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**PROCJENA UČINKOVITOSTI SMJEŠTAJNOG SEKTORA
U ODABRANIM ZEMLJAMA EUROPSKE UNIJE:
PERSPEKTIVA MIKORAZINE**

**EVALUATING THE EFFICIENCY OF THE ACCOMMODATION
SECTOR IN SELECTED EUROPEAN UNION COUNTRIES:
A MICRO-LEVEL PERSPECTIVE**

SAŽETAK: Ovaj članak bavi se kvantitativnom procjenom učinkovitosti poduzeća koja posluju u smještajnom sektoru u zemljama Europske unije. Analiza se temelji na računovodstvenim podacima poduzeća, a rezultati su zatim agregirani na razinama zemalja korištenjem medijana. Učinkovitost zemlje izvedena je iz rezultata od ukupno 11.070 poduzeća između 2018. i 2021. godine, što također omogućuje praćenje utjecaja pandemije COVID-19. S obzirom na raznolikost turizma u zemljama EU-a, one su podijeljene u šest skupina. Osim za 2020. godinu, rangiranje zemalja prema razini učinkovitosti pokazalo se relativno stabilnim. Prvo mjesto zauzela je Francuska, a posljednje Latvija. U vrijeme najjačih ograničenja (tj. 2020. godine), zemlje u trećem i četvrtom klasteru poboljšale su plasman, gdje je manjak u potražnji za smještajem zamijenjen domaćom potražnjom. Primjeri uključuju Republiku Češku i Sloveniju.

KLJUČNE RIJEČI: smještajni sektor, računovodstveni podaci, klaster analiza, učinkovitost, pandemija

ABSTRACT: This article deals with a quantitative assessment of the efficiency of enterprises in EU countries that fall into the accommodation sector. The analysis is based on company accounting data and the results are then aggregated to the country level using median values. Country efficiency is derived from the performance of a total of 11,070 enterprises between 2018 and 2021, which also allows monitoring the impact of the COVID-19 pandemic. Considering the diversity of tourism in the EU countries, they have been divided into six groups. Except for 2020, the ranking of countries by efficiency level was found to be relatively stable. The first position was occupied by France, the last by Latvia. At the time of the strongest restrictions (i.e. 2020), countries in the third and fourth clusters improved in the ranking, where shortfalls in accommodation demand were replaced by resident demand. Examples include the Czech Republic and Slovenia.

KEY WORDS: accommodation sector, accounting data, cluster analysis, efficiency, pandemic

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1. UVOD

Putovanja, turizam i poslovna putovanja postali su nešto što se podrazumijeva ili se čak smatraju načinom života za milijune ljudi diljem svijeta. Zahvaljujući modernim tehnologijama, to je danas lakše nego ikad prije. U 2021. godini u Europskoj uniji zabilježeno je više od 374 milijuna putnika u zračnom prometu, a u 2019. godini (tj. prije pandemije) čak i više od milijardu putnika (Eurostat, 2023). Statistički podaci pokazuju slične vrijednosti dolazaka u turističke smještajne objekte. Konkretno, 2019. godine putovalo je nešto manje od milijarde ljudi, dok je 2021. godine taj broj iznosio samo 0,6 milijarde (Eurostat, 2025). Uz razvoj putovanja, mogu se pratiti i povezane usluge. Nakon odabira destinacije, smještaj je glavno područje kojim se potrošači bave prilikom putovanja. Izbor određenog smještaja ovisi o brojnim čimbenicima poput cijene, lokacije i recenzija gostiju. Posebno se mlađe generacije udaljavaju od putovanja koje organiziraju putničke agencije te sami organiziraju svoja putovanja, čime se značajno smanjuju financijski troškovi povezani s putovanjima (Acorn Tourism Consulting, 2025).

Međutim, sve veća popularnost putovanja i turizma također je izazvala zabrinutost i pitanja o okolišu i budućnosti planeta. Opće je mišljenje danas da putovanja u sadašnjim razmjerima dugoročno nisu održiva. Primjerice, samo su smještaj i ugostiteljstvo kao gospodarska aktivnost prema NACE Rev. 2 proizvele u 2021. godini u EU-u više od 14 milijuna tona stakleničkih plinova. Iako je to smanjenje od 33% u usporedbi s 2012. godinom, i dalje se radi o značajnoj količini (Eurostat, 2023). Stoga ne čudi da su posljednjih godina objavljene brojne studije koje su se bavile ovim problemom i pokušale predložiti rješenja, primjerice Dolnicar (2020) ili Väisänen *et al.* (2023).

Dokazano je da su potrošači skloniji manjoj štedljivosti na odmoru ili putovanjima u usporedbi s podacima o uobičajenoj

1. INTRODUCTION

Travel, tourism and business trips have become a matter of course or even a lifestyle for millions of people all over the world. Owing to modern technologies, this is easier than ever before. In 2021, there were more than 374 million air passengers in the European Union, and even more than one billion passengers in 2019 (i.e. before the pandemic) (Eurostat, 2023). The statistics show similar values for arrivals to tourist accommodation establishments. Specifically, for 2019 there were just under a billion people, and in 2021 only 0.6 billion people (Eurostat, 2025). Along with the development of travel, the associated services can also be monitored. After choosing a destination, accommodation is the main area that consumers address when travelling. The choice of a particular accommodation depends on many factors, including price, location and guest reviews. The younger generations in particular are typically moving away from organised tours by travel agencies and arranging all their own travel, thus significantly reducing the financial costs associated with travel (Acorn Tourism Consulting, 2025).

