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# Productivity Trends in The Entrepreneurship Sector

DOI: 10.7595/management.fon.2024.0010

## Abstract:

**Research Question:** The observed research problem is the low productivity growth rate of Serbian entrepreneurs, which requires a forecast of the trend of this indicator in the future to take advantage of business opportunities and improve the innovative potential of entrepreneurs. Improving productivity implies defining a benchmark, herein the entrepreneurial sector of Slovenia as a country that has achieved high productivity values and, according to certain productivity parameters, achieves similar results as Serbia. **Motivation:** The paper aims to respond to the research gaps: what level of productivity is achieved by the entrepreneurial sector of Serbia and Slovenia, how this value moved over the years, what it will be like in the coming period, and whether appropriate measures of productivity growth of successful countries (Slovenia) can be applied to the development of productivity of Serbian entrepreneurs. **Idea:** The idea of the paper is to determine possible development potentials of the entrepreneurial sector of Serbia by predicting future trends in productivity as well as to define possible measures that will contribute to higher rates of growth in the productivity of Serbian entrepreneurs using the example of Slovenia. **Data:** The sample includes the levels of productivity achieved by the entrepreneurial sectors of Serbia and Slovenia for the period from 2010 to 2021. **Tools:** Data analysis is based on the prediction of future trends in the productivity of entrepreneurs. **Findings:** The results show that the productivity of Serbian and Slovenian entrepreneurs will increase in the future. Based on the results achieved by Slovenia, Serbia must improve external factors of productivity (institutional framework and tax system) but also internal factors (social capital of employees, business agility, and development of innovations) for productivity to grow at a higher rate. **Contribution:** The contribution of the paper is reflected in the analysis of indicators of the efficiency of human resources (productivity), which are of crucial importance for achieving high results for entrepreneurs. Also, the study investigates the productivity of entrepreneurs, while in previous studies the subject of analysis was the enterprises in the SME sector. The paper provides a forecast of future trends in productivity and gives recommendations on how to improve productivity following the example of Slovenian entrepreneurs.

**Keywords:** entrepreneurship, productivity, forecasting, Serbia, Slovenia, time series analysis

**JEL Classification:** L26, J24, C53

## 1. Introduction

Entrepreneurs play a key role in exploiting new opportunities, increasing productivity, creating jobs, and solving some of a society's most pressing challenges (Sirec et al., 2023). The success of an entrepreneurial venture is evaluated by the achieved productivity (Pineda Duque & Castiblanco Moreno, 2022). Productivity is the ability of an employee or an organization to optimally use its resources in the production of goods and services (Sukmaningrum et al., 2022). Sirec et al. (2023) believe that entrepreneurship is necessary to promote productivity. Accordingly, the paper aims to identify the achieved levels of productivity in the entrepreneurial sector of Serbia and Slovenia, predict the future productivity trend, and define measures to improve the productivity of Serbian entrepreneurs.

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The methodology applied in the paper is based on the statistical analysis of secondary data on the achieved level of productivity of entrepreneurs in Serbia and Slovenia. The quantitative method used in the paper is the time series analysis. Based on the obtained results, the applicability of certain measures implemented by Slovenia to increase the productivity of the entrepreneurial sector of Serbia will be reviewed. These results will serve as a good guideline for the political implications and measures that Serbia, following the example of Slovenia, will take.

According to Serbia's New Growth Agenda (World Bank Group, 2019, p. 21), productivity in Serbian companies is growing slowly, by one percent annually. However, productivity is assessed as the main driver of growth in Serbia, which indicates the need to analyze this indicator. Since productivity is efficiency in the use of resources, policies aimed at improving productivity can encourage the economic growth of the Serbian economy (World Bank Group, 2019, p. 20).

In the paper, the productivity of the entrepreneurial sector of Slovenia is a benchmark, since this is a key factor in increasing Slovenia's prosperity (Urad Republike Slovenije za Makroekonomske analize in razvoj, 2022, p. 22). According to the Productivity Report (Urad Republike Slovenije za Makroekonomske analize in razvoj, 2022), Slovenia's productivity has seen slow growth for almost a decade and lags behind the EU average. Currently, the level of productivity is at the level before the outbreak of the economic and financial crises in 2008, which makes the measures taken to improve productivity successful.

