality of the local public goods and services.

A reform in the field of local taxation should also take into account what Stancho Cholakov referred to as "individual and corporate tax tolerance", i.e. the extent to which individual and business would avoid the risk of evading taxes. Note that "the higher their income, the higher tax tolerance is, which means that they would tolerate higher tax rates." (Чолаков, 1936). However, the three bases for taxation – income, consumption, and property – are based on income. Therefore, the proportion of tax bases is essential both in terms of national tax policy as an element of the national financial policy and in terms of financial decentralization and municipal self-government the ratio of taxable tax bases. The tax burden of property taxes as a source of own revenue for municipalities can be defined as second-tier since a tax on the primary income has already been levied for the state budget. In respect, the "tax tolerance" of legal entities and natural persons should be estimated, taking into account the fact that it is affected by consumption taxes as well.

The theoretical concepts regarding the financial autonomy of local governments lead to the conclusion that the statutory provisions for parameters related to local taxes, incl. tax base, tax amount, tax liability are explicit and often ambiguous. The powers of local governments to include or exclude certain elements from the tax amount and to set tax rates beyond the statutory limits are limited. The list of exemptions is long, the possible reliefs are defined meticulously and thus the powers of the local authorities are very limited. A fiscal reform should address issues such as clear legal differentiation of state from the municipal property; reorganization of the structure of municipal and state-delegated functions; property taxes that are levied on already taxed objects; ensuring the financial independence of municipalities; increasing the quantity and quality of local public goods; linking municipal revenues with their economic activity, etc. In other words, the local tax system should be simplified, and the remaining exemptions that apply to all taxes should be pooled, defined clearly and listed in section one of the Local Taxes and Fees Act.

The analysis of the propositions for improvements in regulations regarding local taxes is in line with National Development Program: Bulgaria 2030, adopted by Decision No. 33 of the Council of Ministers of January 20, 2020. For example, Development Axis 3. Integrated Bulgaria aims "to create conditions for increasing the competitiveness and sustainable development of the regions…." (Министерство на финансите на Република България, 2020). Special attention is given to the Local Development priority, which focuses on the territorial unit with its specific characteristics and needs. Emphasis is put on objectives such as employment and growth, environmental quality, adaptation to adverse climate changes, infrastructural investment, better access to public services. The implementation of the Local Development Priorities of the National Development Program Bulgaria 2030 requires an increase of the financial resources of the local governments.

Conclusion

The theoretical analysis of the tax assignment approaches and the comparative analysis of the theoretical interpretations and the actual values of Bulgaria's key fiscal autonomy indicators lead to the conclusion that local governments' fiscal autonomy is a key factor for adherence to the principles of fiscal decentralization. Being of paramount importance, fiscal decentralization requires a revenue system (including tax collection) that would ensure an optimal structure of the public sector and increase the efficiency of both levels of governance.

Considering the stated goal and tasks as well as the specific characteristics of the balanced approach to assessing the regional tax autonomy in the Republic of Bulgaria, the authors have formulated the following main conclusions and recapitulations:

First. Local government fiscal autonomy is defined as the opportunity or the right of local governments to pursue an independent local tax policy in accordance with their own priorities and in the interest of the local community.

Second. The assessment of the fiscal autonomy of local governments following the balanced approach proves the positive effects of a multi-tiered administration structure and budget revenue (including tax collection) autonomy of local governments.

Third. The analysis of the key fiscal autonomy indicators of Bulgarian municipalities (tax imposition, tax base definition and setting of local tax rates, setting of tax reliefs, collection and spending of local taxes) leads to the conclusion that their autonomy is qualitatively limited.

Fourth. The empirical analysis aiming to determine the position of Bulgarian municipalities in comparison with their EU counterparts, has shown that the values of the indicators characterizing the financial autonomy of Bulgarian municipalities are below the EU-28 average.

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Appendix 1

Local government revenue (incl. taxes and social security contributions) as a percentage of GDP (2008-2017)

GEO/TIME	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
European Union – 28 countries	3.9	3.9	3.8	4.0	4.1	4.1	4.1	4.0	4.1	4.1
European Union – 27 countries (2007-2013)	:	:	:	:	:	:	:	:	:	:
European Union – 25 countries (2004-2006)	3.9	3.9	3.8	4.0	4.1	4.2	4.1	4.1	4.1	4.1
European Union – 15 countries (1995-2004)	4.0	4.0	3.8	4.1	4.2	4.2	4.2	4.1	4.1	4.2
Euro area (19 countries)	3.8	3.8	3.6	3.9	4.0	4.1	4.1	4.1	4.0	4.0
Euro area (18 countries)	3.8	3.8	3.6	3.9	4.0	4.1	4.1	4.1	4.0	4.0
Euro area (17 countries)	3.8	3.8	3.6	3.9	4.0	4.1	4.1	4.1	4.0	4.0
Euro area (16 countries)	3.8	3.8	3.6	3.9	4.0	4.1	4.1	4.1	4.0	4.0
Euro area (15 countries)	3.8	3.8	3.6	3.9	4.1	4.1	4.1	4.1	4.0	4.0
Euro area (13 countries)	3.9	3.8	3.6	3.9	4.1	4.1	4.1	4.1	4.0	4.1
Euro area (12 countries)	3.9	3.8	3.6	3.9	4.1	4.1	4.1	4.1	4.0	4.1
Euro area (11 countries)	3.9	3.9	3.7	4.0	4.1	4.2	4.2	4.2	4.1	4.1
Belgium	2.4	2.7	2.6	2.6	2.5	2.6	2.5	2.6	2.6	2.6
Bulgaria	0.9	0.8	0.7	0.8	0.8	0.8	0.9	0.9	0.9	0.9
Czechia	4.7	4.5	4.5	4.6	4.6	5.0	5.0	4.9	5.2	5.3
Denmark	11.2	11.7	12.1	12.1	12.2	12.3	12.3	12.3	12.3	12.2
Germany	3.2	3.0	2.9	3.0	3.1	3.1	3.1	3.2	3.2	3.3
Estonia	0.4	0.4	0.5	0.5	0.4	0.4	0.4	0.4	0.3	0.3
Ireland	1.0	1.0	1.0	1.0	1.0	1.0	0.9	0.6	0.6	0.5
Greece	0.7	0.7	0.8	0.8	0.9	0.9	0.9	0.9	0.9	0.9
Spain	2.8	2.7	2.9	2.9	3.1	3.3	3.4	3.4	3.3	3.3
France	4.9	5.2	4.2	5.4	5.5	5.5	5.6	5.7	5.9	5.9
Croatia	4.4	4.4	4.4	4.4	4.7	4.8	4.9	4.4	4.5	4.2
Italy	6.5	6.0	6.1	6.2	6.7	6.6	6.7	6.6	5.9	6.0
Cyprus	0.5	0.5	0.5	0.5	0.4	0.6	0.5	0.5	0.3	0.4
Latvia	5.3	5.1	5.8	5.5	5.5	5.5	5.7	5.7	6.0	6.1
Lithuania	0.4	0.5	0.5	0.5	0.5	0.3	0.3	0.4	0.4	0.4
Luxembourg	1.7	1.7	1.6	1.7	1.5	1.4	1.2	1.3	1.5	1.6
Hungary	2.6	2.6	2.4	2.4	2.4	2.2	2.1	2.2	2.3	2.2
Malta	:	:	:	:	:	:	:	:	:	:
Netherlands	1.4	1.5	1.5	1.5	1.6	1.6	1.6	1.6	1.6	1.6
Austria	1.4	1.5	1.4	1.4	1.4	1.5	1.4	1.4	1.4	1.4
Poland	4.7	4.2	4.0	4.0	4.1	4.1	4.2	4.2	4.3	4.4
Portugal	2.6	2.5	2.4	2.5	2.5	2.8	2.8	2.8	2.8	2.8
Romania	0.9	0.9	1.1	1.1	1.0	1.0	1.0	1.0	0.9	0.9
Slovenia	3.3	3.8	4.1	4.1	4.2	4.1	4.0	3.6	3.6	3.5
Slovakia	0.7	0.7	0.7	0.7	0.7	0.8	0.8	0.6	0.6	0.6
Finland	9.0	9.7	9.9	9.7	9.7	10.2	10.3	10.4	10.2	10.2
Sweden	14.3	14.5	13.5	13.4	13.8	13.9	13.6	13.4	13.8	13.9
United Kingdom	1.8	1.9	1.8	1.8	1.8	1.7	1.7	1.7	1.7	1.7
Iceland	8.9	8.5	8.2	8.9	8.9	9.2	9.2	9.1	9.4	9.9
Norway	4.9	5.7	5.7	5.1	5.2	5.3	5.4	5.9	6.3	6.1
Switzerland	4.1	4.2	4.1	4.1	4.1	4.1	4.1	4.2	4.3	4.3

Source: Eurostat, Last update 19 July 2019 (Eurostat, 2019).

Appendix 2

Share of municipal revenue in the total government revenue(incl. social security contributions), % (2008-2018)

