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**--TRANSFORMATIONS IN --- BUSINESS & ECONOMICS**



# THE ATTRACTIVENESS OF FOREIGN DIRECT INVESTMENTS FOR BUSINESS: THE CASE OF THE SELECTED EUROPEAN UNION MEMBERS [1]

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***ABSTRACT. Foreign direct investment is a very important factor in the country's development, the transport of goods, services, know-how, and it is one of the main indicators of the country's degree of globalisation. Based on the principle of inflows and outflows of foreign direct investment, we can define the openness of the economy, which therefore contributes to development but also to its vulnerability to changes in global markets. In this study, we assess the attractiveness and productivity of countries in terms of foreign direct investment. We examined 24 countries of the European Union during the period 2011-2019, using the Malmquist productivity index and cluster analysis among the main methods included in the study. Based on the research findings it can be concluded that there are significant differences in the changes in the attractiveness of countries at the beginning and end of the period under review, with a trend reducing the attractiveness of countries. Furthermore, there are significant differences between countries in terms what is the reason for changes in productivity/attractiveness. While management influences prevail in Central and Eastern European countries, technological influences prevail in Western European countries. These findings can be incorporated into policies in order to increase the attractiveness of the countries of the European Union as well as the European Union as a whole.***

***KEYWORDS:*** efficiency, FDI, productivity, Data Envelopment Analysis, Malmquist.

***JEL classification:*** F62, P33, D24, O47.

## Introduction

Foreign direct investment is a key to economic development in countries. It is a component of globalisation that supports the globalisation of trade and the economy in the world. Inflows and outflows of foreign investment cause not only capital flows but also result in the flow of technology, know-how and knowledge (Luo *et al.,* 2021; Ślusarczy *et al.,* 2020; Škare *et al.,* 2020; Shmarlouskaya *et al.,* 2021; Wyrwa, 2018). These patterns are especially typical for countries with developed systems of knowledge-based activities support (Burinskas *et al.,* 2021; Oliinyk *et al.,* 2021; Nassar, Tvaronavičienė, 2021; Radavičius, Tvaronavičienė, 2022). The European Union is a political grouping of countries which is very interesting in terms of FDI research. The European Union is a big target market but also a large source market for FDI. Research shows that FDI accounts for a significant share of economic growth, employment, exports of goods and services (Khan *et al.,* 2021; Mazzanti *et al.,* 2020; Dritsakis, Stamatiou, 2018; Lincényi, Fabuš, 2017; Mehmood *et al.,* 2021; Kryvinska *et al.,* 2013).

Inflows and outflows of foreign investment are conditioned by many factors. These factors create attractiveness for foreign investors (Mehta *et al.,* 2020; Akbari *et al.,* 2021). There is a correlation between countries' efficiency in terms of selected non-parametric outputs and foreign direct investment inflows. Thus, as an effective country transforms the basic factors of production — land labour and capital into outputs — GDP or export is in a relatively strong relationship with FDI (Doytch, 2021; Jayasekara, 2015; Susic *et al.,* 2017; Ključnikov *et al.,* 2021). Factors that influence FDI inflows can be categorised in multiple areas, but political stability, size and growth of the economy, salaries, labour productivity,

taxes, infrastructure, external trade dynamics, cultural factors influencing the foreign investors' perception and many others (Adamczyk, 2021; Dheera-aumpon, Changwatchai, 2020; Wijoyo, Cahyono, 2020; Białek-Jaworska, Klapkiv, 2021; Bhutto *et al.,* 2020) can be included. The way a country is attractive to foreign investors is, of course, also due to the managerial skills that help the influx of foreign investments (Teplova, Sokolova, 2019). Another factor is corruption and the level of jurisprudence, with corruption affecting FDI predominantly negatively and the efficiency of the judiciary positively (Comi *et al.,* 2021; Krifa-Schneider *et al.,* 2022; (Comi *et al.,* 2021; Krifa-Schneider *et al.,* 2022; Androniceanu *et al.,* 2022; Woo, Heo, 2009). A clear summary of the impacts of the above-mentioned factors of attractiveness is a meta-analysis carried out in 97 primary studies, and its significant benefit is also a summary of the main indicators associated with these factors (Bailey, 2018). The influx of FDI is good for countries and individual businesses. The presence of FDI in the enterprise increases the efficiency of production (Ghali, Rezgui, 2011; Urikova *et al.,* 2013).