However, the increasing popularity of travel and tourism has also raised concerns and questions about the environment and the future of the planet. The general view today is that travel on the current scale is unsustainable in the long term. For example, just accommodation and food services activities as an economic activity by NACE Rev. 2 produced in EU in 2021 more than 14 million tonnes of Greenhouse gases. Although it is a reduction of 33 % compared to 2012, it is still a substantial amount (Eurostat, 2023). It is not surprising, then, that many studies have been published in recent years that have addressed this issue and attempted to propose solutions, for example Dolnicar (2020) or Väisänen *et al.* (2023).

Consumers have been proven to tend to be less frugal on holidays/trips compared to

potrošnji kod kuće. Dakle, iako prevladava trend određene udobnosti i konzumerizma, prema Juvanu i Dolnicar (2014), udio ljudi koji su svjesni važnosti okoliša i održivosti raste. Promjene u smjeru održivosti mogu se vidjeti i kod samih pružatelja usluga. Kao što pokazuju rezultati Pereira-Moliner (2021) ili Sakshi *et al.* (2020), pozitivan utjecaj na troškove pružatelja usluga može se vidjeti pri primjeni održivih politika. Informacije o održivosti također dolaze do izražaja na platformama za pretraživanje interneta. Tako, na primjer, platforma Booking.com daje potrošačima informaciju o razini održivosti putovanja koja se izvodi iz ukupno 29 pokazatelja poput gospodarenja otpadom, uštede vode i energije, metoda smanjenja stakleničkih plinova ili stupnja kompenzacije za ugljični otisak i prisutnost zelenila u okolini.

Općenito se stoga može zaključiti da se velika pozornost posvećuje održivosti. Međutim, pitanje putovanja i turizma može se promatrati iz drugačijeg kuta pa se može razmatrati učinkovitost pojedinačnih pružatelja usluga. Analiza neučinkovitih subjekata pomoći će ne samo upravi u poboljšanju funkcioniranja objekata, već može doprinijeti i održivosti sektora u cjelini. Održivost bi trebala koegzistirati s ekonomskom učinkovitošću da bi bila doista korisna.

Proučavajući područje smještaja, može se primijetiti da su dosadašnja istraživanja o kvantitativnoj procjeni učinkovitosti obično bila regionalne prirode. Unutar EU-a, primjeri uključuju autore koji proučavaju učinkovitost hotela u Španjolskoj (Lado-Sestayo i Fernández-Castro, 2019), u Portugalu (Oliveira *et al.*, 2015) i u Italiji (Pulina *et al.*, 2010). Međutim, takve studije nisu pogodne za usporedbe među zemljama. U kontekstu međunarodne perspektive, vrijedno je spomenuti studiju grupe autora Alinsato *et al.* (2022) koji su analizirali 111 zemalja iz cijelog svijeta i čiji su rezultati procjene učinkovitosti pokazali da razina učinkovitosti ovisi o prihodima zemlje, kao i o kvalifikacijama radne snage. Također su ispitali rezultate

their normal consumption at home. Thus, although the trend of certain comfort and consumerism prevails, according to Juvan and Dolnicar (2014) there is an increasing proportion of people who are aware of the importance of the environment and sustainability. Changes towards sustainability can also be seen in the service providers themselves. As the results of Pereira-Moliner (2021) or Sakshi *et al.* (2020) show, positive impact on providers' costs can be seen when applying sustainable policies. Sustainability information is also coming to the fore on internet search platforms themselves. Thus, the Booking.com platform offers information on the level of travel sustainability, which is derived from a total of 29 indicators such as waste management, water and energy conservation, methods of reducing greenhouse gases, or carbon footprint compensation degree and presence of greenery in the environment.

In general, therefore, it can be concluded that a great deal of attention is being paid to sustainability. However, the issue of travel and tourism can be looked at from a different angle and the efficiency of individual providers can be examined. The analysis of inefficient entities will not only help management to improve the functioning of their facilities but can also contribute to the sustainability of the sector as a whole. Sustainability should coexist with economic efficiency to be truly useful.