GEO/TIME	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
European Union – 28 countries	11.0	11.7	11.5	11.3	11.4	11.3	11.2	11.1	10.9	10.7	10.7
European Union – 27 countries (2007-2013)	:	:	:	:	:	:	:	:	:	:	:
European Union – 25 countries (2004-2006)	11.1	11.7	11.6	11.4	11.5	11.3	11.2	11.1	10.9	10.7	10.7
European Union – 15 countries (1995-2004)	11.0	11.7	11.6	11.4	11.5	11.3	11.2	11.1	10.9	10.8	10.7
Euro area (19 countries)	9.8	10.4	10.1	10.0	10.1	10.1	10.0	10.0	9.9	9.8	9.8
Euro area (18 countries)	9.8	10.4	10.1	10.0	10.1	10.1	10.0	10.0	9.9	9.8	9.8
Euro area (17 countries)	9.8	10.4	10.1	10.0	10.1	10.1	10.0	10.0	9.9	9.8	9.8
Euro area (16 countries)	9.8	10.4	10.1	10.0	10.1	10.1	10.0	10.0	9.9	9.8	9.8
Euro area (15 countries)	9.8	10.5	10.2	10.0	10.1	10.1	10.1	10.0	9.9	9.8	9.8
Euro area (13 countries)	9.8	10.5	10.2	10.1	10.2	10.2	10.1	10.1	9.9	9.8	9.8
Euro area (12 countries)	9.8	10.5	10.2	10.1	10.2	10.2	10.1	10.1	10.0	9.8	9.8
Euro area (11 countries)	10.0	10.7	10.4	10.2	10.3	10.3	10.2	10.2	10.1	9.9	9.9
Belgium	7.1	7.3	7.1	7.2	7.1	7.3	7.3	7.3	7.3	7.3	7.2
Bulgaria	6.7	7.4	7.2	6.6	6.8	8.3	8.9	9.5	7.0	7.4	7.5
Czechia	11.5	12.3	12.3	12.0	11.2	11.7	11.7	11.8	11.2	11.5	12.0
Denmark	31.9	35.2	35.7	35.7	35.9	35.8	35.5	35.0	34.6	33.9	33.6
Germany	7.6	7.7	7.5	7.7	7.6	7.8	7.7	7.9	8.1	8.2	8.4
Estonia	10.1	10.8	10.0	9.4	9.5	9.4	9.1	9.5	9.3	9.4	9.7
Ireland	6.6	6.1	5.4	4.7	4.2	3.6	2.9	2.5	2.4	2.3	2.2
Greece	3.6	4.1	3.5	3.3	3.6	4.0	3.6	3.7	3.8	3.8	3.9
Spain	6.0	6.5	6.4	6.0	6.2	6.5	6.6	6.5	6.4	6.4	6.3
France	10.7	11.6	11.4	11.4	11.5	11.5	11.6	11.4	11.3	11.2	11.2
Croatia	12.0	11.8	12.0	11.5	12.1	11.9	12.5	12.3	11.8	11.6	12.0
Italy	14.9	16.1	15.3	14.8	15.1	14.9	14.8	15.0	14.4	14.0	14.1
Cyprus	1.7	1.9	2.0	2.1	1.8	1.7	1.6	1.6	1.4	1.6	1.5
Latvia	10.6	11.0	11.7	10.3	9.7	9.7	9.8	9.7	9.7	9.9	9.8
Lithuania	9.0	10.3	11.2	9.6	9.1	8.0	8.0	8.2	8.3	7.9	8.3
Luxembourg	5.4	5.5	5.4	5.3	5.5	5.4	5.1	4.8	5.0	4.9	5.3
Hungary	11.4	11.5	11.6	12.0	9.7	9.9	9.1	8.0	6.3	6.4	6.0
Malta	0.5	0.6	0.7	0.7	0.7	0.7	0.6	0.6	0.4	0.4	0.4
Netherlands	13.7	15.0	14.6	14.4	14.2	13.4	13.3	13.8	13.7	13.1	12.9
Austria	8.0	8.3	8.2	8.1	8.2	8.4	8.5	8.5	8.3	8.3	8.3
Poland	13.9	13.4	13.7	13.3	13.0	13.0	13.2	12.9	13.2	13.4	13.8
Portugal	6.5	6.7	6.6	6.7	6.7	6.8	6.3	6.3	6.1	6.1	6.1
Romania	8.4	8.8	9.5	9.8	9.2	9.3	9.6	10.6	9.3	9.1	8.1
Slovenia	8.4	9.3	9.6	9.4	9.6	9.5	9.7	9.2	8.4	8.2	8.1
Slovakia	6.1	6.6	6.4	6.6	6.5	6.6	6.6	7.6	7.1	6.9	7.2
Finland	19.6	21.7	22.2	22.0	22.3	23.1	23.1	22.5	22.1	21.7	21.0
Sweden	23.5	24.6	24.0	23.8	24.5	24.8	24.5	24.2	24.6	24.9	24.7
United Kingdom	12.0	12.7	12.8	12.1	12.1	11.0	10.7	10.4	9.7	9.3	9.3
Iceland	12.4	11.8	11.6	12.2	12.2	12.4	12.3	11.9	12.4	12.7	12.6
Norway	11.9	14.1	14.1	13.9	14.0	14.2	14.7	15.7	16.4	16.2	15.8
Switzerland	7.0	7.3	7.1	7.2	7.1	7.1	7.2	7.3	7.4	7.4	:

Source: Eurostat, Last update 19 July 2019 (Eurostat, 2019).

ИКОНОМИЧЕСКИ ИЗСЛЕДВАНИЯ
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POLICY CONCERNING THE HTTP COOKIES

The intensive expansion of the digital economy poses new challenges to the regulatory framework and corporate privacy policies for individuals. The enforcement of the EU's General Data Protection Regulation is triggering a new approach to the scope of personal data and the rules for their administration. There is a need for a complete reorganization of the ways in which websites study the behaviour and characteristics of online content users, which determines a change of the cookie policy out of the hidden internet area towards an unconditional need for explicit consent to their use for whatever purposes.

This work provides theoretical basics about the nature and variety of HTTP cookies as a web tool. It outlines what changes result from the introduction of regulatory instruments and corporate policies for the protection and administration of the personal data of individuals in real and electronic environments. On this basis, the use of cookies in modern webpages and sites has been explored, which serves to implement varied changes in the proposed internet content to achieve conversion and the resulting economic and social effects.

JEL: L86; K00; K19; K39

Introduction

The entry into force on 25 May 2018 of the General Data Protection Regulation (GDPR) (Regulation (EU) 2016/679 of the European Parliament and of the Council of 27 April 2016 on the protection of natural persons with regard to the processing of personal data and on the free movement of such data, and repealing Directive 95/46/EC 2016), imposes a series of new rules for the protection of personal information which can identify each person as a consumer and customer. Mandatory implementation of the regulation sets out a number of new obligations for business, related to the responsible collection and processing of personal data, regardless of where it takes place inside or outside the Union. In the modern digital age, each internet user visits multiple web pages or sites on the global network, where significant information is transferred between the web server and the internet browser used for web content view. One part of the exchanged packages is related to the use of "HTTP Cookies" or only "Cookies". They are a tool for collecting accurate user information without affecting the user's internet experience, as it takes place in a

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conditionally hidden process that occurs while browsing and studying a website. Their existence, application and functionality ensure electronic content providers with specific consumer information that can enhance the efficiency and precision of the digital relationship. However "the development and deployment of cookies technology in the last … years has been the most significant – and most controversial" (Peters, 1999, p. 275) phenomenon. It is related to the business ethics of the application of cookies, the level of their aggression, which is an expression of a loyalty policy to consumers, in addition, it may be in the relationship and exchange of information with the consumer data market and the possibilities for their use by third parties for a variety of objectives.

The purpose of this work is to systematize the essence of cookies as a modern tool for collecting information about end-user work in an internet environment.

In this study, the terms website and webpage are used with a high degree of conditionality as very close concepts, despite the difference between them. The most common design of a website is a collection of webpages that are addressed by a single domain. Technically, at any point in its online experience, the user views the content of a web page, even though he/she can visit a website.

A further limitation of the conducted survey is the use of secondary statistical information by Q-Success DI Gelbmann GmbH (W3Techs), which is collected and processed according to a specific company methodology and automated algorithm and can be accomplished with certain conditionality and constraints related to representativeness of the data that the company defines as "include only the top 10 million websites (top 1 million before June 2013) in the statistics… they serve our purpose of providing a representative sample of established sites very well" (W3Techs, 2018).

In its legal definition, personal data is any information about the physical person that allows his/her individualization and clear distinction as identity. In its most recent definition, GDPR also allows personal data to be expressed using online identifiers. This extension of scope is a logical and quite natural product of tangible social development driven by the evolution and importance of information and communication technologies for contemporary public and private life. Therefore, the use of cookies today requires the user's explicit consent to the use of information society products in an electronic internet environment as it may be directly or indirectly linked to the processing of personal data of the physical entity. In this way, part of the internet experience may be accompanied by the invisible process of exchanging personal data and is therefore currently covered by a specific regulatory framework and administrative treatment regime.

HTTP Cookies: Theoretical Background

In their programmable nature, cookies are a minimal component or message that is applied through the HyperText Transfer Protocol (HTTP) and is set by a specific code or programming language. They are defined as "a small piece of information implanted into the HTTP content by the server and used to identify the client on all future visits to the site" (Matthew, Goldie, 2004, p. 127). They exist in the form of a name-value pair that the web

server sends to the internet content viewer. This name-value pair is stored locally and can be saved within a specified or unlimited time as a text file. The specific information accumulated by the browser, including personal data, is sent back to the server at each subsequent visit by the user or within a continuous retrieval of information within a time-limited active session or when contacting the website or page. It follows that its functions can be fulfilled within each subsequent visit, and even within the scope of a longer web browsing or advanced information and communication exchange before the waiting time of the session expires. The information collected and formatted is in the form of a "file through which the user is identified, and thus repeat visits are not counted" (Salova 2014, p. 43), this means that the cookie is a tool for conditional reporting and differentiation of unique from loyal visitors. With regard to the security of online user sessions, it should be kept in mind that cookies do not appear in their pure form as malware, they are not related to automatic execution of commands to manipulate the browser, other programs or the operating system used or other atypical behaviour of computer systems. Cookies play the role of "verification sent back to the programmer that a piece of software code is running smoothly, and that entire process is worthwhile" (Hannaham 1996). However, the specificity of the internet technology, which implies that the participants in the information process are conditionally identified as senders and recipients of digital packets, means that any intermediate and terminal device in the communication process can be relatively accurately identified and thus a seemingly impersonal information is associated with another that is inherently personal data, such as a user IP address. In this way, cookies that are designed to perform a basic information function are a powerful tool through which digital companies can get specific data about their users. Sometimes this data may not have a standalone and direct application but, in combination with other information, it is an effective mechanism for impact and a way to anticipate consumer expectations or to purposefully attempt to stimulate consumer responses. Fields that define the syntax of a cookie may contain different attributes: the activity period, which may be, for example, until the end of the current session or closure of the internet content browser; the domain name, and the internet path that sent the cookie; various settings for restrictions on the recipient of the information gathered. The latter is linked to the possibility that information can be identified and received by a third party, which is again determined by the cookie policy of the internet sites.

One of the main purposes of getting information about the online internet content recipients behaviour when visiting a site is within the current session or on a future visit to that internet address to have a higher level of personalized content tailored to its current or past behaviour and registered activity and responses to a particular internet matter. The information, gathered by many users aggregates to a certain extent, allowing web managers to constantly improve their content and functionality in response to real and active users' reactions and profiling them in homogeneous groups, and even the possibility of highly personalized approach.