The influence of factors and its intensity depends on the source market of FDI and the destination countries. Therefore, research needs to look at regional differences and examine the intensity of impacts at an extended level (Rubini *et al.,* 2021; Androniceanu, 2020; Islam *et al.,* 2020). One of the most important political groups in the world is the European Union (EU). The enlargement of the EU in 2004 had a major impact on the enlargement of borders and thus on the political and economic change of neighbouring countries. This, of course, has produced positive economic effects on the countries of the original EU-15 (Dorakh, 2020). As the countries that joined the EU in 2004 are mostly situated in the Central and Eastern parts of Europe (CEECs), this has triggered a considerable amount of research that examines the differences in these geographical units. These studies show that Eastern European countries achieve a greater forward spillover effect than China (Fan *et al.,* 2022), and FDI alone cannot ensure CEECs' income convergence, but emphasis must be placed on the development of human capital, (Kekic, 2018; Völlmecke *et al.,* 2016). It is essential to emphasize the social aspect of FDI for individual regions of the EU (Rubini *et al.,* 2021). In addition, FDI can even have a negative impact on the development of economic freedom in Western EU countries (Sayari, 2019). It should be noted that one of the main catalysts of FDI inflow in countries that joined the EU in 2004 and later are low labour costs and a qualified and experienced workforce. It is also emphasised that in developing knowledge economy, investors cooperate more with local companies than with educational institutions (Bellak *et al.,* 2008; Boghean and State, 2015; Gauselmann *et al.,* 2011; Prochazka, Cerna, 2022). FDI influx is also supported by various tax breaks for investors and various other promotion activities (Crescenzi *et al.,* 2021; Ślusarczyk, 2018).

Based on a literature survey, we have identified the importance of examining regional differences in the attractiveness of both FDI and ODI in EU countries, which are relatively dynamically changing. We targeted to examine the above-mentioned aspects and changes in the attractiveness of FDI in selected EU countries over a selected period of time. We decided to look for similarities in the attractiveness of EU countries in terms of attracting foreign investors. We will also examine the impact of various political (management) decisions and technological development on the attractiveness of FDI.

## 1. Methods and Variables

To evaluate the productivity of FDI attractiveness in EU countries, the Malmquist productivity index (MPI) was used. Many studies that evaluated the processes related to the

attractiveness and productivity of FDI mentioned in the previous section used two main methods, namely Data Envelopment Analysis (DEA) and MPI (Acar, Özer Torgalöz, 2022; Dorakh, 2020; Krifa-Schneider *et al.*, 2022; Lei *et al.*, 2013; Rubini *et al.*, 2021, 2021; Sayari, 2019; Tanna, 2009).

According to Färe *et al.*, (1994), the Malmquist Productivity Index (MPI) measures changes in productivity along with changes in time and can be broken down into changes in efficiency and changes in technology using a non-parametric DEA approach. The MPI can be expressed by the distance function (E) as equation (1) and equation (2) by observations at time t and t + 1.

$$MPI_I^t = \frac{E_I^t(x^{t+1}, y^{t+1})}{E_I^t(x^t, y^t)} \tag{1}$$

$$MPI_I^{t+1} = \frac{E_I^{t+1}(x^{t+1}, y^{t+1})}{E_I^{t+1}(x^t, y^t)} \tag{2}$$

Where *x* is the vector of inputs, *y* is the vector of outputs and I denote the orientation of the model (Input). The geometric mean MPI from equations (1) and (2) can then be calculated as shown in equation (3).

$$MPI_I^G = (MPI_I^t . MPI_I^{t+1})^{1/2} = \left[\left(\frac{E_I^t(x^{t+1}, y^{t+1})}{E_I^t(x^t, y^t)}\right).\left(\frac{E_I^{t+1}(x^{t+1}, y^{t+1})}{E_I^{t+1}(x^t, y^t)}\right)\right]^{1/2} \tag{3}$$

This geometric mean can then be divided into so-called technological change (TECHCH) — change in technological efficiency (TE) and change in efficiency (EFFCH) — change in managerial efficiency (ME), see equation (4).

$$MPI_I^G = (EFFCH_I . TECHCH_I^G)^{1/2} = \left(\frac{E_I^{t+1}(x^{t+1}, y^{t+1})}{E_I^t(x^t, y^t)}\right).\left[\left(\frac{E_I^t(x^t, y^t)}{E_I^{t+1}(x^t, y^t)}\right).\left(\frac{E_I^t(x^{t+1}, y^{t+1})}{E_I^{t+1}(x^{t+1}, y^{t+1})}\right)\right]^{1/2} \tag{4}$$

Technological change is caused by changes in technology (investments in new machines and buildings). The change in efficiency is caused by managerial decisions. If the value of the indicator is greater than 1, it means that there is an increase in efficiency. If the value is less than 1, it means that there is a decrease in efficiency (Färe *et al.*, 1994; Richterová *et al.*, 2021).

Data used in this study were obtained from publicly available sources of Eurostat and UNCTAD databases (Eurostat, 2022; United Nations, 2022). Based on the relevance of the research and the availability of resources, a sample of the European Union countries was examined for the period from 2011 to 2019. Malta, Cyprus, and Luxembourg were eliminated from the total EU27 current member states since they are not homogenous with the larger countries and the MPI approach encountered inconsistencies in final productivity Categorisation. Several studies note the occurrence of anomalies and limits of these three countries when using DEA methodologies to measure the productivity of the EU27.