Several research gaps have been identified. First, previous studies have analyzed the contribution of various factors to entrepreneurship: education (Pathak et al., 2013); corporate social responsibility (Al-Omouh et al., 2023); public policies (Bylund et al., 2023). Pointing to the role of entrepreneurship in economic development, Kungwansupaphan and Leihaothabam (2016) state that previous research focused on the demographic characteristics of entrepreneurs, barriers and limitations in business, and their motivations and benefits, without relating them to employee performance, such as productivity. By analyzing such indicators, entrepreneurs understand their potential for creating innovations and using market opportunities. Second, previous studies have analyzed business performance among entrepreneurs (Appiah et al., 2019; ChoudhuryKaul et al., 2023). However, productivity has not been specifically analyzed in the previous studies. This study seeks to fill the perceived research gap, following Maniyalath and Narendran's (2016) advice that entrepreneurship researchers should not only focus on the analysis of monetary variables (e.g., national income) but should also expand their research to other performances. In addition, the largest number of papers about business performance has been researched in SMEs (Kyal et al., 2022). The research in this study includes only entrepreneurs, that is, those SMEs recognized as a sector with great development potential. Third, previous research did not compare the productivity results of entrepreneurs in developed countries (Slovenia) and developing countries (Serbia). Slovenia is a suitable country for benchmarking because it is a smaller EU economy, so it is easier to compare with one of the countries of the Western Balkans (Nikolic, 2020). In terms of productivity values, Slovenia achieves much higher values than Serbia. However, in some productivity parameters, Serbia and Slovenia record similar results - average rate of labour productivity growth, and labour force participation rate. Also, both countries have slow productivity growth. It is necessary that measures be proposed to increase the productivity of entrepreneurs in Serbia, following the example of Slovenia. According to the observed research gaps, the following research questions were defined:

1. What was the productivity trend in the entrepreneurial sector of Serbia and Slovenia in the previous period?
2. What will be the productivity trend of the entrepreneurial sector of Serbia and Slovenia in the period to come?
3. What measures should be taken to increase the productivity of Serbian entrepreneurs?

The study's contribution is that it analyzes the achieved productivity only for entrepreneurs. Most previous analyses were made for the SME sector. Second, the study analyzes one indicator of entrepreneur productivity, which was not an often analyzed indicator in previous studies. As human resources are the key carriers of entrepreneurial activities, monitoring their results through productivity is necessary. Thirdly, the study forecasts the future trend of the productivity of the entrepreneurial sectors in Serbia and Slovenia. Fourth, the study provides measures to improve Serbia's productivity, following Slovenia's example and the productivity results they achieved.

In addition to the introduction, the paper contains five more parts. The second part of the paper includes the analysis of realized entrepreneurial activities in the two observed countries. In the third part of the paper, the forecast of productivity trends in Serbia and Slovenia are given, while in the fourth part a discussion of the results is presented. The fifth section describes the political implications and limitations of the research.

## 2. Results of the Entrepreneurial Ecosystem in Serbia and Slovenia

### 2.1 Entrepreneurial ecosystem in Serbia

According to the Annual Report on Business Operations (Serbian Business Registers Agency, 2023, p. 42), in 2022, 116,551 entrepreneurs employed 225,302 workers, which is 17.4% of the total number of employees. The productivity of entrepreneurs in 2021 was RSD 908,500, which is 24.5% more than in the previous year (Statistical Office of the Republic of Serbia, 2023, p. 130). Regarding financial indicators, in 2022, the entrepreneurs of Serbia achieved revenues of RSD 1,283,966 million, which is 14.6% more than in 2021 (Serbian Business Registers Agency, 2023, p. 42). As in previous years, entrepreneurs were financed from borrowed sources. In 2022 the financial structure is more favourable since the share of own capital in total sources has increased from 37.0% to 38.9%, and the level of total indebtedness has decreased from 1.70 to 1.57% (Serbian Business Registers Agency, 2023, p. 44). It can be concluded that Serbia's entrepreneurial sector tends to grow.