The use of cookies in one of the most popular internet applications the browser is related to the ability of a once visited website to recognize its users in a subsequent contact. This means that the user demonstrates interest in the collection of elements on the relevant web page. This is related to the desire to improve the ability of the content provider to manipulate the information sent to respond more fully to user decisions established in

previous contacts. Thus, using the collected data for the user, it is possible to optimize the scope of the presented digital information, taking into account its individual features and preferences. Here, the degree of presentation of personalized digital material should not be absolutized because it is generally designed for certain homogeneous groups of users who exhibit similar or very close behavioural profiles in an internet environment. However, the automation of this process provides an opportunity for these alternatives to be relatively high. Of course, depending on the site's functionality and the security level of the session, customization can also be done on an individual level, such as e-banking, e-mail, virtual commerce, etc. What's more, cookies are a solution through which websites can accurately determine how many actual users were their visitors and what their behaviour was in information dimensions to which we have an economic or other interest. Such a conditional application is implemented by generating a unique user number that is part of the newly created cookie (Brain, 2000) and stored locally at the users' device, serving to distinguish new visitors from those who reached the website earlier. However, this possibility should not be perceived without certain limitations and disadvantages, as cookies cannot distinguish different users accessing a shared computer system. This disadvantage may be conditionally overcome by using individual user accounts to access information on a site, but it is also not a guarantee that the person who is currently viewing certain internet content is the account holder. Again, the latter constraint can be overcome with technologies to recognize the physiological specifics of the individual. Thus, through biometrics (a mathematical approach to recognition through the unique dimensions of the physiology of an individual via dactyloscopy, facial recognition, etc.), it is possible in real time to recognize personality, which again involves sharing a considerable amount of information about the individual and its application for safe identification. Under certain conditions, such an approach is achievable in personal smart devices (smartphones, smart accessories, etc.), where the use of certain features and applications is tied to activating a user account and sharing certain information as personal data, but this is not entirely a secure approach to ensuring credibility and absolute user authentication. Consequently, the ability to identify user behaviour of a specific person by using cookies can not be accepted or presented unconditionally. Additionally, users can change their program settings in the functionalities of today's browsers and Internet content viewers and refuse to accept and / or store cookies, but cookies still remain a “good enough indicator of how many visitors are different” (Salova, 2014, p. 43) or the same. Information related to cookies should not be accepted unconditionally because it provides relatively accurate but not completely reliable information about end-users and their information consumption. However, "cookies can be understood as a database of personal demographic, psychographic, and behavioural information, or as a temporary device for creating a stateful, tailored online environment" (Peters, 1999, p. 277). The main problem that the internet community can not promote and adopt correctly is that cookies are a tool through which "the web, and all the convenience it brings, funds itself" (Shields, 2013). Therefore, cookie technology allows companies offering a variety of conditionally free internet content and pursuing multiple economic and social goals to reach a certain desired consumer information without making resource allocation in costly and time-consuming traditional marketing research. Separately, even if the user refuses to accept or store cookies, there are other tools to help collect end-user information in an online environment. In this regard, it should be taken into account that users can anonymize their online behaviour and remain relatively invisible on the Internet

through VPN (Virtual Private Networks), proxy servers, Tor protocol and other means. This should not be accepted unconditionally, since according to Art. 251b of the Bulgarian Electronic Communications Act (Bulgarian Electronic Communications Act, 2001) entities providing public electronic communications networks and/or services shall keep data created or processed in the course of their activity for a period of 6 months. Such a solution seeks safeguards related to the needs of national security and the prevention, detection and investigation of serious crimes. The organization of the processing and storage of traffic data must be coordinated and in full compliance with the provisions of the personal data protection regime. This means that it can not be used against the general interests of consumers and for sanctioning the behaviour allowed by the regulatory framework for economic agents in an electronic environment.

Web pages and sites use a variety of internet technologies, such as cookies, which can target the following possible impacts on users that determine their types:

- Permanent and temporary cookies. The name itself indicates what period the cookies sent by the web server are stored locally on a personal device. In the case of temporary cookies, after the current session expires and the internet browser closes, they are automatically deleted. Identifying a cookie as permanent is not related to its endless storage on the user's computer. First, cookies can be removed by the user by changing the browser settings or using specialized software for this purpose. Secondly, despite their provisional designation as long-term or permanent, they have a certain storage period, which may be one or even two calendar years. It should be made clear that every subsequent visit to the same website, the latter has the ability to manipulate the remaining cookies and change their behaviour as required by the site administrator. This determines the tracking nature of permanent cookies.

- Mandatory and session cookies. Mandatory cookies should be accepted by users and their devices in order for the web page/site to function in its full capabilities and content. If they are denied, then it is possible that all of the information on the web page may not be displayed or certain items may be unavailable or inactive. However, sites are required to notify users of this type of cookie and the cookie policy they apply. Also, identifying a cookie as inherently necessary depends entirely on the owners and developers of the website. Session cookies have a "life" until the end of browsing, which may either mean leaving the page or closing the Internet browser program.

- Identifying and anonymous cookies. The first type performs the role of registering a user on a site to allow him/her to view a variety of content without having to re-authenticate each subsequent page, meaning that the web server automatically recognizes the user by the cookie-associated unique user number. This defines cookies as "an internet user ID card that tells the site when the user has returned" (Pinsent Masons LLP, 2018). Anonymous cookies collect information regardless of the strategy to identify the uniqueness of the user, but rather perceive her/him as a typical user of the website. Therefore, they quantify and specify not so much the user as the way the website is used, its efficiency and working capacity.

- Own cookies and third-party cookies. The difference between them is according to the source of the cookie, when the first one is created, it accumulates information and is sent by the site being visited, while the latter is developed by specialized companies that deal with internet audiences research and subsequent supply of high profiled content. The use of third-party cookies is done on a contractual basis and should only be for the purpose of upgrading and manipulating online content, while ensuring the protection of data confidentiality and its use. Agreeing on the use of foreign cookies implies that conditions should also be set for the dissemination of the information gathered to subsequent participants. To that end, it is possible to use appropriate standards to ensure the protection and access to information gathered by end-users of web content. It is assumed that third-party cookies are "more aggressive cookies" (SuperHosting.BG, 2017), as their application goes beyond the interests of the particular site and is expanded to perform tasks related to comprehensive promotional strategies and diverse economic and social goals of third parties.

- Targeting and advertising cookies are tailored to the behaviour of the web visitor. They serve to evaluate the effectiveness of the internet advertising used. This allows the concept of interest-based advertising to be realized so that internet users can be offered content that is fully compliant with the established online behaviour. In the internet it has been an established practice that this kind of cookies should be owned by third parties who control their content. Behind the information gathered through this type of business, there are serious economic opportunities that allow this kind of cookies and the data gathered through them to form a digital market for their exchange.

The listed criteria allow us to accept the distinction made by the International Chamber of Commerce of the UK in four main categories (ICC UK, 2012): strictly necessary, to measure efficiency, related to functionality and advertising cookies. To accomplish multiple tasks, a more complex approach is applied at the same time, in which the strict boundaries between the different categories overlap and they lose their own outline and one-dimensional application.

In this way, cookies can serve one or more of the following:

- preferred web content by the user as sections and headings visited on a website or internet;
- time spent on staying on a web page and visualizing specific web content;
- advertising messages that were on the visible part of the web page and the reactions they caused;
- cooperative affiliate programs to track user activity and cross profiling across multiple conditionally independent sites;
- a tool for a variety of marketing purposes, including an assessment of the effectiveness of sales promotion tools;

- collecting statistical information about the functioning of the site or the web page, resources used, mechanism for recording and reporting errors in the visualization of the content and the work of the site, etc.

New Dimensions of Protection of Personal Data

In their genesis, cookies have been created as a means by which companies can get information about their users without distracting their presence in online space and engaging time resource for that. Running them in the background in a web browsing application renders them inconspicuous for internet users who focus their attention entirely on the web content. However, their specificity, linking keywords, actions and demonstrated interests to a user, identified as an internet address, a computer, and a web browser, creates new dimensions of the need for an adequate management of user's personal data by each administrator and any person with access to cookies. This at least means that internet users should be fully informed of the extracted cookies and their possible use and on the basis of their informed acceptance or denial of their storage and use of the information gathered through them, and further use by third parties.

The legal framework regulating the use of cookies within the EU was originally laid down in Directive 2002/58/EC (Directive 2009/136/EC of the European Parliament and of the Council of 25 November 2009 amending Directive 2002/22/EC, Directive 2002/58/EC and Regulation (EC) No 2006/2004 2009) and useful means of facilitating the provision of information society services, for example in analyses improving the efficiency of website design and advertising and checking the identity of the user engaged in online transactions. The main philosophy behind the regulatory framework is the fundamental need for users of electronic communications services over the Internet to obtain clear and comprehensive information when conducting an activity that could result in storing or gaining access to the processing of personal data and the free movement of such data. The primary consideration is related to the need in the new digital realities to ensure the right balance and effective protection of personal data and the privacy of individuals. On the one hand, the normal and seamless use of information society products must be ensured, but on the other, it must provide safety for consumers in the context of the administration of their personal data. The retention of traffic data by operators or intermediaries of the communication process is not tied to commitments to their observation or study. The imposition of liability on providers of information society communication services with regard to the lawfulness of data is a matter of national law and therefore, they must apply the principle of technological neutrality.

Obtaining consent to the processing of personal data is not an imperative action. The GDPR decides that once a person has given or refused to give his or her personal data, he or she should have the right to change this decision and to cancel it. The most important dimension of this is the ability to “be forgotten”, that is, by his own will, to prohibit the subsequent processing of his data and to have the unlimited right to request collected personal data to be removed, provided it was already used for certain purposes and in accordance with the exceptions to the Regulation. The main reason for this is the constant

change in consumer preferences and the risks that accompany this process. This means that when a person has been a customer or user of a particular real or electronic trader and has provided him with certain personal data after a change in his behaviour, he has the right to request that these data be removed from the administrator's registers. Possible exceptions to this principle are related to reasons of public interest where the preservation of this personal data may have applications in the field of history, health, statistical purposes or future legal claims related to that information. At this stage, a clear and specific definition of the lawful use of collected information in the form of personal data has a comprehensive regime and is extremely important in terms of equality and the universality of treatment.

Although the cookie has been created as an automated user feedback tool to diagnose and collect feedback on the website, it quickly acquires the functions of an instrument of outstanding economic and social significance. This transformation brings us to the point where, in terms of the privacy policy the cookie can be defined as a medium or tool that provides wide scope for identifying the user within the meaning of the definition of personal data. This requires the internet user to give his explicit consent regarding the acceptance of cookies and their use for marketing and other purposes. Thus, personal and non-personal information exchanged can be used for a variety of business and other purposes by the site owner, the cookie creator, and/or third parties.

Furthermore, with the introduction of the GDPR, the application of the collected information from an organization can not be directly transferred to a third party unless explicit consent is given. This means that end-users are entitled to take a position on such use of their data for a wide range of economic and other impacts from third parties that, by commercial or alternative means, have obtained information about them. The behaviour and actions of participants in a situation where a person has given his permission to use his personal data, subsequently transferred to a third party, but in the meantime, the person has decided to change his original position and refuses to the first party to process more of his data and may even take advantage of the right to be forgotten. In such a situation, it is possible to assume that the original consignee, as initiator and executor of the transmission of the information to a third party, assumes responsibility for informing the addressee of the change in the initial administration consent situation. This is linked to the resulting possibilities for the third party to be penalized for its bad conduct, in identifying the unallowed and unauthorized use of personal data that has been denied to the user for a higher-level right of use.

Also, one of the benefits of cookies is that as a web tool, they act as a hidden element of the website or page and are most often written in a specialized programming language. Exploring the settings of the internet content browsing program used, the user could review and explore the cookies received in general. This allows the program administrator to remove the stored information on the local device, including stored cookies. The latter means that its information records can be locally deleted, by applying this mechanism, the system is brought to its original state, which means that it is ready to exchange information. In this way, the relative restart will re-initiate a process for accepting cookie policies on the visited websites or pages. Such a process of resetting to default can be perceived as a working technological solution to the “right to be forgotten”.