We use 4 input variables:

- Gross fixed capital formation — bn. EUR
- Energy consumption in the industry — tons of oil equivalent
- Energy consumption in services — tons of oil equivalent

- Human capital as input variables — thousands.

As output variables we use 3 variables:

- FDI Inward stocks — bn. THE USD.
- FDI outward stocks and — bn. THE USD.
- GDP — bn. THE USD.

The above-mentioned variables are commonly used in studies which measure productivity in productivity analysis in terms of FDI (Lei *et al.*, 2013; Sur, Nandy, 2018; Wang *et al.*, 2018).

## Results and Discussion

*Table 1* shows detailed results from the beginning and the end of the measured period.

**Table 1. Results of Malmquist productivity index**

| | 2011-2012 | | | 2018-2019 | | |
|---|---|---|---|---|---|---|
| Country | MPI | ME | TE | MPI | ME | TE |
| Austria | 1.0305 | 1.0188 | 1.0115 | 0.9909 | 0.9617 | 1.0303 |
| Belgium | 1.0315 | 0.9863 | 1.0458 | 1.0059 | 1.0150 | 0.9910 |
| Bulgaria | 0.9961 | 0.9850 | 1.0113 | 0.9923 | 1.0072 | 0.9852 |
| Croatia | 1.0394 | 0.9628 | 1.0796 | 1.0159 | 1.0086 | 1.0072 |
| The Czech Republic | 1.0220 | 0.9855 | 1.0370 | 1.0098 | 1.0021 | 1.0076 |
| Denmark | 1.0359 | 1.0000 | 1.0359 | 1.0335 | 1.0000 | 1.0335 |
| Estonia | 0.9341 | 0.9091 | 1.0274 | 1.0509 | 1.1361 | 0.9251 |
| Finland | 1.0036 | 0.9834 | 1.0205 | 1.0142 | 0.9886 | 1.0259 |
| France | 1.0044 | 1.0239 | 0.9810 | 0.9922 | 0.9707 | 1.0221 |
| Germany | 1.0047 | 1.0479 | 0.9588 | 1.0030 | 0.9790 | 1.0246 |
| Greece | 1.0756 | 1.0000 | 1.0756 | 1.0350 | 1.0000 | 1.0350 |
| Hungary | 1.0612 | 1.0230 | 1.0373 | 1.0072 | 0.9970 | 1.0102 |
| Ireland | 1.1006 | 1.0000 | 1.1006 | 0.8077 | 1.0000 | 0.8077 |
| Italy | 1.0370 | 1.0490 | 0.9886 | 0.9999 | 0.9917 | 1.0082 |
| Latvia | 0.8755 | 0.8028 | 1.0905 | 1.0074 | 1.0043 | 1.0031 |
| Lithuania | 1.0690 | 0.9682 | 1.1041 | 1.0527 | 1.0351 | 1.0171 |
| The Netherlands | 1.0362 | 1.1040 | 0.9386 | 0.9616 | 1.0000 | 0.9616 |
| Poland | 1.0611 | 0.9530 | 1.1134 | 1.0515 | 1.0438 | 1.0073 |
| Portugal | 1.0789 | 1.0681 | 1.0101 | 1.0162 | 1.0144 | 1.0017 |
| Romania | 1.0051 | 1.0247 | 0.9809 | 1.0043 | 0.9752 | 1.0298 |
| The Slovak Republic | 1.1507 | 1.0780 | 1.0675 | 1.0571 | 1.0510 | 1.0058 |
| Slovenia | 1.0656 | 1.0459 | 1.0189 | 1.0422 | 1.0145 | 1.0273 |
| Spain | 1.0195 | 1.0416 | 0.9788 | 0.9957 | 0.9745 | 1.0218 |
| Sweden | 1.0368 | 0.9967 | 1.0402 | 1.0180 | 1.0058 | 1.0121 |