Focusing on the area of accommodation, it can be noted that research conducted to date on quantitative evaluation of efficiency has typically been regional in nature. Within the EU region, examples include Lado-Sestayo and Fernández-Castro (2019) studying hotel efficiency in Spain, Oliveira *et al.* (2015) in Portugal, and Pulina *et al.* (2010) in Italy. However, such studies do not provide cross-country comparisons. If one focuses on the international perspective, one can mention, for example, Alinsato *et al.* (2022), who included 111 countries from all over the

učinkovitosti na razini kontinenta i došli do zaključka da su Europa i Amerika postigle najbolje rezultate. Ipak, važno je napomenuti da je ovo istraživanje objavljeno 2022. godine, a rezultati pokrivaju razdoblje od 2008. do 2016. godine. Radovanov *et al.* (2020) analizirali su učinkovitost u 33 zemlje u razdoblju od 2011. do 2017. godine. Jedan od njihovih glavnih zaključaka je da je članstvo u EU-u pridonijelo učinkovitijem poslovanju u tim zemljama. Postoje i rezultati analiza, na primjer Soysal-Kurta (2017) ili Lozana i Gutiérreza (2011), koji su se usredotočili na evaluacije učinkovitosti u europskim zemljama, no njihove su analize bile iz 2013. i 2005. godine.

U 2020. godini sektor smještaja (kao i cijeli sustav turizma) pretrpio je veliki udarac zbog pandemije COVID-19. Wang *et al.* (2020) navode da je pandemija poremetila poslovanje poduzeća do te mjere da prvobitni rezultati postignuti u vremenu prije pandemije COVID-19 više ne odražavaju stvarno stanje. Tijekom pandemije, sloboda putovanja bila je ozbiljno ograničena državnim propisima, a spremnost ljudi na putovanja smanjila se zbog straha i neizvjesnosti. Značajan broj subjekata (posebno manjih poduzeća) radije je prestao poslovati, a neki od njih su do te mjere bili iscrpljeni da nije bilo mogućnost za ponovno otvaranje poslovanja – vidi, na primjer, Nhamo *et al.* (2020). Nacionalne vlade pokušale su (i još uvijek pokušavaju) sanirati ekonomski utjecaj na turizam pomoću beskamatnih kredita i potpora te drugih načina. Iako se stručnjaci slažu da je uloga vlade ključna za oporavak sektora (primjerice, Assaf i Scuderi, 2020 ili Sharma *et al.*, 2021), Sharma i Nicolau (2020) tvrde da su financijske injekcije samo kratkoročno rješenje, nakon kojih mora uslijediti cjelovita promjena na razini strateškog planiranja.

world in their analysis and whose efficiency assessment results showed that the level of efficiency depends on the country's income and the qualifications of the workforce. They also examined efficiency results at the continental level and found that Europe and America performed best. Although their research was published in 2022, their results cover the period from 2008 to 2016. Radovanov *et al.* (2020) examined a similar period (2011 to 2017) but focused only on the European countries. Their efficiency analyses covered a total of 33 countries. Among their main findings is that EU membership has helped countries to operate more efficiently. There are also results from analyses by, for example, Soysal-Kurt (2017) or Lozano and Gutiérrez (2011), who focused on efficiency evaluations in European countries, but their analyses were from 2013 and 2005.

In 2020, the accommodation sector (as well as the entire tourism sector) was dealt a major blow by the COVID-19 pandemic. According to Wang *et al.* (2020), the pandemic has disrupted enterprise operations to such an extent that the original results obtained in the "pre-COVID" era no longer reflect reality. During the pandemic, freedom to travel was severely hampered by government regulations and people's willingness to travel declined due to fear and uncertainty. A significant number of entities (especially smaller enterprises) have preferred to close down and some of them were drained to the point that there was a no chance of reopening, see for example Nhamo *et al.* (2020). National governments have tried (and are still trying) to remedy the economic impact on tourism through interest-free loans and grants. Although experts agree that the government's role is crucial for the sector's recovery (for example, Assaf and Scuderi (2020) or Sharma *et al.* (2021)), according to Sharma and Nicolau (2020), financial injections are only a short-term solution, which must be followed by an overall change at the level of strategic planning.

2. CILJ, MOTIVACIJA I DOPRINOS

Glavni cilj ovoga rada jest procijeniti učinkovitost sektora smještaja u zemljama EU-a tijekom razdoblja koje obuhvaća pandemiju COVID-19. Za razliku od drugih do sada provedenih studija, ova analiza obuhvaća razdoblje od 2018. do 2021. godine. Time se omogućava sagledavanje ne samo početka pandemije (tj. prijelomne 2020. godine), već i sljedeće razdoblje kada se pandemija pomalo povlačila.

Ova analiza uključuje međunarodne usporedbe poput Alinsanta *et al.* (2022), s razlikom da se umjesto korištenja agregiranih podataka na razini zemlje izravno koriste računovodstveni podaci za pojedinačna poduzeća u odabranim zemljama, kao što to čine Oliveira *et al.* (2015). Koncentracijom na podatke pojedinačnih poduzeća moguće je izravno se usredotočiti na sektor smještaja umjesto na cijeli sustav turizma.

López-Molina i Pulido-Fernandéz (2023) te Stanisic *et al.* (2022) preporučuju prikaz rezultata u turizmu za skupine sa sličnim karakteristikama. Slijedeći ovaj primjer, i u ovom članku zemlje EU-a biti će podijeljene u skupine prema nacionalnim razlikama u turizmu. Rezultati analiza učinkovitosti stoga će biti predstavljeni s obzirom na identificirane skupine zemalja, što omogućuje jedinstvenu perspektivu na pitanje procjene učinkovitosti u turizmu.