Previous research indicates the characteristics of entrepreneurship in Serbia. Entrepreneurs generally establish firms to ensure personal freedom, independence, and financial gain (Radojevich-Kelley, 2011). The financing of Serbian entrepreneurs is mainly done through equity funding (Radojevich-Kelley, 2011). Certain aspects of the entrepreneurial ecosystem, "such as cultural support, human capital, product and process innovation, and risk capital" are at an average level in comparison with EU members from the region (Ljajic et al., 2019, p. 438). The process of innovation and skills for starting a business are improved (Zvezdanovic Lobanova & Lobanov, 2018).

Previous research also points to barriers to the development of Serbian entrepreneurship. Bobera et al. (2014) conclude that financial and fiscal burdens are the most obstructive barriers to entrepreneurship development, as well as human resource barriers and subjective circumstances (idea, education, family support). Radojevich-Kelley (2011) points out administrative issues, political instability, and economic uncertainty as the biggest challenges facing Serbian entrepreneurs.

### 2.2 Entrepreneurial ecosystem in Slovenia

According to the Report Informacija o poslovanju samostojnih podjetnikov posameznikov v Republiki Sloveniji v letu 2022 (Agencija Republike Slovenije za javnopravne evidence in storitve, 2023), the entrepreneurial sector of Slovenia consists of 48,940 entrepreneurs, which makes 22% of the total number of companies. This sector employed 40,378 employees in 2022 and generated €1,644,611,000 net added value, which is 12% more than in 2021. Productivity has been growing until 2019. The value of realized revenues in 2022 is €6,054,021,000, which is 19% more than in 2021. The share of the entrepreneurial sector in liabilities to sources of funds decreased from 57% to 56.4%, while the assets of entrepreneurs increased by 0.3% in 2022.

Entrepreneurial activities in Slovenia have been on the rise in the last two decades. This is also confirmed by the value of the index of total entrepreneurial activity - in 2002 it was 4.6% and in 2020 it amounted to 8% (Sirec et al., 2023). The aspirations of entrepreneurs to expand their businesses have decreased significantly, and the reasons given are the economic crisis and lessons learned during the crisis, risk aversion, and better information from entrepreneurs (Sirec et al., 2023). Digital technology is excellently used at an early stage while the share of established entrepreneurs gradually increases (Sirec et al., 2023). The development of entrepreneurship in the last twenty years have been realized through many programmes, policies and initiatives (Sirec et al., 2023). This support is crucial because it indicates investment in high-quality, innovative entrepreneurship with added value, often with a focus on international markets (Sirec et al., 2023).

The position of Slovenian entrepreneurs is lower compared to the EU average (Sirec et al., 2023). The areas in which Slovenia lags behind the EU average are early-stage entrepreneurship and established entrepreneurship rates (Rebernik & Hojnik, 2017). In addition, "the entrepreneurship policy lags in terms of access to finance, administrative complexity and burdens and entrepreneurship education" (Rebernik & Hojnik, 2017, p. 171). Slovenian entrepreneurs are more internationally and globally oriented than the EU average because it is a small country with a small market and limited resources (Sirec et al., 2023). Sales growth, increased competitiveness, and market expansion are the main motives for entering the international market (Korez-Vide et al., 2010).

The results of previous research indicate that Slovenian entrepreneurs have difficulties and barriers in their development. Korez-Vide et al. (2010) indicate the presence of low awareness and negative experiences of Slovenian entrepreneurs with entrepreneurship policy support for internationalization. Adequate institutional infrastructure, financial resources, and non-competitive prices are the most common barriers to entering foreign markets (Korez-Vide et al., 2010). Some experts state that social and cultural norms are obstacles to the development of entrepreneurship in Slovenia (Korez-Vide et al., 2010), as is an insufficiently developed system of entrepreneurial education (Pejic Bach et al., 2018).