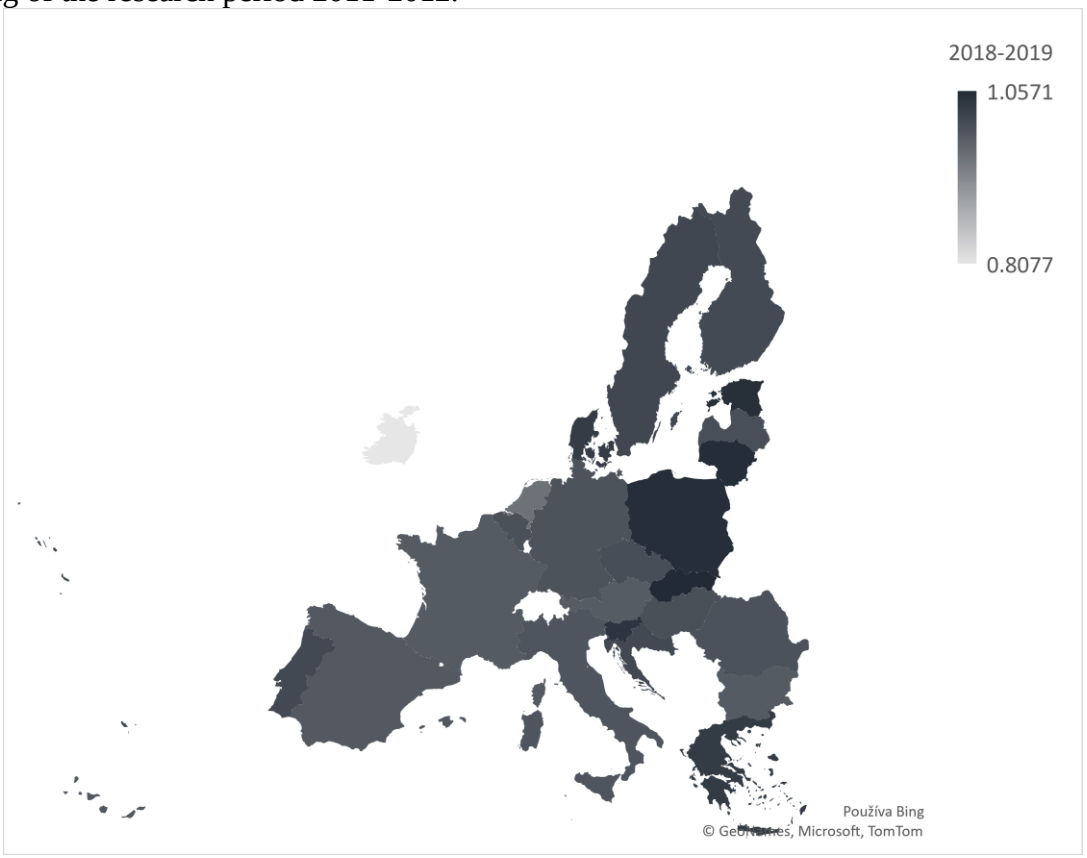
*Source:* author's own results.

At the beginning of the observed period (2011/2012), the change in MPI values recorded the most significant positive value in the Slovak Republic (1.1507/15.07 %) and Ireland (1.1006/10.06 %). A significant decrease in MPI values was observed in Latvia (0.8755/-12.45 %) and Estonia (0.9341/-6.59 %). Positive managerial changes (ME) were the most significant in the Netherlands (1.1040/10.40 %) and the Slovak Republic (1.0780/7.80 %). The lowest ME values were recorded in Latvia (0.8028/-19.2 %). The highest increase in technological changes was detected in Poland (1.1134/11.34 %) and Lithuania (1.1041/10.41 %). The most significant decrease in TE was reached in the Netherlands (0.9386/-6.14 %).

The MPI values in the last examined period (2018-2019) reached less significant differences of change than at the beginning of observation. The highest value of MPI was reached by the Slovak Republic (1.0571/5.71 %) and Lithuania (1.0527/5.27 %). The decrease

of MPI reached seven countries; the highest and the most significant decrease was in Ireland (0.8077/-19.23 %). The highest increase in managerial change value was reached by Estonia (1.1361/13.61 %). Four countries experienced stagnation, and eight countries observed a decrease in ME, in the range of less than -4 %. Most of the countries achieved positive technological change with slightly significant values. On the other hand, five countries detected a decrease, the most significant was visible in Ireland (0.8077/-19.23).

*Figure 1* shows the values of the Malmquist productivity index of each country at the beginning of the research period 2011-2012.