3. PODACI ZA PROCJENU UČINKOVITOSTI

Za potrebe analize korišteni su podaci iz baze podataka Orbis (proizvod poduzeća Bureau van Dijk), koja bilježi financijske podatke pojedinačnih poduzeća s godišnjom učestalošću. Prema klasifikaciji NACE Rev. 2, radi se o poduzećima čija poslovna aktivnost spada u kategoriju 55 (tj. smještaj). Unutar ove baze podataka pretražena su po-

2. AIM, MOTIVATION AND CONTRIBUTION

The main aim of this paper is to assess the efficiency of the accommodation sector in EU countries during the period covering the COVID-19 pandemic. Unlike other studies conducted so far, this analysis covers the period from 2018 to 2021. This makes it possible to look not only at the beginning of the pandemic (i.e. the breakthrough year 2020), but also at the following period when the pandemic was little by little receding.

This analysis includes international comparisons like Alinsanto *et al.* (2022), with the difference that instead of using aggregate data at the country level, accounting data for individual companies in selected countries are used directly, similar to Oliveira *et al.* (2015). By focusing on data from individual enterprises, it is possible to focus directly on the accommodation sector instead of the entire tourism sector.

López-Molina and Pulido-Fernandéz (2023) and Stanisic *et al.* (2022), recommend presenting the results in the tourism sector for groups with similar characteristics. Following this example also in this article, EU countries will be divided into groups according to national differences in the tourism sector. The results of the efficiency analyses will therefore be presented with respect to the identified clusters of countries, allowing a unique perspective on the issue of efficiency assessment in this sector.

3. DATA FOR EFFICIENCY EVALUATION

For the purpose of the analysis, the data from the Orbis database (product of Bureau van Dijk), which records financial data of individual companies at an annual frequency, was used. According to the NACE Rev. 2 classification, these are enterprises whose business activity falls into category 55 (i.e.

dužeća u zemljama EU-a koje imaju dostupne financijske podatke u razdoblju između 2018. i 2021. godine. Na sličan način kao i kod autora Huang (2017) ili Ben Aissi i Goaid (2016), kao izlazna varijabla odabran je promet (tj. prihodi od poslovanja). Ova varijabla je stoga financijski iskaz (u tisućama eura) aktivnosti poduzeća.

U okviru ulaznih varijabli, pozornost je posvećena faktorima rada i kapitala, u skladu s ekonomskom teorijom. Kapital je u analizama predstavljen računovodstvenom stavkom ukupna imovina (u tisućama eura). Stoga uključuje sav kapital – bilo materijalni kapital u obliku, npr., zgrada, ili nematerijalan u obliku *goodwill* i financijske imovine ili udjela u drugim društvima, primjerice. Ova varijabla korištena je primjerice za procjenu učinkovitosti u istraživanjima Ramanathana *et al.* (2016) ili Varvařovske i Stařkove (2021).

Čimbenik rada može se izravno mjeriti na temelju broja zaposlenika, kao što su to učinili, na primjer, Barros *et al.* (2011) i Dapeng *et al.* (2020). S obzirom na to da se naše analize provode u zemljama u kojima se mogu očekivati različite razine vrednovanja ljudskog rada, odlučeno je koristiti financijski izraz za faktor rada te se stoga, slično kao kod Yin *et al.* (2015) te Lado-Sestayo i Fernández-Castro (2019), preferira korištenje varijabilnih troškova zaposlenika (u tisućama eura).

Hsieh i Lin (2010) podijelili su troškove i odvojeno promatrali troškove zaposlenika, troškove smještaja i troškove prehrane prilikom procjene učinkovitosti. Slično tomu, De Jorge i Suárez (2014) u analizu su uključili operativne troškove uz troškove rada. Stoga je odlučeno da se u analizu uključe i drugi troškovi osim troškova zaposlenika. Baza podataka Orbis omogućila je uključivanje i stavki troškova materijala uz troškove zaposlenika (u tisućama eura). Dakle, u naš model ulaze ukupno tri ulazne varijable.

accommodation). Within this database, companies in the EU countries that have available financial data between 2018 and 2021 were searched. Similarly to Huang (2017) or Ben Aissa and Goaid (2016), turnover (i.e. operating revenue) was chosen as the output variable. This variable is therefore a financial expression (in thousands of EUR) of the activity of the enterprise.

Within the input variables, attention was paid to the factors of labour and capital, in line with economic theory. Capital in analyses is represented by the accounting item total assets (in thousands of EUR). It includes, therefore, all capital – whether tangible in the form of buildings, for example, or intangible in the form of goodwill and financial assets or shares in other companies, for example. This variable has been used, for example, to assess efficiency in research by Ramanathan *et al.* (2016) or Varvařovská and Stařková (2021).