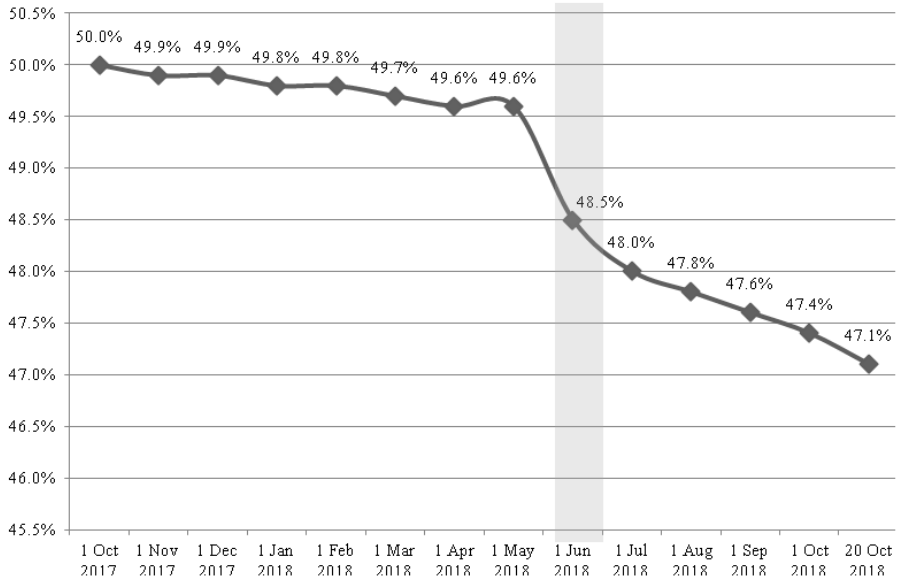
The imposed changes to the privacy policy require the cookie application to be implemented after a request for their management is received, and only after a clear consent from the person whose data will be used, which can also be done electronically. An electronic statement of intent must be digitally documented and stored in an appropriate manner, this may also be done under a regime in which the written form is deemed to be complied with if an electronic document containing an electronic statement is present (Bulgarian Law on Electronic Document and Electronic Signature, 2007).

Usage of Cookies

According to the W3Techs technology company, within the scope of a systematic global survey as of 27.07.2018, 47.8% of all websites use cookies (W3Techs, 2018). This indicates the importance of this web tool and its popularity in the global network. It is important to note that within the one-year observation of the use of various elements included in websites, a slight downward trend of development is formed. The reduction in the use of cookies is further influenced by the entry into force of the GDPR principles and rules by the end of May 2018. A decline of 1.1% unlocks a process of rethinking the use of cookies from websites. Extending the scope of the definition of personal data leads to the denial of excessive use of cookies, and currently less than half of the sites use this web tool (see Figure 1). The 2.6% cookie reduction for the 12-month period from 01.10.2017 to 01.10.2018 is also an expression of the strategy for using alternative means of collecting and using the information to personalize the services provided to end-users, forming the modern information society.

Figure 1

Historical trends in the usage of cookies for websites



Source: W3Techs 2018.

It is necessary to assume that the downward trend in the use of website cookies is a legitimate response to technological changes whereby electronic traders, by outsourcing the creation and service of the online digital exchange platforms used, take advantage of the benefits to get ready-made e-commerce software solutions. The latter integrates third-party consumer information, meaning that the website does not have to collect information that is accumulated and processed at a higher and specialized level on the internet and can be applied as a finished product in the form of a set of data. In this way, the collection and processing of user information as a function and activity are entrusted to a third party, which is producing reports on the served user segments and website visits, which can be dynamic and updated as information content in real time. The detailed statistics allow us to study in a great depth the aspects related to: the functioning of the site and the visualization of its information in the internet environment, search engine indexing, traffic sources, internet commerce conversions, follow-up of the marketing campaigns, user flow visualization, and a host of other metrics, tables, infographics, automatic messages, alarms, etc. (WEBSITE BG, 2012). In addition, through the use of an external contractor, who is responsible for the presentation of a company on the web, allows the agents of commercial exchange to concentrate on those elements and activities in which they are the best and competent, namely the divestiture and management of processes related to it. Thus, for all other service tasks, a dedicated agent is engaged, whose loyalty and responsibility is a factor for the success of any business initiative in an electronic environment. Moreover, the transfer of performance towards an external organization transfers to it the responsibilities related to the management of personal information concerning the users. This means that any weaknesses and omissions that may cause violations of laws and regulations in the field of personal data protection, the rights of individuals and third parties in connection with the administration of such information as well as the possible violations and the ensuing of sanctions from control authorities can be contractually transferred as a liability to the outside contractor. This is also admissible under Art. 37 GDPR, where the Data Protection official can perform its functions on the basis of a service contract (Regulation (EU) 2016/679 of the European Parliament and of the Council of 27 April 2016 on the protection of natural persons with regard to the processing of personal data and on the free movement of such data, and repealing Directive 95/46/EC 2016).

The fact that only half of the websites covered by W3Techs are using cookies may be due to the circumstance that part of them in their content is digital business cards of certain economic or social entities or individuals who in their digital strategy do not seek to use the internet as an economic activity environment or study of online audiences but rather as a platform for their presentation to a wider virtual audience. In this situation, the Internet is used only as an electronic channel for informing potential customer segments.

The use of cookies as a tool for registering user activity continues to be an essential element of modern websites but in a new mode of more responsible and committed behaviour of recipients of this information. The latter is an expression of the growing need for trust and loyalty of the processes taking place in a digital environment. This requires a higher level of responsibility and commitment of web content administrators to end-users receiving and managing personal data. Last but not least, the applicable consent or waiver regime with regard to the management of personal data must be customized in such a way as to make it as easy as possible and without misleading the interests of end-users of internet content.

Conclusion

Used for the purposes of recognizing or collecting user-related statistics, cookies are a popular tool used on the internet. Modern digital society sets new higher requirements for the development of adequate and comprehensive digital content delivery policies that all online players have to take into account. The main direction of the cookie application as an automated web tool should be to achieve higher levels of personalization of the offered internet content, awareness and optimal protection of user data.

Several major issues have been raised in the development of the essence, varieties and state of the cookie application embedded in and functioning on modern websites and web pages. The most important points are:

1. Cookies are a web technology for automated data exchange between the server and the end-user internet content viewer. They can be clearly divided into several kinds, but the specificity and necessity of complexity of the information collected implies their simultaneous application.
2. In the course of the analysis, it was found that there was a general reduction in the use of web-based HTTP cookies, which is a legitimate response to the introduction of the stricter and comprehensive General Data Protection Regulation – GDPR, which has been in operation since late May 2018 and includes online identifiers, such as the end user's IP address, within the scope of protection.
3. By appropriately modifying the cookie policies of websites and webpages, subject to explicit permission from the physical person, HTTP cookies may be installed on the user's local device and certain data about his internet behaviour and for the effectiveness of the functioning of the website or web page, which consent can be unlimitedly changed over time.

The chosen theme for examining the application of HTTP cookies to obtain specific consumer information that can be applied to individualize the Internet content offered has its economic and social significance and identifies opportunities for future research in this regard.

Changes in the regulatory framework for personal data protection mean that special attention should also be paid to online identifiers. This will allow for greater protection of personal data and balance of the interests of members of the information society. In this context, cookie policies should reflect new regulatory realities and offer adequate information security to affected parties.

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ИКОНОМИЧЕСКИ ИЗСЛЕДВАНИЯ
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FACEBOOK TRAFFIC OF THE PROJECT "PLOVDIV – EUROPEAN CAPITAL OF CULTURE 2019"

The aim of this paper is to examine the Facebook traffic of the project "Plovdiv – European Capital of Culture 2019" for the first quarter of 2019 using rates and indicators available from research. Applying quantitative analysis, the authors of this paper conclude that latent opportunities for development in a more positive way than the current situation have to be unlocked. The social media strategy can be specified through monitoring and "social listening". Afterwards, recommendations are made how to increase awareness and reach a wider audience with the intent of engagement of more fans and followers in the 2nd, 3rd and 4th quarter of the title-year.
JEL: M31

1. Introduction

Internet transparency allows companies to get inspired and outrival their competitors. The social media as an online platform define the world in such a new and different manner because it allows consumers from all over the world to interact with each other. They successfully overcome geographic as well as demographic boundaries and connect people from diverse ethnic and cultural groups. Moreover, social media allows global partnerships and innovations. Social media platforms are based on crowdsourcing methods (Kotler et al., 2017) and help customers strengthen the feeling of belonging to a new kind of common cultural area.

Social media as a term or concept encompasses easy-to-use Internet applications and platforms that allow users to share information, to communicate and to connect to each other (Rapp, http://frankrapp.de). Another important feature of social media is that these applications and platforms allow many-to-many communication and interaction. Their advantage consists in a low technological as well as economic entry barriers of new users. According to the last updated data from Bulgarian National statistical institute, in 2017 34.4% of all registered companies in Bulgaria have used social media as a marketing tool (NSI, 2017). Therefore, social media are diversified and divided into various groups and

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categories, e.g. they include social networks (Facebook, Twitter etc.). Both authors of this paper pay particular attention to this category. The current survey is limited to Facebook due to the fact that this social media is the most widely used in Bulgaria and might be the most important and beneficial online communication channel in the business-to-consumer context.

It's an odd, but indisputable fact that the control in social media has been shifted from companies to consumers. The customers play a central role in social media platforms and their opinion could be of great importance for further research. Meanwhile, the impact is no longer concentrated on individuals, but moves from one person to various social groups (Kotler et al., 2017).

Thanks to the technological development, markets evolve from mass markets (high volume production) to niche markets (focused on a specific product). Future competitors come from related branches as well.

While in the past it was easier to convince customers to choose a company's product with marketing campaigns, nowadays most of them are using the F-factor (family, friends, Facebook fans, Twitter followers). People search for an advice in social media from unknown person, in which they have more confidence than advertising and expert's opinion.

2. Literature review

Scientific researches consider a dynamic nature of the emergence of social media platforms, where different agents (individuals, groups, societies) are building a connective common space for information and communication. Users become "thirsty" for online connection in order to fulfil their human basic needs. In 21st century cultures network connectivity seems to transform the understanding of the matter (van Dijck, 2012). On the one hand, platforms enhance citizenship and collective engagement (Benkler, 2006; Jenkins, 2006). Thus, platforms are socio-technical and cultural-ideological constructs that create a new type of social capital: connectivity. Through social media, marketers have the unique advantage to be at the same place as their customers, to interact with them and to gain insights into their attitudes, interests, needs, etc. On the other hand, social media sites do not automatically turn all users into active participants. Companies need to target exactly the right audience and to create content relevant to each customer's need. Therefore, a loyal and reliable relationship with the audience can be built (Chaffey and Smith, 2005; Facebook Business, 2019; Laudon and Traver, 2008; Miller, 2008; Tsai, 2009; Scott, 2007; Weber, 2007).

According to Hartshorn (2010) there are some differences between social media and social networks. First, social media is primarily used to share information with a broad audience, while social networking allows people with common interests to engage and build relationships through the community (Cohen, 2009; Hartshorn, 2010). Social media is simply a communication channel. However, social networking is a two-way communication to such an extent that relationships are developed through conversations (Bedell, 2010; Hartshorn, 2010). Therefore, social networking is direct communication

between users. In contrast, social media does not allow them to manipulate comments or other data for the personal or business benefit (Bedell, 2010; Cohen, 2009; Hartshorn, 2010; Nations, 2010; Stelzner, 2009). The difference between social media and social networks consists not only in semantics but primarily in the features and functions of these websites and the way they have to be used (Cohen, 2009). Social media is about a strategy, while social networking is a tool for connecting with other users (Cohen, 2009; Stelzner, 2009).