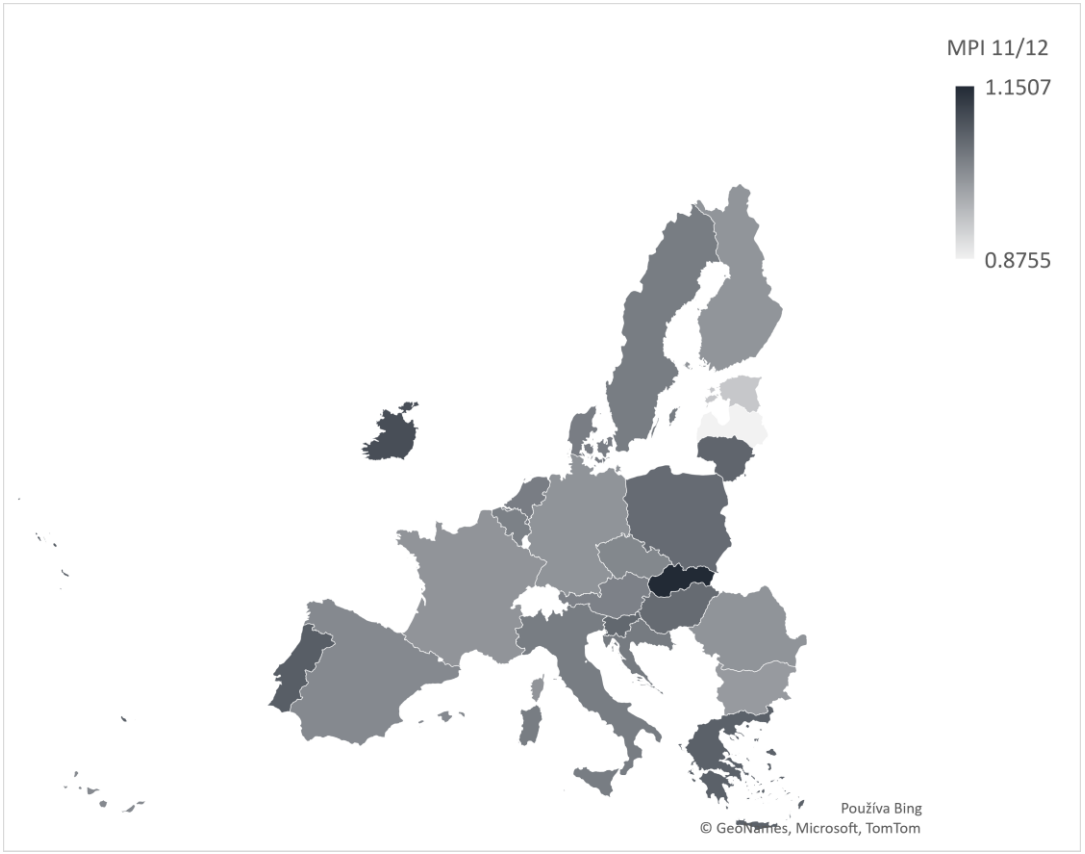



*Source:* author's own results.

*Figure 1.* **MPI Values for 2011-2012**

The changes in the MPI values at the beginning of the period under review, i.e. 2011/2012, show predominant diversity in geographical distribution within the countries surveyed in the European Union. The highest MPI change was achieved by the Slovak Republic (1.1507/15.07 %) and Ireland with a significant value (1.1006/10.06 %). The lowest values were reached by Lithuania (0.8755/-12.45 %) and Estonia (0.9341/-6.59 %).

*Figure 2* shows the values of the Malmquist productivity index of each country in the last stage of the research period, 2018-2019.



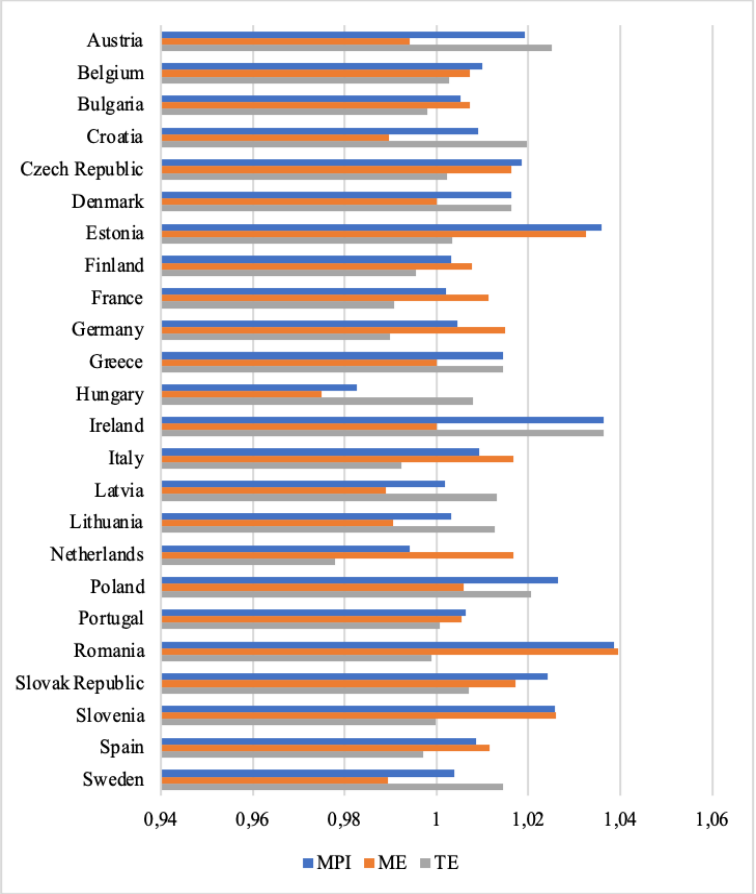

*Source:* author's own results.

*Figure 2.* **MPI Values for 2018-2019**

When depicting and observing individual countries in the last year of the reporting period, it can be concluded that MPI changes are largely favourable in Eastern Europe and the Baltic States, except of Greece and Denmark, where they also have positive significant values. The highest MPI was reached the same way as at the beginning of the reporting period (1.0571/5.71 %). The lowest MPI was recorded by Ireland (0.8077/-19.23 %), which was, on the contrary, very favourable at the beginning of the period under review.