In the paper, Slovenia is seen as a benchmark for defining measures to improve the productivity of Serbian entrepreneurs, since it had a lower productivity growth rate in previous years (Urad Republike Slovenije za Makroekonomske analize in razvoj, 2022), which is the current situation in Serbia. On the other hand, Slovenia achieves similar results in productivity indicators as Serbia - Labour force participation rate for Serbia is 55.20%, while in Slovenia it is 57.80%; the Average rate of labour productivity growth by year for Serbia is 1.29%, while in Slovenia it is 2.43% (CEIC, 2023). Previous research indicates that, according to certain parameters of entrepreneurial activities (Entrepreneurial Attitudes sub-index), Serbia ranks well compared to Slovenia, while it lags significantly behind in terms of Entrepreneurial Aspirations and Entrepreneurial Abilities (Ljajic et al., 2019). Compared to neighboring countries, Slovenia is the only one that belongs to the Moderate innovator with an innovation index of 93.5 (European Commission, 2022). Serbia belongs to the Emerging innovator with a 61.8 innovation index (European Commission, 2022). Also, Slovenia has been the best-ranked economy for entrepreneurial activity development since 2010 (Zvezdanovic Lobanova & Lobanov, 2018).

### 3. Data Collection

The data needed to analyze the productivity of entrepreneurs in Serbia were collected from the report *Companies by Size and Entrepreneurs in the Republic of Serbia* published by the Statistical Office of the Republic of Serbia. Data on the productivity of Slovenian entrepreneurs were taken from the report *Productivity Report* (Urad Republike Slovenije za Makroekonomske analize in razvoj, 2022, p. 118) published by the Institute of Macroeconomic Analysis and Development of the Republic of Slovenia.

Data were collected by year, for the period from 2010 to 2021. Productivity values are secondary data and are not given in the same format for Serbia and Slovenia. The productivity values were calculated for Serbia based on the data provided in the *Companies by size and entrepreneurs in the Republic of Serbia* as the ratio of gross value added to the total number of employees. For Slovenia, the productivity values are presented in the *Productivity Report*. Also, the productivity values are given in RSD for Serbia, while for Slovenia these values are shown in euro.

#### 3.1 Forecast of productivity of entrepreneurial activities in Serbia

The productivity in Serbia in the observed period (2010-2021) generally had an increasing trend (Figure 2). The only drop in productivity was recorded in 2020 as a result of the Covid crisis. In Figure 2 it can be observed that productivity in 2021 records a higher value compared to 2019.

According to IBM SPSS Forecasting 22, analysis of individual model forecasts requires the determination of appropriate parameters: parameter estimates, residual autocorrelation function (ACF), and residual partial autocorrelation function (PACF). ACF and PACF are used to understand the properties of the time series data (Dong et al., 2024, p. 189).

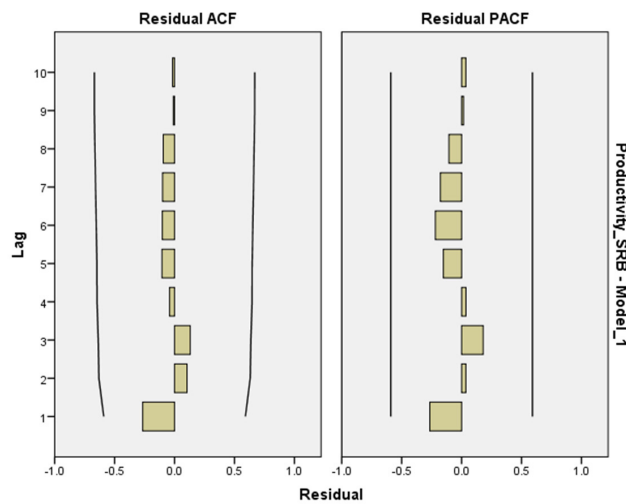
Table 1 shows the statistics for the observed model of productivity of Serbian entrepreneurs. The assessment of the observed model is also based on the values of Root mean square error (RMSE) and Mean absolute percentage error (MAPE), which should have lower values (Gavrila & Ancillo, 2021). Lower values of the RMSE and MAPE indicators indicate better model accuracy (Gavrila & Ancillo, 2021).