Hollier (2009) pointed out the long term benefits of social media. Social media engagement will reinforce the brand experience, which will support brand building. By building a brand, social media helps to strengthen the brand in the minds of the consumers and will also help building trust and a good reputation for a business organization. Customers experience a brand in both ways: while using a product or service and when interacting with a company (Carraher, Parnell, Carraher, Carraher and Sullivan, 2006). Social media can be used to motivate people to speak for the company as well as to reduce negative talk (Hollier, 2009). However, social media is now facing the biggest challenge, which is to be a reliable source for communication. It is both the most inexpensive place for marketing and advertising of company's products or services and also a place to interact with the customers and solve their problems (Edosomwan, et al., 2011).

Tuten (2008) pointed out, that today social marketing represents user control, freedom and dialogues. For example, social media platforms have created a new form of a dialogue between firms and customers by turning the previous passive consumers into active producers and distributors of content, also known as prosumers. Traditional forms have been business-to-business (B2B) and business-to-customer (B2C), while new forms are customer-to-business (C2B) and customer to-customer (C2C) (Chaffey and Smith, 2005).

The goal of social media marketing is to pay attention to the consumer and their opinions and build trust (Chaffey and Smith, 2005; Laudon and Traver, 2008; Tsai, 2009; Tuten, 2008; Weber, 2007). Since the launch of the first social network sites, online communities have attracted millions of users, mainly due to the fact that users have the possibility to share their opinions and experiences with other users.

The brand-customer relation in the digital era is not vertical anymore, but horizontal, i.e. customers have to be seen as brand followers or brand co-creators (Kotler et al. 2017). Before making a decision customers inform themselves about brands and pay attention to the following three factors: first, marketing message and advertising (radio, television, print issues); second, closest friends and family's opinion; third, their own personal knowledge and brand image, that depend on previous experience with the brand. The main advantage of connection through social media in the world today is building trust and assurance of making the right choice. From a customers point of view, social media platforms shield individuals and their relatives from bad companies and brands. The meaning of word-of-mouth in terms of final purchase decision increases, because it's easy to ask other customers for an advice (Kotler et al., 2017).

Nowadays, the diversity of social media platform allows consumers to share and discuss opinions with consumers from all over the world (Kotler et al. 2017). Hence, five different types of social networks can be distinguished (Acquisti and Gross, 2006; Boyd and Ellison,

2007; Gillin, 2009; Laudon and Traver, 2008; Tuten, 2008; Weber, 2007): General networks e.g. Facebook; Professional networks e.g. LinkedIn; Interest-based or vertical social networks e.g. Flickr; Horizontal networks e.g. TripAdvisor; Sponsored communities e.g. eBay.

Companies can benefit from social media and learn more about their target groups, because in most cases customers share detailed information about their interests. A great example is the social media Facebook (Facebook Business, 2019). Companies create a fan page on Facebook or a public profile in order to collect likes from customers and fans. If a company publishes images or videos, all fans will be informed about this action in their news-feed. Further, brand owners can share events and if a customer has given his or her explicit consent, the event will appear in his calendar and news-feed, that is visible to his Facebook friends (Facebook Business, 2019).

Facebook's marketing system is based on the concept of transparency. Companies can access users' published personal information in order to target exactly the right audience (Blech et al., 2009; Tapscott and Williams, 2008). Nowadays, marketers try not only to capture consumer attention but also to hold their attention via engagement (Hanna, Rohm and Crittenden, 2011). Therefore, adding an entertainment component to social communications can facilitate a beneficial relationship with customers. Nevertheless, some experts argue that social network sites as Facebook are useless for marketing purposes. In their opinion, people use Facebook to stay in touch with friends and not as an information source (Maurer and Wiegmann, 2015).

In conclusion, there is no doubt that social media platforms provide many chances to companies, but sometimes the fact that their use arises some questions and can be very risky has been underestimated. For example, some questions may be related to how to engage audiences and plan an adequate social strategy? How to measure the engagement rate of posts in social media? Major challenges for specialists are related to planning, advertising campaigns and measuring results (Kreutzer, Hinz, 2010). In order to overcome this problem in Facebook, they rely on quantitative data, that has been derived from research. Especially in European Capital of Culture project, social media is of great importance, because the product is intangible and as such cannot be tried out before a purchase (Charlesworth, 2009; Chung and Buhalis, 2008).

The aim of this paper is to examine the Facebook traffic of a particular project called "Plovdiv – European Capital of Culture 2019" using rates and indicators available from research. "Plovdiv – European Capital of Culture 2019" creates an opportunity for Bulgaria to promote its ancient cultural heritage not only at European, but also at global level. It happens for the very first time and provokes civil society, designers, people, involved in creative industries, Plovdiv municipality, non-government organizations, marketing and brand managers to cooperate and work together[3] for a common goal. The survey encompasses the first quarter of 2019. Afterwards recommendations are made how to increase awareness and reach a wider audience with the intent of engagement of more fans

[3] #together is the slogan of "Plovdiv 2019".

and followers in the 2nd, 3rd and 4th quarter of the title-year. In order to achieve this aim, the following tasks were set.

First, to examine major rates, indicators and metrics, used in social media, in particular on Facebook.

Second, to analyze best versus worst performing posts on the main page of "Plovdiv 2019" and to study the shared video content of "Plovdiv 2019" on Facebook up to now.

Third, to examine the performance of Plovdiv on Facebook up till now and to compare its positioning to previous cities holding the title "European Capital of Culture" during the period 2017-2020.

Fourth, to make recommendations on how to increase awareness and reach a wider audience with the intent of engagement of more fans and followers.

Both authors support factually the need for social media monitoring, "social listening", and make readers of this paper aware of the possible negative implications for "Plovdiv 2019" if the above-mentioned techniques get neglected.

There are some limitations due to the scope of this research. It only refers to the main Facebook page of "Plovdiv 2019", i.e. not to be taken into account the associated pages such as Plovdiv 2019 – Chitalishta, Tobacco city, Kapana – Creative District, Plovdiv 2019 – Volunteers. Further, only organic reach will be considered (paid reach has not been widely applied). Both authors use the marketing platform Facebook Insights to accumulate input data. Figures and tables are being processed with the program STATA 14. The research focusses on the social media platform Facebook, because of the wide range of usage in the context of South-Central region of Bulgaria, in particular Plovdiv.

3. Methodology

Several methods for quantitative measurement of the effect of social media exist. They build the so-called **social media traffic framework** research. Depending on the used social media, the terms are different, but the meaning remains the same. Number-of-clicks (or the traffic) is seen as a key indicator, followed by "number-of-impressions", "reach", "number-of-likes", as well as "page consumption" and "number-of-active-users". In order to examine the level of success in social media, specialists use the following rates: "applause rate", "conversation rate" and "amplification rate". They can be informative enough, when researchers observe and combine them with other analysis methods. Quantitative social media metrics can be confusing and lead to wrong interpretation of results when observed simultaneously or isolated.

"Applause Rate" is being estimated through:

$$Applause\ Rate = \frac{Number\ of\ Likes}{Number\ of\ Posts}$$

Social media marketers measure "Conversation Rate" as follows:

$$\text{Conversation Rate} = \frac{\textit{Number of Comments}}{\textit{Number of Posts}}$$

Last, but not least, specialists compute the "Amplification Rate" as follows:

$$\text{Amplification Rate} = \frac{\textit{Number of Shares}}{\textit{Number of Posts}}$$

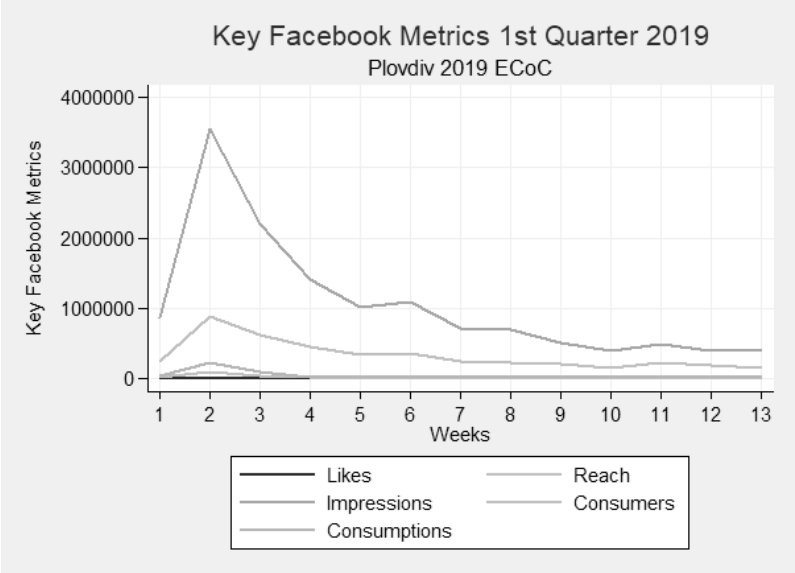
In particular, in social media a best versus worst performing posts analysis on Facebook is considered. It is important to study both the type of content, being published (link, image, status, video) on Facebook. Examination of these rates and terms is the most reliable way to gain insights about the performance of "Plovdiv – European Capital of Culture 2019" on Facebook and the only way to avoid one-sided interpretation of results.

4. Research findings and discussion

The key Facebook metrics for "Plovdiv – 2019" project in terms of *"likes", "impressions", "reach", "consumers"* and *"consumptions"* in the 1st quarter of 2019 (from 1st to 13th calendar week) are shown on Figure 1.

Figure 1

Key Facebook Metrics



The figure makes clear, that the lines showing the number of impressions and the number of reach follow the same path and move parallel during the period. In contrast, the line

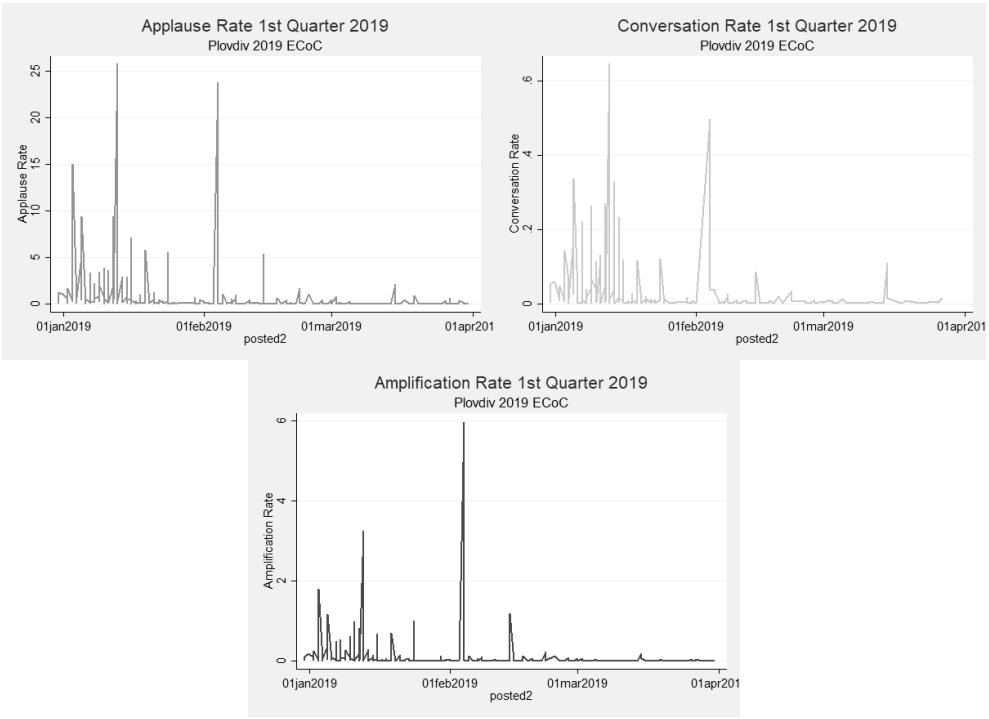
representing "reach" has lower values. However, this observation is nothing but expected and logical, because a priori the total reach is always less than or equal to impressions.