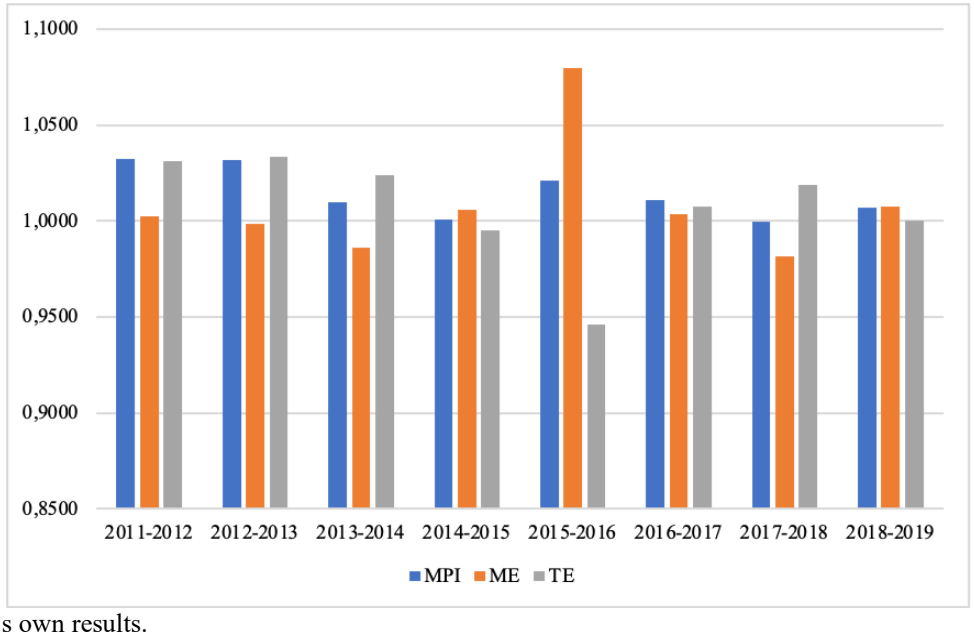
The average of individual variables MPI, ME, and TE, together for all years of examined period is shown in *Figure 3*.

The results in *Figure 3* show that the highest increase in average MPI change was recorded in Romania (3.86 %), Ireland (3.65 %) and Estonia (3.60 %). On the other hand, an average MPI decrease was observed only in two countries, Hungary (-1.72 %) and the Netherlands (-0.58 %.) The highest average managerial changes were identified in Romania (3.96 %) and Estonia (3.26 %.) Contrary to MPI, the average managerial changes observed decreased in 6 countries. The highest decrease was in Hungary (-2.51 %). The most significant average increase in technological changes was recorded in Ireland (3.65 %), which was the same amount as the country's MPI average change. The average technological change decreased in 9 countries, with no more than 1 % per country, except the Netherlands, where the decrease was -2.21 %.




*Source:* author's own results.

*Figure 3.* **Geometric Average Values per Country**



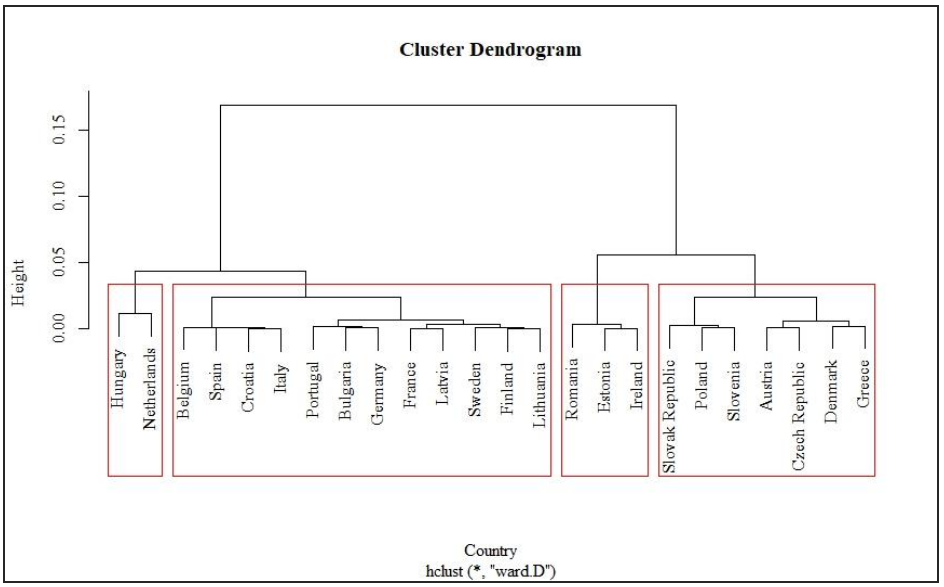

*Source:* author's own results.