**Table 1:** Fit statistics for the productivity of the Serbian entrepreneurial sector

Fit statistics	Productivity of Serbian entrepreneurs
Model type	ARIMA (0,1,0)
N predictors	0
Model fit statistics	
Stationary R <sup>2</sup>	0.588
R <sup>2</sup>	0.870
RMSE	48.962
MAPE	4.401
MaxAPE	14.602
MAE	30.998
Normalized BIC	8.000
Number of outliers	0

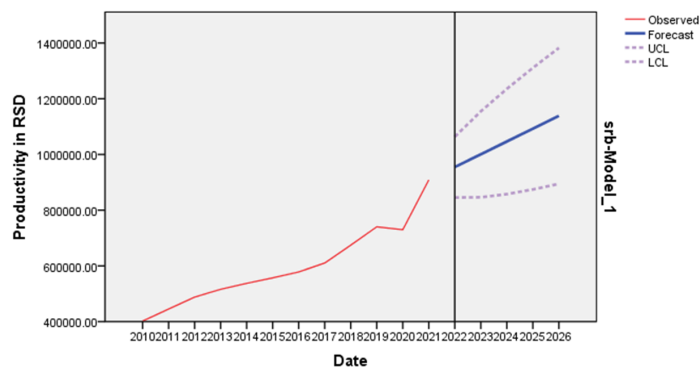
Source: Author's calculation

Based on the mentioned criteria and the results shown in Table 1, it can be concluded that the chosen model is suitable for analysis. The same conclusion can be drawn based on Figure 1, showing the autocorrelation graphs. In ACF plots, the magnitude and direction of the correlation are shown in yellow. Plots show that the time series data are random and range from -0.265 (2010) to 0.131 (2012). PACF is used to monitor the correlation between two observations that the shorter lags do not explain (Dong et al., 2024, p. 189). PACF ranges from -0.265 (2010) to 0.180 (2012).



**Figure 1:** Autocorrelation graphs for the productivity of the Serbian entrepreneurial sector

*Data set forecasting.* Data on the productivity of the entrepreneurial sector of Serbia, based on which the model was formed, were observed for 12 years (2010-2021). The forecast was made for the following five years, which is shown in Figure 2. The red line "observed" shows the movement of variables based on real indicators. The blue "forecast" line shows the assumed movement of the variables in the following period of five years. The line "UCL" shows the highest possible value of the variable in the following five-year period, while the line "LCL" shows the lowest possible value of the variable in the period to come.



**Figure 2:** Forecast of productivity trends in the entrepreneurial sector of Serbia (2022-2026)

The forecast is that the productivity of entrepreneurs will increase in the next five years. According to the results, in 2026, the productivity value will be higher by 19.2% compared to 2022. Such forecasts indicate higher efficiency in the use of human resources as well as the possibility of improving the competence and intellectual abilities of employees in Serbian entrepreneurship.

**Table 2:** Forecasted productivity values of Serbian entrepreneurs by year

Model	2022	2023	2024	2025	2026
Forecast	954540*	1000570	1046610	1092650	1138680
UCL	1063630	1154850	1235560	1310830	1382620
LCL	845440	846290	857650	857650	894740
*Data are shown in RSD					

Source: Author`s calculation

Table 2 shows the estimated productivity results of Serbian entrepreneurs in the following five-year period in nominal amounts.

### 3.2 Forecast of the productivity of entrepreneurial activities in Slovenia

Slovenia's productivity grew in the observed twelve-year period (Figure 4). The only oscillations occurred in 2020 due to the Covid crisis (as in the case of Serbia) but also in 2012. Productivity was higher in 2021 than in 2019.