Number of likes, number of active consumers and consumptions remain almost the same during the observed period of time with less dynamics in values. Their values are as close to each other, as the lines in the figure overlap.

Not without reason some social media specialists define these three rates as "the best social media metrics". The rates determine the level of social media success. Figure 3 shows the values of "applause rate", "conversation rate" and "amplification rate" for "Plovdiv 2019" on Facebook in the first quarter of 2019.

Figure 2

Rates in Facebook



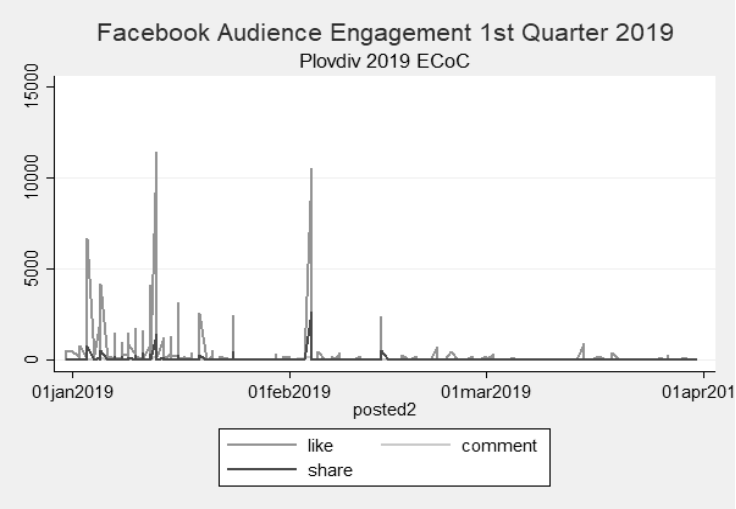
Despite their popularity, marketers need to be careful when analyzing the calculated values. Researchers need to observe and combine them with other analysis methods. These rates can be confusing and lead to wrong interpretation of results when observed simultaneously or isolated. At the same time, it's compulsory to perform best versus worst performing posts analysis, as well as to consider other key metrics (in particular, Facebook audience engagement).

Audience engagement on Facebook counts number of likes, comments and shares in a fixed period of time on the page of "Plovdiv 2019". Figure 3 shows the dynamic of the indices and how they fluctuate in the first quarter of 2019.

As Figure 3 shows, the most likes the Facebook page of "Plovdiv 2019" has accumulated during the period from January to February 2019, while the comments and shares remain constant almost through the whole period of time, with a little fluctuation again in January and February.

Figure 3

Facebook Audience Engagement (likes, comments and shares)



In spite of these positive trends, the measured values (comments, shares) cannot reach the high level of likes. On the basis of available information can be concluded, that visitors are still not willing to comment and reshare published content on the page of "Plovdiv 2019" with their own friendship circle. The reasons behind their action or lack thereof need to be profoundly examined. It is recommended for the marketing team of "Plovdiv 2019" Foundation, responsible for the content in social media, to create opportunities to increase visitor's motivation to comment and share on Facebook.

The total number of users, who have liked the Facebook page of "Plovdiv 2019" in the first quarter of 2019 is shown on Figure 4. The figure makes clear, that the number of unique users increases with time. While at the beginning of the referenced period the page has been liked by 41 331 people, at the end of the period their total number has grown to the amount of 50 386 people.

Besides the total number of users, who have liked the Facebook page of "Plovdiv 2019", another important Facebook indicator is the daily accumulation of likes compared to the daily measurement of unlikes. This way researchers get a clue about the effectiveness of marketing efforts. It's necessary to examine the reasons, and therefore why the Facebook

page of "Plovdiv 2019" is losing its audience. Afterwards, marketers should take action in order to limit the number of unlikes.

Figure 4

Total number of people who have liked your page (Facebook Unique Users)

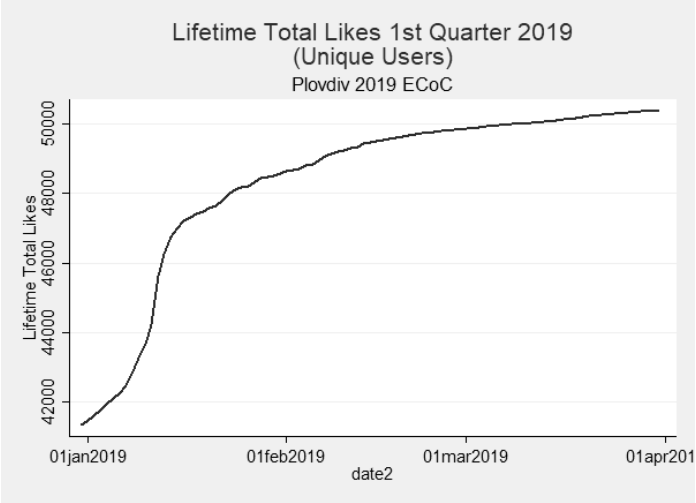
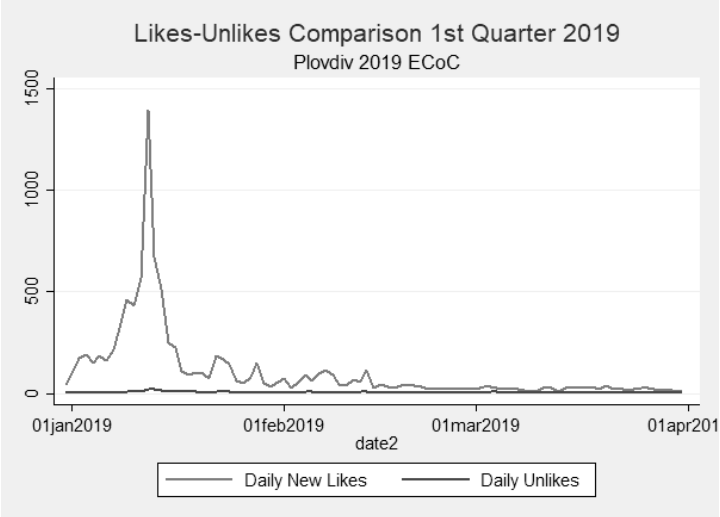


Figure 5

Likes-Unlikes Comparison



The reasons why there are people, who have clicked first the button "like" and after some time "unlike" the Facebook page of "Plovdiv 2019" can vary: it is possible that

administrators of the page publish content too often, or in contrast, they publish very rare, so there might be posts, that visitors find boring.

Posts content matters to all Facebook fans. Here counts the principle 70/20/10: the most of the post in social media must be informative (70%) and to provoke lively interest, because this way a relationship between brand and audience is created. Researchers recommend lesser part to be devoted to shares of someone else's posts, blogs, images or videos (20%), and slight part of post (10%) can be "self-promoting" (Ayres, 2016). Ignoring user's comments, containing negative feedback, can still lead to "unlikes". In this particular case, the marketing team of "Plovdiv 2019" Foundation have to carefully study consumer's behaviour in order to identify possible reasons for accumulation of "unlikes" and to give adequate prepositions how to resolve this problem.

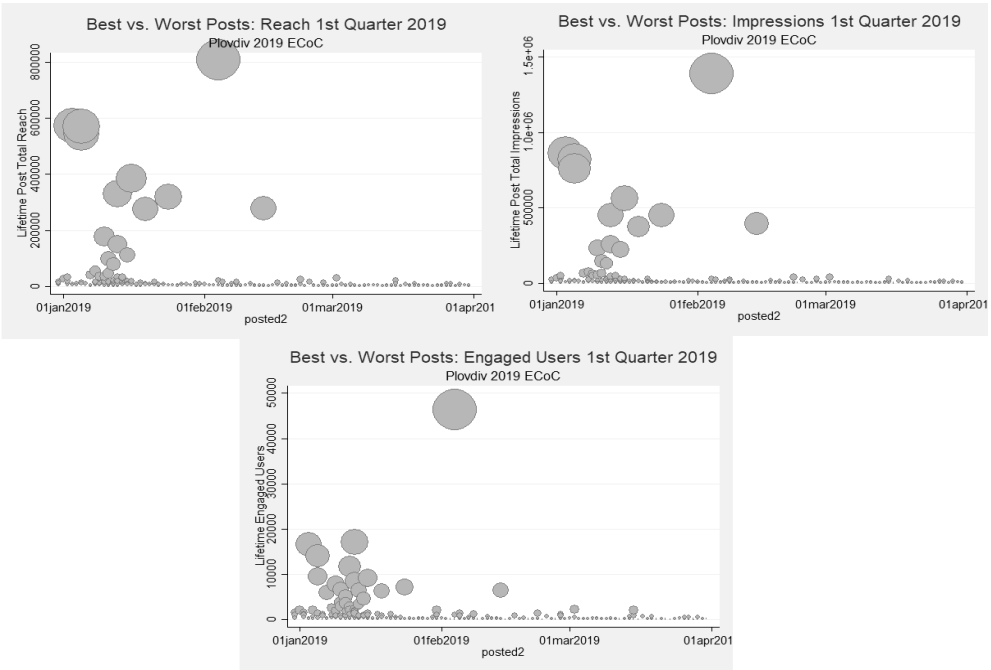
Besides key indicators on Facebook, regarding fan activity on the page of "Plovdiv 2019" in the social media, mentioned above, it is also needed publications to be tracked and their performance to be interpreted.

5. Analysis of "Plovdiv 2019" publications on Facebook

Best and worst performing posts on Facebook are shown on Figure 6. The authors use three types of criteria to evaluate the posts performance: "reach", "impressions" and "engaged users". All three criteria deliver similar results. The circle size depends on the weight of the specific post, i.e. the bigger the circle, the greater amount of Facebook users have seen this post, the greater amount of users are reached and engaged.

Figure 6

Best vs. Worst Posts



The figures point out a negative trend: while in January 2019 posts have been evenly distributed between both best and worst-performing posts, in March and April all posts lose their significance and attractiveness (circles with small weight). One of the best performing posts on the page of "Plovdiv 2019" on Facebook throughout the observed time period is released in February (biggest circle). This is caused by the fact that the above-mentioned post contains a linked video content from a third-party channel, which should be heavily used when sharing content in the future.