The labour factor can be measured directly through the number of employees, as Barros *et al.* (2011) and Dapeng *et al.* (2020) have done, for example. Given that our analyses are across countries where different levels of valuation of human labour can be expected, it was decided to use a financial expression for the labour factor, and therefore, similar to Yin *et al.* (2015) and Lado-Sestayo and Fernández-Castro (2019), the use of variable cost of employees (in thousands of EUR) is preferred.

Hsieh and Lin (2010) split costs and looked at employee costs, accommodation costs and catering costs separately when evaluating efficiency. Similarly, De Jorge and Suárez (2014) included operational costs in the analysis in addition to labour costs. Therefore, it was also decided to include other costs besides cost of employees in the analysis. The Orbis database allowed us to include the item costs of material (in thousands of EUR) in addition to cost of employees. Thus, a total of three input variables enters our model.

S obzirom na odabrane varijable, u analizu je bilo moguće uključiti ukupno 16 zemalja EU-a. Budući da je cilj ove studije bio generalizirati rezultate učinkovitosti na cjelokupne zemlje, obuhvaćene su samo one zemlje za koje su bili dostupni podaci za više od 10 poduzeća. Ukupno je u naše analize moglo biti uvršteno 11.070 poduzeća. Tablica 1 prikazuje popis zemalja i broj razmatranih poduzeća.

Tablica 1: Popis zemalja, uključujući i broj poduzeća koja predstavljaju zemlju

Zemlja	Poduzeća	Zemlja	Poduzeća
Bugarska	663	Latvija	17
Hrvatska	1318	Poljska	284
Republika Češka	44	Portugal	1417
Estonija	273	Rumunjska	15
Finska	338	Slovačka	828
Francuska	985	Slovenija	642
Mađarska	89	Španjolska	527
Italija	2745	Švedska	885

4. MODELI ZA PROCJENU UČINKOVITOSTI

Odabrana je neparametrijska metoda analize omeđivanja podataka (DEA), koja je prema Odecku i Brathenu (2012) ili Lampeu i Hilgersu (2015) najčešće korištena metoda za procjenu učinkovitosti neovisno o gospodarskom sektoru. Ova metoda omogućuje usporedbu rezultata pojedinačnih jedinica donošenja odluka (u našem slučaju poduzeća) putem zadataka linearnog programiranja. U tom procesu stvara se granica učinkovitosti gdje se mogu pronaći ona poduzeća koja mogu generirati najbolje rezultate s obzirom na uloženo.

Kako bi se formulirao skup jednadžbi linearnog programiranja, potrebno je identificirati specifične postavke modela u vezi s

With respect to the selected variables, it was possible to include a total of 16 EU countries in the analysis. Because this study wants to generalise the efficiency results to whole countries, only countries where data were available for more than 10 companies were included. In total, 11,070 enterprises could be included in our analyses. The list of countries and number of enterprises is recorded in Table 1.

Table 1: List of countries including the number of enterprises representing the country

Country	Enterprises	Country	Enterprises
Bulgaria	663	Latvia	17
Croatia	1318	Poland	284
Czech Republic	44	Portugal	1417
Estonia	273	Romania	15
Finland	338	Slovakia	828
France	985	Slovenia	642
Hungary	89	Spain	527
Italy	2745	Sweden	885

4. MODELS FOR EFFICIENCY EVALUATION

The non-parametric method of data envelopment analysis (DEA), which according to Odeck and Brathen (2012) or Lampe and Hilgers (2015) is the most widely used method for efficiency evaluation purposes regardless of the economic sector, was selected. The DEA method allows to compare the results of individual decision-making units (in our case enterprises) through linear programming tasks. In this process, an efficiency frontier is created where one can find those enterprises that can produce the largest output with a given amount of inputs.

In order to formulate a set of linear programming equations, specific model settings need to be identified regarding how to measure

načinom mjerenja učinkovitosti, orijentacijom modela i ekonomskim pretpostavkama u vezi s prinosima od razmjera. Nurmatov *et al.* (2021) preporučuju radijalni pristup mjerenja (tj. CCR i BCC modele) za gospodarske aktivnosti turizma i smještaja. Orijehtacija modela utječe na put koji neučinkovita poduzeća moraju proći da bi postala učinkovita. Drugim riječima, treba li poduzeće smanjiti inpute ili povećati outpute. Prema Barrosu (2005), za sektor odabran u ovom članku treba odabrati orijentaciju modela na output, u kojoj bi se neučinkovita poduzeća trebala usredotočiti na povećanje outputa. Ovu vrstu orijentacije koristili su u svojim istraživanjima i Radovanov *et al.* (2020) ili Tómic i Marcikić Horvat (2018), na primjer. Budući da analize uključuju poduzeća različitih veličina, bit će prikladno razmotriti prinose razmjerno veličini. S obzirom na opći ustroj, korišten je model BCC s orijentacijom na output. Izračun učinkovitosti E za poduzeće H (ukupno se procjenjuje p poduzeća) se stoga provodi pomoću sljedećeg problema linearnog programiranja:

$$\begin{aligned} \text{Min.} \quad & E_H = \sum_{i=1}^m u_i x_{iH} + \mu, \\ \text{podložno} \quad & \sum_{j=1}^n v_j y_{jk} = 1, \\ & \sum_{j=1}^n v_j y_{jk} \leq \sum_{i=1}^m u_i x_{iH} + \mu, \quad k = 1, 2, \dots, p, \\ & u_i \geq \varepsilon, \quad i = 1, 2, \dots, m, \\ & v_j \geq \varepsilon, \quad j = 1, 2, \dots, n, \\ & \mu \text{ free,} \end{aligned}$$

gdje su ulazne i izlazne varijable poredane u matrici $X = \{x_{ik}, i = 1, 2, \dots, m, j = 1, 2, \dots, p\}$, i $Y = \{y_{jk}, i = 1, 2, \dots, n, j = 1, 2, \dots, p\}$. ε je tzv. infinitezimalna konstanta, a μ predstavlja veličinu odstupanja od konstantnih

efficiency, the orientation of the model, and the economic assumptions regarding returns to scale. Nurmatov *et al.* (2021) recommend a radial measurement approach (i.e. CCR and BCC models) for the economic sector of tourism and accommodation. The orientation of the model influences the path that inefficient enterprises must take to become efficient. In other words, whether the enterprise should reduce inputs or increase outputs. According to Barros (2005), for the sector chosen in this article, the output orientation of the model should be chosen, in which inefficient companies should focus on increasing output. This type of orientation was also used in their research by, for example, Radovanov *et al.* (2020) or Tómic and Marcikić Horvat (2018). Since the analyses include enterprises of different sizes, it will be appropriate to consider variable returns to scale. With respect to the overall setup, it will therefore be an output-oriented BCC model. The calculation of the efficiency E for enterprise H (a total of p enterprises is evaluated) is therefore carried out through the following linear programming problem:

$$\begin{aligned} \text{Min} \quad & E_H = \sum_{i=1}^m u_i x_{iH} + \mu, \\ \text{subject to} \quad & \sum_{j=1}^n v_j y_{jk} = 1, \\ & \sum_{j=1}^n v_j y_{jk} \leq \sum_{i=1}^m u_i x_{iH} + \mu, \quad k = 1, 2, \dots, p, \\ & u_i \geq \varepsilon, \quad i = 1, 2, \dots, m, \\ & v_j \geq \varepsilon, \quad j = 1, 2, \dots, n, \\ & \mu \text{ free,} \end{aligned}$$

where the input and output variables are arranged in matrix $X = \{x_{ik}, i = 1, 2, \dots, m, j = 1, 2, \dots, p\}$, and $Y = \{y_{jk}, i = 1, 2, \dots, n, j = 1, 2, \dots, p\}$, ε respectively. is the so-called infinitesimal constant and μ represents the magnitude

prinosa na skalu. Izgradnja modela provedena je pomoću DEA SolverPro (verzija 15f). Za daljnje tehničke detalje pogledati Cooper *et al.* (2007).

of the deviation from constant returns to scale. Model building was performed using DEA SolverPro (version 15f). For further technical details, please see Cooper *et al.* (2007).

5. PODACI I METODE ZA KLASTER ANALIZU

Za podjelu zemalja u skupine korišteni su agregirani podaci dostupni na Svjetskom ekonomskom forumu. Konkretno, ekonomski podaci iz spomenute baze podataka koji su specifični za pojedine zemlje navode sedam varijabli:

1. međunarodni turistički dolasci (u tisućama),
2. prihodi od međunarodnog turizma (u milijunima USD),
3. BDP putovanja i turizma (u milijunima USD),
4. udio putovanja i turizma u BDP-u (u % ukupnog BDP-a),
5. zaposlenost u industriji putovanja i turizma (u tisućama),
6. udio putovanja i turizma u zaposlenosti (u % ukupne zaposlenosti),
7. domaća potrošnja na putovanja i turizam (u % unutarnje potrošnje).

Svih navedenih sedam varijabli korišteno je za stvaranje klastera. Za analizu su odabrani najnoviji dostupni podaci u bazi podataka, tj. 2021. godina. Budući da varijable imaju različite izraze, prema Blaškovoj i Staňkovoj (2023) ili Staňkovoj *et al.* (2023b) klasteriranje je provedeno standardizacijom. Stoga je za određivanje udaljenosti između promatranja korištena standardizirana Euklidska udaljenost. Standardizirana Euklidska udaljenost dobiva se prvo standardizacijom varijabli, a zatim izračunom Euklidske udaljenosti D između točaka r i s :

$$D(r,s) = \sqrt{\sum_{i=1}^p (x_{ri} - x_{si})^2}.$$

5. DATA AND METHODS FOR CLUSTER ANALYSIS

For the purpose of dividing countries into groups, aggregated data available on the World Economic Forum were used. Specifically, country-specific economic data were used, where the database lists seven variables:

1. international tourist arrivals (in thousands),
2. international tourism inbound receipts (in millions of USD),
3. travel and tourism industry GDP (in millions of USD),
4. travel and tourism industry share of GDP (in % of total GDP),
5. travel and tourism industry employment (in thousands),
6. travel and tourism industry share of employment (in % of total employment),
7. domestic travel and tourism spending (in % of internal spending travel and tourism).