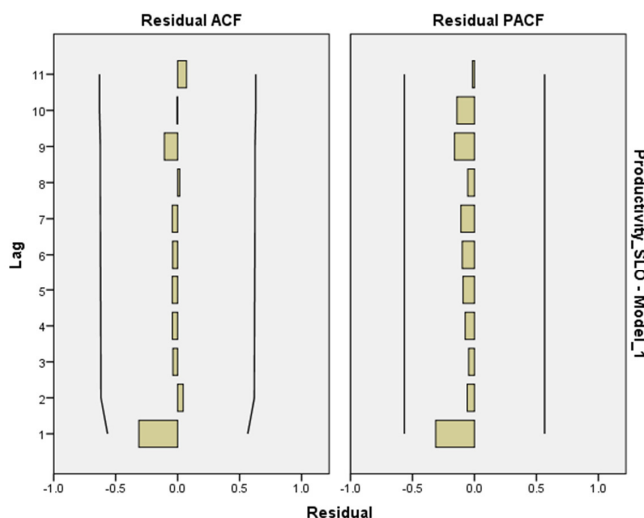
Table 3 shows the results of fit statistics for Slovenian entrepreneurs' observed model of productivity.

**Table 3:** Fit statistics for the productivity of the entrepreneurial sector of Slovenia

Fit statistics	Productivity of Slovenian entrepreneurs
Model type	Holt
N predictors	0
Model fit statistics	
Stationary R <sup>2</sup>	0.629
R <sup>2</sup>	0.883
RMSE	1600.516
MAPE	1.905
MaxAPE	8.399
MAE	871.136
Normalized BIC	15.170
Number of outliers	0

Source: Author's calculation

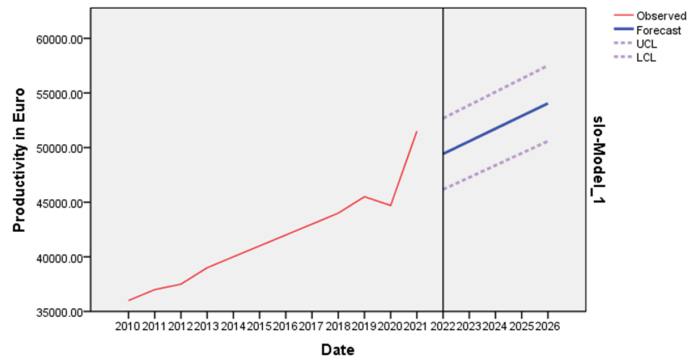
Based on the results shown in Table 3 and the autocorrelation graphs, it can be concluded that the model is suitable for analyzing productivity forecasts (Figure 3). ACF ranges from -0.339 (2010) to 0.071 (2021), while PACF has values from -0.339 (2010) to -0.023 (2021). Indicators Fit statistics, ACF, and PACF indicate better accuracy of the observed model.



**Figure 3:** Autocorrelation graphs for the productivity of the Slovenian entrepreneurial sector



*Data set forecasting.* The productivity of the Slovenian entrepreneurial sector was monitored over a period of 12 years (2010-2021), while a forecast was made for the next five years. The results are shown in Figure 4 and Table 4.



**Figure 4:** Forecast of productivity trends in the entrepreneurial sector of Slovenia (2023-2026)

The productivity of the entrepreneurial sector in Slovenia continues to grow until 2026. According to the results, in 2026 the productivity value will be higher by 8.6% compared to 2022.

**Table 4:** Forecasted productivity values of Slovenian entrepreneurs by year

Model	2022	2023	2024	2025	2026
Forecast	49423.75*	50580.39	51737.04	52893.68	54050.33
UCL	52680.74	53889.16	55096.78	56303.64	57509.77
LCL	46166.75	47271.62	48377.29	49483.72	50590.88

\* Data are shown in EUR

Source: Author's calculation

Table 4 shows the estimated productivity results of Slovenian entrepreneurs in the following five-year period in nominal amounts. Productivity results are significantly higher compared to those of Serbia, so it is necessary that measures should be defined for Serbian entrepreneurs such as those that Slovenia applied for productivity development.

#### 4. Discussion

The analysis of trends in the productivity of the entrepreneurial sector in Serbia and Slovenia provided answers to the research questions. First, the graphic presentation of the trends in the productivity of Serbia and Slovenia until 2019 shows constant growth. These results are in line with the results of previous studies (Zvezdanovic Lobanova & Lobanov, 2018) that both countries have done a lot to improve the entrepreneurial climate - they have improved the process of innovation and acquired skills for starting a business. The parameters of the Serbian innovation index that have been significantly improved are product innovators, employment in innovative enterprises, and business process innovators, while Slovenia has significantly improved public-private co-publications and Job-to-job mobility of HRST (European Commission, 2022). However, networking and insufficient human capital development are still problematic for both countries (Zvezdanovic Lobanova & Lobanov, 2018), which explains the drop in productivity during the crisis periods.