Video on Facebook

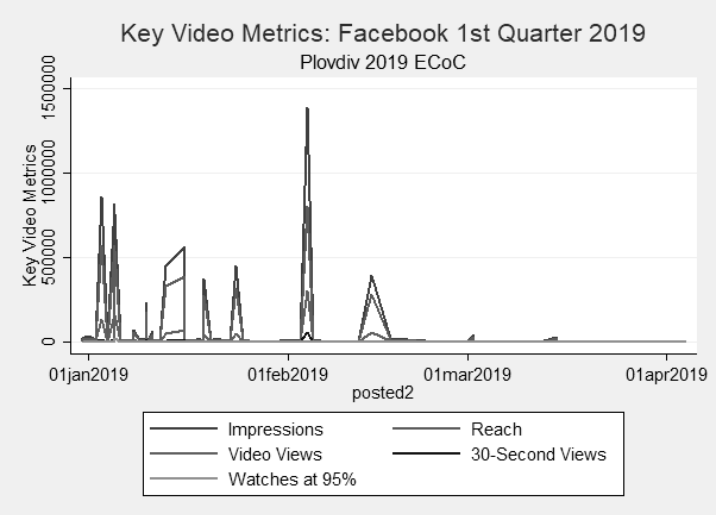
Besides analysis of posts, the performance of published videos on Facebook should also be taken into account. Marketing specialists submit videos, primarily because of the influence, that they can have regarding users and fans. Images or video (in comparison to textual content) have been preferred by the major part of consumers. Images encompass emotions, that can be easily sent to the audience.

Videos on Facebook start automatically, but without sound, until the person watching does not activate it by a simple click. So, videos have to contain visual elements that attract target audiences, even if there is no sound.

Furthermore, videos bond audience and are an effective way to increase key successful metrics in social media, as well as "applause rate", "conversation rate" and "amplification rate". Facebook videos have another advantage: they are visible, i.e. they can be found without any effort in Google. The key video metrics that inform about customer retention are: "impressions", "reach", "video views", "30-second views" and "watches at 95%" (Figure 7).

Figure 5

Key Video Metrics on Facebook



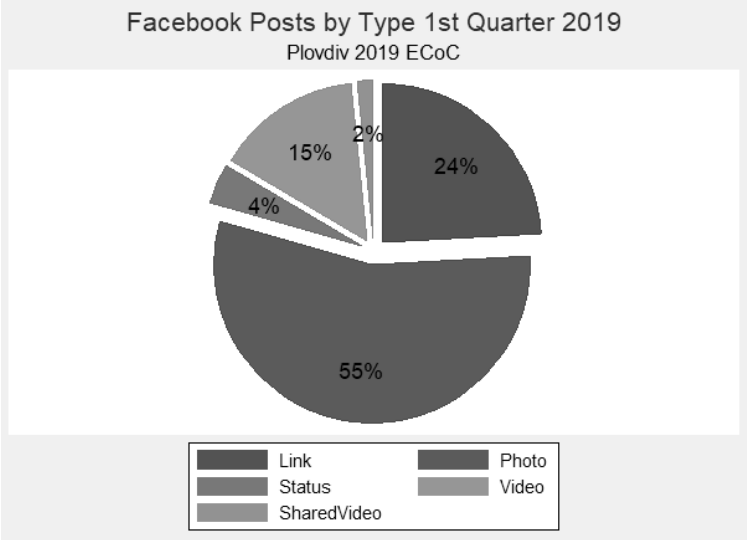
Almost all metrics described above (except "watches at 95%", which remain constant) throughout the time period of the conducted study move simultaneously whether up or down, but not in different directions. Therefore, consumer behaviour is more or less uniform, homogenous, has a spiralling motion and various stages. As both authors of this paper have already mentioned above, a prediction can be made: in the next months, a slowdown of key video metrics values can be expected, followed by a peak after that.

The efforts of marketing specialists have to be concentrated in such a way, that peaks duration get maximized, for instance, creating more interesting video content for users.

An evaluation of content, delivered to customers in social media, has to be considered after a Facebook video analysis is done. The pie diagram on Figure 8 refers to the type of content published on the page of "Plovdiv 2019" on Facebook. It can be an image, link, status, video or a shared video.

Figure 8

Facebook Posts by Type



The figure shows, that the former outweigh the latter: 55% of all published posts on the page are devoted to images, while 24% refer to links. Videos count for 15% of the published content, which is a relatively small per cent, taking their unique opportunities to engage the audience into account, which both authors have shown on previous pages of this paper. The last two places are devoted to published status and shared videos, respectively – 4% and 2% of the total posts on Facebook.

In order to gain an in-depth view of the performance of "Plovdiv 2019" in social media, Facebook is necessary to discuss a benchmark between European Capitals of Culture 2017-2020 on Facebook.

A benchmark between European Capitals of Culture 2017-2020

Benchmarking in the context of "Plovdiv – European Capital of Culture 2019" aims to highlight the positioning of previous, as well as future cities holding the title regarding the effectiveness of efforts, that marketing teams have made or are making on Facebook.

The time period encompasses 2017-2020. Secondary data and statistics from Facebook pages of each ECoC[4] is used. Data has been calculated during the second quarter in the year before holding the prestigious title "European Capital of Culture".

Cities, that both authors consider, are as follows: Pafos, Aarhus (2017), Valleta, Leeuwarden (2018), **Plovdiv**, Matera (2019), Rijeka, Galway (2020).

Figure 9

Likes/Follows on Facebook – A benchmark between European Capitals of Culture 2017-2020

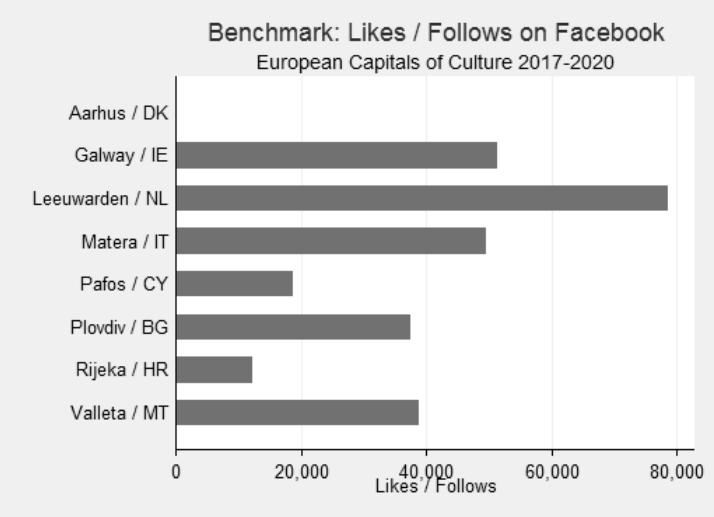


Figure 9 makes clear that the city Leeuwarden in the Netherlands leads the ranking with a score of total of 78 625 likes/follows on Facebook. Galway finishes up second and Matera third, while Plovdiv remains with less than 40 000 likes. This statistics is even more worrying, if we consider the performance of Plovdiv on Facebook in comparison with Valleta. Valetta has more fans than Plovdiv up to now, although the city will hold the title ECoC in 2020. It is also remarkable that there is a big difference between cities regarding their location – Eastern (new ECoC) vs. Western Europe (old ECoC) and population. Western cities usually perform better, even when their population is fewer. For example, Leeuwarden has a population of 122.983 (year 2019), Galway 79.504 (year 2016), Matera

[4] ECoC is an abbreviation for European Capital of Culture

60.403 (year 2017), Valleta 5.730 (year 2016) and Plovdiv 346.893 (year 2018). Leeuwarden still leads the likes / follows ranking on Facebook.

Figure 10
Maximum Shares on Facebook – A benchmark between European Capitals of Culture 2017-2020

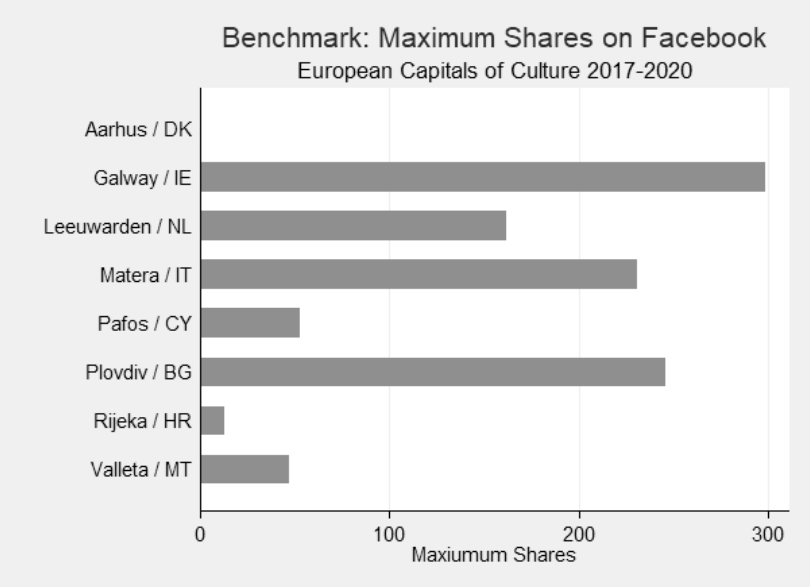


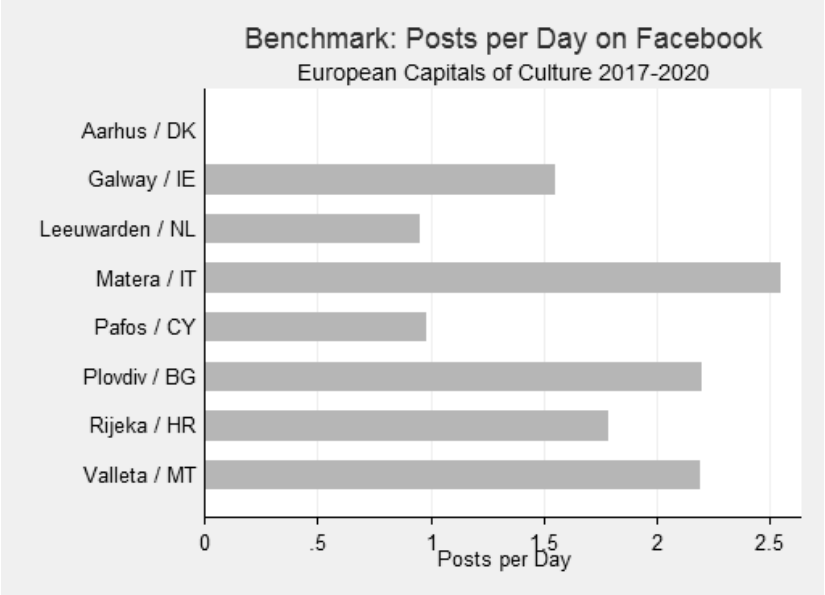
Fig. 10 shows that maximum shares on the social media Facebook – according to statistics – are devoted to Galway, Ireland (approximately 300). Plovdiv holds second place in this ranking with 246 shares. The difference between Plovdiv and Matera (the second city in 2019 holding the ECoC title together with Plovdiv) is minimal (15 shares).