*Figure 4.* **Average Values of Productivity Indicators**

*Figure 4* shows the averages of the values of all countries for each year of the period 2011-2019.

The trend of decline or increase has not been detected by examining the geometric averages. In addition to a larger anomaly in the period 2015-2016, where it significantly increased the managerial change and reduced the technological change, there is a diversity in a relatively low dispersion of about 3%. It can also be assessed that in the recent period 2018-2019, all three values are the most balanced.

Based on the verification, of whether there are differences in the attractiveness of FDI countries, we used cluster analysis. We used the elbow method to determine the number of clusters, and for all three indicators of change in productivity and efficiency, we found the possibility of creating four clusters. *Figure 5* shows the results of the country-specific MPI scores integrated into clusters. The underlying values for cluster analysis are geometric averages of productivity values over the reference period.




*Source:* author's own results.

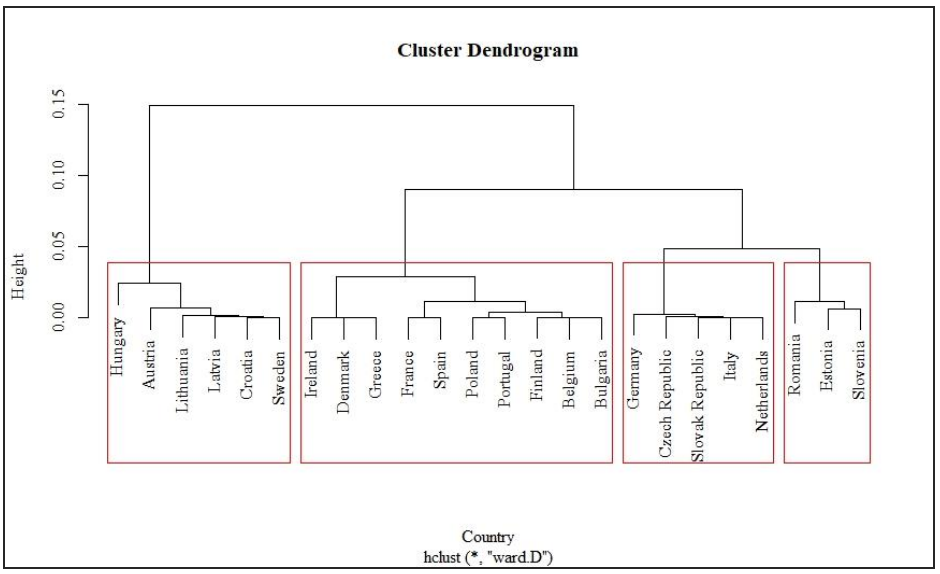
*Figure 5.* **Dendrogram of the Average MPI Values**

Based on the results of the cluster analysis, several findings can be identified. Romania, Estonia and Ireland accounted for the highest productivity change over the period under review. This is followed by a larger cluster of countries - Slovakia, Poland and Slovenia. This cluster, except for Hungary, includes the V4 countries. Germany, Bulgaria, France and Finland are in the largest cluster of countries. This cluster includes highly industrialised countries. In the last cluster, there are countries where productivity falls on average — Hungary and the Netherlands. We have also created clusters for ME and TE values.

*Figure 6* shows the results of the evaluation of results managerial efficiency changes in individual countries integrated into clusters.

Based on the results of the cluster analysis for managerial efficiency change in productivity, it can be concluded that the highest positive changes in management efficiency occurred in Slovenia, Romania and Estonia. Ranking of the countries is followed by Germany, Czechia, Slovakia, Italy and the Netherlands. In the next cluster are Ireland, Denmark and Poland. There was still a positive trend in these countries, except for Ireland and

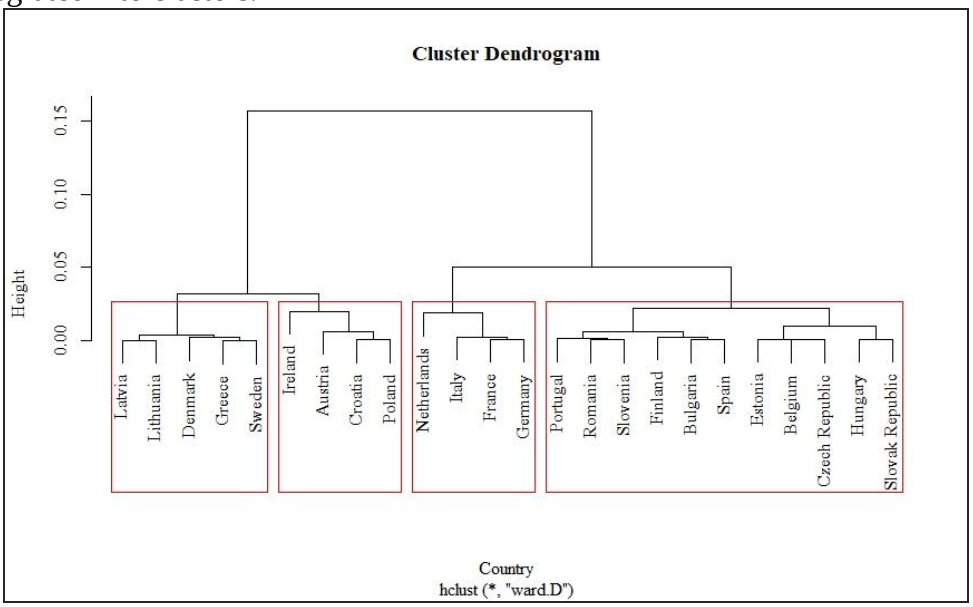
Denmark, where, on average, the management efficiency remained unchanged. Hungary, Austria, Sweden, Lithuania, Latvia and Croatia can be found in the last cluster. These countries show a declining trend in managerial efficiency.