Second, the research results indicate that the productivity of entrepreneurial activities in both Serbia and Slovenia will grow in the coming period. The importance of forecasting the required workforce and their results is also discussed by Kim et al. (2018) stating that such activities lead to greater labour efficiency. Such forecasts are in line with the expectations of the author Crnogaj (2022) that the positive effects of government policy and coherent, holistic and conducive frameworks will strengthen the potential of entrepreneurs in the post-COVID period. Building an institutional framework for entrepreneurship in Serbia is something that in the future Zvezdanovic Lobanova and Lobanov (2018) and Bobera et al. (2014) see as a significant factor in improving entrepreneurial activities. Improving productivity in the coming period requires that a review be carried out of the policies that encourage competition, business conditions, access to financing, as well as the conditions for the introduction of new production processes, modern technologies that lead to greater productivity in the Serbian entrepreneurial sector (World Bank Group, 2019, p. 24). Slovenian entrepreneurs must prepare for the European Green Deal and align their operations with these regulations (Urad Republike Slovenije za Makroekonomske analize in razvoj, 2022, p. 76).

Third, although Serbia's entrepreneurial sector follows Slovenia's in some indicators, Serbia's productivity lags far behind Slovenia's. The high deviation in the productivity values of Serbia compared to Slovenia is a consequence of considerable differences in employment per company and GDP per employee (Zvezdanovic Lobanova & Lobanov, 2018). In previous studies, a low willingness to take risks was identified as a limiting factor in the development of entrepreneurship in Serbia (Zvezdanovic Lobanova & Lobanov, 2018; Ljajic et al., 2019). In that regard, nothing has significantly improved, and one of the reasons is the culture in which private companies were not common form (Radojevich-Kelley, 2011). Following the example of Slovenia, the growth of the productivity of the entrepreneurial sector of Serbia could be achieved by improving external factors of productivity, such as the institutional framework and the tax system, but also by internal factors, such as improving the social capital of employees, business agility and the development of innovations (Urad Republike Slovenije za Makroekonomske analize in razvoj, 2022, p. 42). This is confirmed by the results of the study by Sirec et al. (2023) stating that Serbia must introduce programmes, policies, and entrepreneurship initiatives that have given good results in Slovenia. Also, the orientation of entrepreneurs toward export is a good measure of productivity growth (World Bank Group, 2019).

### Political Implications and Limitations of the Research

*Political implications.* Following the example of Slovenia, the political establishment of Serbia can implement the following measures to increase the productivity of entrepreneurs: institutional framework, tax system reform, active promotion of changes, larger investments, additional subsidies, and support towards export orientation. Encouraging the growth of productivity contributes to the economic well-being of the country through increasing the value of the GDP and the growth of population consumption.

*The limitations* are twofold. First, the study bases its research on secondary data, which narrows the possibilities of explaining the achieved productivity levels. The data analyzed in this way may not provide a lot of suggestions regarding the improvement of individual productivity, but they show the trend of the productivity of the entire entrepreneurial sector, so they are significant data in macroeconomic research. Second, the research analyzes the productivity values of the entire entrepreneurial sector without additional information on productivity by branches. This and other information was not available in the analyzed statistical reports of Serbia and Slovenia, which is also the situation with most reports in other countries (Orser, Riding & Li, 2019).

*Future research* can focus on analyzing a larger number of business performances and investigating entrepreneurial factors that influence these performances, among which artificial intelligence and the regulatory environment are particularly significant.

**Acknowledgment:** This research is supported by the Ministry of Science, Technological Development and Innovation of the Republic of Serbia by the Decision on the scientific research funding for teaching staff at the accredited higher education institutions in 2024 (No. 451-03-65/2024-03/200375 of February 5, 2024).

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Received: 2023-09-13

Revision requested: 2024-05-05

Revised: 2024-05-27 (1 revision)

Accepted: 2024-09-03

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