All the named seven variables were used to create clusters. The most recent data available in the database, i.e. the year 2021, was selected for the analysis. Since the variables have different expressions (for example, Blašková and Staňková, 2023; Staňková *et al.*, 2023b) it will be necessary to perform clustering through standardisation. Thus, the standardised Euclidean distance was used to calculate the distance between observations. The standardised Euclidean distance is obtained by first standardising the variables and then calculating the Euclidean distance D between points r and s :

$$D(r,s) = \sqrt{\sum_{i=1}^p (x_{ri} - x_{si})^2}.$$

Također je potrebno postaviti kriterij za izračun udaljenosti između klastera. Za tu svrhu korištena je Wardova metoda, koja ima tendenciju stvaranja čvrstih, relativno malih klastera približno jednake veličine (primjerice Staňková *et al.*, 2023a; Zámková *et al.*, 2021). Udaljenost između klastera C_i i C_j u slučaju Wardove metode W izvedena je iz centroida $\bar{x}$:

$$W(C_i, C_j) = \sum_{x_i \in C_i \cup C_j} \sum_{s=1}^n (x_{is} - \bar{x}_s)^2 - \left(\sum_{x_i \in C_i} \sum_{s=1}^n (x_{is} - \bar{x}_{1s})^2 + \sum_{x_i \in C_j} \sum_{s=1}^n (x_{is} - \bar{x}_{2s})^2 \right).$$

6. REZULTATI KLASTER ANALIZE

Na temelju klaster analize stvoreno je ukupno šest klastera (Slika 1). Prvi klaster (plavi) sastoji se od Francuske, Italije i Španjolske. Ove zemlje su popularne destinacije i za ljetne odmore na moru i za zimske ski-jaške odmore. Zemlje unutar prvog klastera imaju vrlo sličnu razinu udjela turizma u BDP-u (u prosjeku 1,87%), udjela turizma u zaposlenosti (u prosjeku 3,60%) i domaće potrošnje na putovanja i turizam (u prosjeku 52,80%) (Tablica 2). Ove tri zemlje također su formirale klaster prema studiji Stanisić *et al.* (2022), koji su grupirali zemlje na temelju njihovog odnosa prema prirodnim resursima u odnosu na konkurentnost turizma. Međutim, preostale zemlje EU-a u istoj su studiji (Stanisić *et al.*, 2022) podijeljene u dva velika klastera. Za razliku od njihovog odabira, u ovom članku kreirano je nekoliko manjih klastera.

Zemlje drugog klastera (Hrvatska i Portugal) razlikuju se od zemalja prvog klastera po, primjerice, iznosu domaće potrošnje na putovanja i turizam (otprilike polovica one u prvom klasteru) ili prihoda od među-

It is also necessary to set the criterion for calculating the distance between clusters. For these purposes, Ward's method was used, which tends to produce solid, relatively small clusters of roughly equal size, see for example Staňková *et al.* (2023a) or Zámková *et al.* (2021). The distance between clusters C_i and C_j in the case of Ward's method W is derived from the centroids $\bar{x}$:

$$W(C_i, C_j) = \sum_{x_i \in C_i \cup C_j} \sum_{s=1}^n (x_{is} - \bar{x}_s)^2 - \left(\sum_{x_i \in C_i} \sum_{s=1}^n (x_{is} - \bar{x}_{1s})^2 + \sum_{x_i \in C_j} \sum_{s=1}^n (x_{is} - \bar{x}_{2s})^2 \right).$$

6. CLUSTER ANALYSIS RESULTS

Based on the cluster analysis, a total of six clusters were created (Figure 1). The first cluster (blue) consists of France, Italy and Spain. These countries are popular destinations for both summer seaside holidays and winter skiing holidays. Countries within the first cluster have a very similar level of travel and tourism industry share of GDP (on average 1.87%), travel and tourism industry share of employment (on average 3.60%) and domestic travel and tourism spending (on average 52.80%) (Table 2). These three countries also formed a cluster in the study by Stanisić *et al.* (2022), which grouped countries based on their relationship to natural resources in relation to tourism competitiveness. However, the remaining EU countries Stanisić *et al.* (2022) divided it into two large clusters. In contrast to their procedure, several smaller clusters are created in this article.

The countries of the second cluster (Croatia and Portugal) differ from the countries of the first cluster, for example, in the amount of domestic travel and tourism spending (roughly half that of the first cluster) or international tourism inbound receipts (roughly

narodnog turizma (otprilike 3.000 milijuna USD više u apsolutnom iznosu).

Treći klaster (označen tirkiznom bojom) sastoji se od tri zemlje, od kojih su dvije – Republika Češka i Slovačka – povijesno povezane. Do kraja 1992. godine ove dvije zemlje bile su jedna zemlja, pa je logično da imaju sličnu kulturu, mentalitet i putne navike. Prema podacima Českog statističkog ureda (ČSÚ, 2018), Slovaci čine značajan dio inozemnih posjetitelja u Češkoj i obrnuto. Litva također ima više zajedničkog s Češkom i Slovačkom od samo veličine teritorija. Iako je Latvija obalna zemlja, glavna atrakcija ove zemlje su priroda i kulturni spomenici, što je tipično za sve zemlje ovog klastera.