*Source:* author's own results.

*Figure 6*. **Dendrogram of Average Managerial Changes**

*Figure 7* shows the evaluation of the technological efficiency changes of individual countries integrated into clusters.




*Source:* author's own results.

*Figure 7*. **Dendrogram of Average Technological Changes**

The cluster of countries with the highest positive change in technological efficiency is made up of the countries Ireland, Poland, Croatia and Austria. They are followed by another cluster including Latvia, Lithuania and Denmark. The largest cluster is the third cluster with

countries such as the Czech Republic, Estonia, Spain and others, comprising a total of 11 countries. Already in the third cluster, there has been a drop in technological efficiency — Slovenia, Romania, Bulgaria, Spain, and Finland. The biggest decline in technological efficiency occurred in the Netherlands, Italy, France and Germany.

## Conclusions

This chapter will summarise our findings and will highlight the interrelationship that can be established based on the results of our research. In this paper, we assessed the attractiveness of countries in terms of FDI inflows, including foreign investment outflows (ODI), which is another indicator of the degree of globalisation and development of the country. Such a model has the potential to plausibly assess the situation in those countries. We decided to use the Malmquist productivity index to measure the changes between 2011 and 2019.

First of all, it should be noted that changes in productivity indicators were less pronounced at the end of the period under review, suggesting a moderate downturn due to market stabilisation, but also changes in the main factors affecting the attractiveness of countries, e.g. wage growth. Differences can also be observed in the geographical distribution of countries that are more productive — more attractive, even if these are not large differences. These countries are mainly located in Central and Eastern Europe (CEECs).

There was no significant trend detected in the change of managerial and technological efficiency in the countries observed within the period under review. However, productivity gains have been largely driven by technological change for several years. This is also in line with the objectives of the various instruments implemented not only by the countries but also by the EU. These are different investments in technology development, innovation, and modern solutions in industry and services.

These changes may vary from country to country, which has been confirmed by further analysis. Significant improvements in managerial (technical) efficiency were mainly present in Romania, Estonia, Slovenia and Slovakia. This can be explained by measures introduced by governments that seek to make various tax breaks, but also other factors more attractive for investors. In terms of technological efficiency, Austria, Ireland, Denmark and Sweden are among the most efficient countries. Most of these countries have quite successfully implemented a variety of tools to help them develop and streamline the technology in services and industries. They are also characterised by high productivity.

Based on the obtained results, it can be concluded that this research has brought some interesting findings and a new perspective on measuring the attractiveness of countries to foreign investors. This research also suggests further research opportunities, e.g. survey based on selected factors of FDI influx in terms of the geographical and political affiliation of the countries.

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**TIESIOGINIŲ UŽSIENIO INVESTICIJŲ PATRAUKLUMAS VERSLUI: PASIRINKTŲ EUROPOS SĄJUNGOS NARIŲ ATVEJIS**

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**SANTRAUKA**

Tiesioginės užsienio investicijos (TUI) – svarbus šalies vystymosi, prekių, paslaugų ir praktinių žinių gabenimo veiksnys, taip pat vienas iš pagrindinių šalies globalizacijos lygio rodiklių. Šiame tyrime vertinamas šalių patrauklumas ir produktyvumas tiesioginių užsienio investicijų požiūriu. Remiantis tyrimo rezultatais galima daryti išvadą, kad šalių patrauklumo pokyčiai nagrinėjamo laikotarpio pradžioje ir pabaigoje labai skiriasi, o šalių patrauklumas linkęs mažėti. Šios išvados gali būti įtrauktos į politiką siekiant padidinti Europos Sąjungos šalių ir visos Europos Sąjungos patrauklumą.

*REIKŠMINIAI ŽODŽIAI:* veiksmingumas, TUI, produktyvumas, duomenų apgaubties analizė (DEA), Malmkvisto indeksas.