Results show, that the most active team on social media is the communication team, responsible for the performance of Matera on Facebook. Per day on average on Matera's page on Facebook 2,55 posts are published, which is less than on Plovdiv's page (see Figure 11).

There is a slight difference between Plovdiv and Valleta, i.e. 0,01 (statistical amounts are as follows: 2.20 post per day are distributed to Plovdiv and 2.19 to Valleta).

The above research has shown an opportunity for quantitative measurement of the effect of social media Facebook through several methods, building the so-called **social media traffic framework.** Results are being discussed.

Figure 11
Posts per Day on Facebook – A benchmark between European Capitals of Culture 2017-2020



Conclusions and implications have to be drawn in the last session of this paper.

6. Conclusion

The outlined from both authors in this paper data about key Facebook metrics is designed to analyze traffic and performance of the project "Plovdiv – European Capital of Culture 2019" in the first quarter of 2019. On the basis of the conducted study, missing opportunities are found. Marketing specialists attach great importance to "social conversations" in the web. Some of their applied aspects are very important for "Plovdiv 2019", but are not being used adequate or enough in the right manner until now.

Both authors make the following recommendations on how to improve the social media strategy of "Plovdiv 2019" in the 2nd, 3rd and 4th quarter of the title-year:

- Through "social listening" social strategies are made, aiming to reach a wide range of audiences with appropriate, timely and sufficient content. As a result, more users, fans and followers are being engaged. All these efforts increase brand awareness.
- It's relevant to users that the "Plovdiv 2019" page has to be as easily accessible as possible in different social media platforms. Users want to receive timely and consistent information and content.

- Past (Leeuwarden) and future (Galway) European Capitals of Culture have better positioning on Facebook regarding the number of likes and shares up to the moment of conducting this survey. The city of Matera (holding the ECoC title together with Plovdiv in 2019) leads the ranking when considering the number of daily post on Facebook during the second quarter in the year before the title "European Capital of Culture". Plovdiv holds a similar position to Valleta – ECoC 2020. For this reason, both authors suggest an increase in publishing of daily posts on Facebook, but also necessarily taking users preferences with regard to the type of content into account.

- The performance of "Plovdiv 2019" on Facebook in the first quarter of 2019 is good. After a social media traffic analysis, it can be concluded, that there are latent opportunities for development in a more positive way than the current one, i.e. through heavy usage of linked video content from a third-party channel. Further, the social strategy can be refined through monitoring and "social listening".

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SUMMARIES

Burim Gashi

THE IMPACT OF PUBLIC DEBT ON THE ECONOMIC GROWTH IN SOUTH-EASTERN EUROPE: AN EMPIRICAL PANEL INVESTIGATION

The goal of this paper is to examine the impact of public debt in six countries from South-Eastern Europe over the period 2008 to 2017, by applying three different panel methods: the fixed effects model, the GMM method and the system-GMM method. More specifically, we investigate if there is evidence of a non-linear (quadratic) relationship in this group of countries. The results of our study confirm that increasing public debt has a statistically significant negative influence on the GDP growth. Also, the results confirm the existence of a „U inverted" relationship, with a maximum debt threshold of about 58% of GDP. After this threshold, public debt is expected to negatively affect the economic growth rate, due to fear of public debt unsustainability higher interest rates, and severe budgetary consolidation measures.
JEL: E62; H63; O47

Rumen Gechev
Ivailo Beev
Yanko Hristozov

EXPECTED EFFECTS OF THE EURO ADOPTION IN BULGARIA

This article interprets facts regarding the accession to the euro area of selected (representative) EU Member States and the expected effects on the Bulgarian economy. In addition, the main risks of myths are identified, and the objective is to provide an objective view of the benefits and risks of the introduction of the euro in Bulgaria, respectively joining the euro area. The identification of the "critical zones" of possible negative effects is based on a precise examination of the experience gained in countries that have already introduced the single currency. This enables the measures aimed at joining the euro area to incorporate the necessary measures so that the positive effects dominate, which would justify the introduction of the euro in Bulgaria.
JEL: E31; E42

Svetlana Aleksandrova-Zlatanska

FISCAL DISCIPLINE ASSESSMENT MODEL FOR BULGARIAN MUNICIPALITIES

This article examines the fiscal stability of Bulgarian municipalities in conjunction with financial discipline, which is crucial for carrying out the criteria and indicators set up by Bulgarian Public Finance Act (2017). An evaluation model has been developed to assess the propensity of municipalities to observe fiscal discipline, which is a prerequisite for their financial stability. The study covers all municipalities in Bulgaria (265 municipalities in total) irrespective of their population size and economic potential. The evaluation in the model is complex and dependencies are drawn between the financial indicators that characterize the municipalities' financial state and the fiscal discipline. The findings and the results of the model contribute to the existing literature on local public finance by empirically developing indices for assessment of the dependency of fiscal stability and fiscal discipline.
JEL: H10; H11; H7

Gergana Dimitrova
Donka Keskinova

COMPOSITE INDICATORS FOR THE EVALUATION OF THE COMPETITIVENESS OF AN INDUSTRIAL ENTERPRISE (The Case of the Wine Industry)

Competitiveness management is both a subject, a goal and a challenge in the research and expertise of many scientists, analysts, researchers and managers. With its multidimensional and multilevel structure defining it, the category is regarded as a foundation for the functioning of both individual economic units and entire sectors and economies of countries. Recognizing that competitive enterprises are a major drive of the nation's competitiveness (Garelli, 2002), the focus is on the microeconomic aspects of the category, with a reasoned focus on industrial enterprises. All this determines the evaluation of the company's competitiveness as particularly significant, both theoretically and practically. In this regard, the present study presents an algorithm for the construction of composite indicators for its evaluation, as well as the results of its testing in micro and small enterprises from the wine-producing industry in the Plovdiv region.
JEL: L10; M21; L66; C01

Tatjana Drangovska
Marica Antovska-Mitev

CHALLENGES OF THE NATIONAL INNOVATION SYSTEM FOR THE APPLICATION OF OPEN INNOVATION PRACTICES IN THE REPUBLIC OF NORTH MACEDONIA

Nowadays, products become increasingly complex, their development and production is a result of the application of a wide range of external ideas, technologies and knowledge. In the complex economy, it is impossible for any single enterprise to keep abreast of all modern technologies. In the production process enterprises include development of specialized knowledge assets, using a wide range of knowledge from different areas. At the same time, enterprises make their specialized knowledge assets available for usage by the other actors. Those activities are referred as open innovation practices. The great interest in applying the open innovation practices is a result of the positive impact that open innovation has on the enterprise performance and on the overall economic system as a central element in the modern knowledge-based societies. However, for successful implementation of the open innovation practices, which is essentially based on the cooperation between the key actors within the national innovation systems, government, academy and the business sector, there is a need for significant institutional support at a national level, a developed innovation system and a particularly developed system for technology and knowledge transfer. Hence, the paper primarily analyzes the institutional factors (national innovation system), with a view to the institutional and financial support in cooperation and knowledge transfer. At the same time, an analysis of the innovation of the Macedonian business sector is made, with particular emphasis on the application of open innovation practices in terms of the representation of the key model dimensions in the enterprises. On the basis of the analysis made, conclusions are presented and measures are proposed to improve the environment for applying the open innovation practices in the Macedonian business sector.
JEL: O36; O38; L52

Siya Veleva
Anka Tsvetanova

APPLICATION OF THE TOPSIS METHOD FOR PRELIMINARY ASSESSMENT OF TECHNOLOGICAL TRANSFER OPTIONS

In modern times, the business success of enterprises is increasingly the result of the development of science and the accelerated introduction of new advances. Innovations is becoming the key to success. Under these conditions, the importance of technology transfer is also becoming a main "strategic way of meeting the challenges of globalization in business" (Mayer and Blaas, 2002). With the increasing importance of technological transfer, increases the interest in the theoretical elucidation and empirical research of various aspects of its implementation in enterprises.
In view of the above, the aim of this paper is to propose a method for the preliminary assessment of alternative technology transfer options based on the use of the TOPSIS method (The Technique for Order of Preference by Similarity to Ideal Solution) (Hwang and Yoon, 1981). It allows an initial assessment and selection of technological transfer options on the base of preliminary selected important criteria. As a result, businesses can reduce the number of options that will later be subject to a more in-depth assessment, from the list of already selected ones, by choosing only those who have good potential and are in their capabilities. In this way the experts' efforts are focused and their work, concerning the selection of a transfer option in which to invest, is also significantly relieved.
JEL: O32

Stoyan Prodanov
Lyudmil Naydenov

THEORETICAL, QUALITATIVE AND QUANTITATIVE ASPECTS OF MUNICIPAL FISCAL AUTONOMY IN BULGARIA

Scientific research in the field of municipal financial policy covers a wide range of issues which include the issues analysed in this paper, viz. the theoretical foundations and the qualitative aspect of regional fiscal autonomy. The article explores the approaches to assessing the fiscal autonomy of local governments. The results of a detailed critical analysis conducted by the authors outline the merits and demerits of the normative and the positive approaches and justify the need for a balanced approach for assessing local fiscal governance. This approach is based on the idea that the process of extending the fiscal powers of local governments is part of a more general trend for public sector reforms to promote the principles of subsidiarity. The balanced approach was used for a qualitative and quantitative assessment of the fiscal autonomy of local governments in the Republic of Bulgaria. Empirical data were analysed to assess the financial capacity and relative position of Bulgarian municipalities in comparison with similar structures within the European Union (EU). The general conclusion is that the legislative measures for the implementation of the principles of local self-government are not sufficient for the achievement of an optimal ratio of local to state budget fiscal revenues.
JEL: H71; H72

Michal Stojanov

POLICY CONCERNING THE HTTP COOKIES

The intensive expansion of the digital economy poses new challenges to the regulatory framework and corporate privacy policies for individuals. The enforcement of the EU's General Data Protection Regulation is triggering a new approach to the scope of personal data and the rules for their

administration. There is a need for a complete reorganization of the ways in which websites study the behaviour and characteristics of online content users, which determines a change of the cookie policy out of the hidden internet area towards an unconditional need for explicit consent to their use for whatever purposes.
This work provides theoretical basics about the nature and variety of HTTP cookies as a web tool. It outlines what changes result from the introduction of regulatory instruments and corporate policies for the protection and administration of the personal data of individuals in real and electronic environments. On this basis, the use of cookies in modern webpages and sites has been explored, which serves to implement varied changes in the proposed internet content to achieve conversion and the resulting economic and social effects.
JEL: L86; K00; K19; K39

Radina Ruseva
Evgeni Stanimirov

FACEBOOK TRAFFIC OF THE PROJECT "PLOVDIV – EUROPEAN CAPITAL OF CULTURE 2019"

The aim of this paper is to examine the Facebook traffic of the project "Plovdiv – European Capital of Culture 2019" for the first quarter of 2019 using rates and indicators available from research. Applying quantitative analysis, the authors of this paper conclude that latent opportunities for development in a more positive way than the current situation have to be unlocked. The social media strategy can be specified through monitoring and "social listening". Afterwards, recommendations are made how to increase awareness and reach a wider audience with the intent of engagement of more fans and followers in the 2nd, 3rd and 4th quarter of the title-year.
JEL: M31