Estonija i Slovenija zajedno čine još jedan klaster. Ovaj klaster razlikuje se od ostalih klastera po količini domaće potrošnje na putovanja i turizam. U prosjeku je to nešto manje od 70%, što je najveći udio u usporedbi s ostalim klasterima. Iako dvije zemlje nisu geografski blizu, dijele vrlo nisku gustoću naseljenosti. Slovenija i Estonija su šesta i četvrta najmanje naseljena zemlja EU-a, a između njih se nalazi Latvija.

Peti klaster (označen ljubičastom bojom) sastoji se od tri zemlje. Iako Rumunjska, Finska i Švedska imaju pristup moru, najveća atrakcija ovih zemalja su uglavnom jezera. Ove zemlje su također slične po visini BDP-a putovanja i turizma (u prosjeku 2.734,6 milijuna USD) i prihodima od međunarodnog turizma (u prosjeku 2.457,57 milijuna USD).

Posljednji klaster (crveno) sastoji se od Bugarske, Poljske i Mađarske. Ove su zemlje slične, na primjer, po razini zaposlenosti u sustavima putovanja i turizma. Sve one zapošljavaju stotine tisuća ljudi u sektoru putovanja (u prosjeku 440 tisuća) i imaju sličan udio putovanja i turizma u BDP-u (u prosjeku 2,3%).

USD 3,000 million higher in absolute terms).

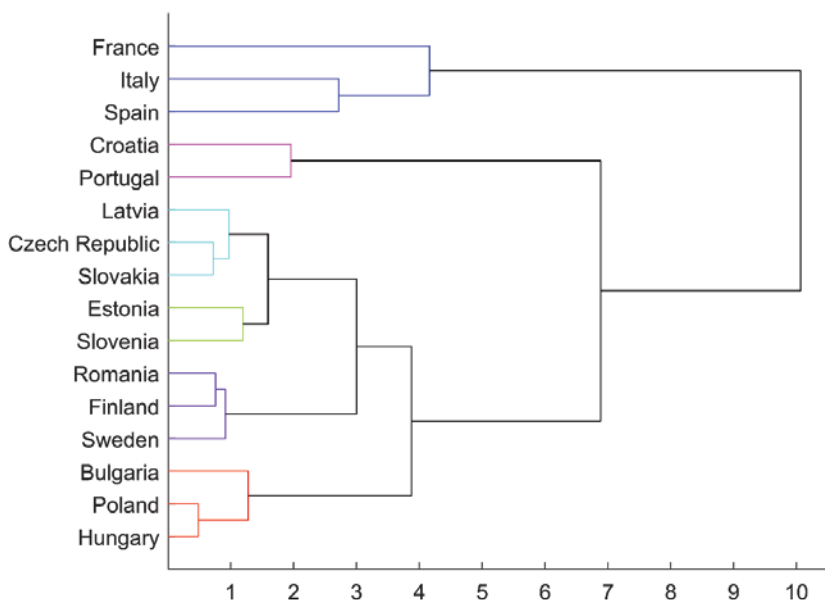
The third cluster (cyan) consists of three countries, two of which – the Czech Republic and Slovakia – are historically linked. Until the end of 1992, these two countries were one country, so it is logical that they have similar culture, mentality, and travel habits. According to the Czech Statistical Office (ČSÚ, 2018), Slovaks make up a significant part of foreign visitors to the Republic and vice versa. Lithuania has more in common with the Czech Republic and Slovakia than just the size of territory. Although Latvia is a coastal country, its main attraction is nature and cultural monuments, which is typical for all countries of this cluster.

Estonia and Slovenia together form another cluster. This cluster differs from the other clusters in the amount of domestic travel and tourism spending. On average, this is just under 70%, which is the highest proportion compared to the other clusters. Although the two countries are not geographically close, they share very low population density. Based on this study they are the sixth and fourth least populous EU countries respectively with Latvia betwixt.

The fifth cluster (violet) is made up of three countries. Although Romania, Finland and Sweden have access to the sea, the biggest attraction of these countries are mainly the lakes. They are also similar in the amount of travel and tourism industry GDP (on average USD 2,734.6 million) and international tourism inbound receipts (on averages USD 2,457.57 million).

The last cluster (red) consists of Bulgaria, Poland and Hungary. The countries are similar in the level of travel and tourism industry employment, for example. They all employ hundreds of thousands of people in the travel sector (on average 440 thousand) and have a similar travel and tourism industry share of GDP (on average 2.3%).

Slika 1: Dendrogram sa šest stvorenih klastera označenih bojama / Figure 1: Dendrogram with color-coded six clusters created



Tablica 2: Prosječne vrijednosti svih varijabli klaster analize za svaki stvoreni klaster

Klaster/ varijabla	Varijabla 1	Varijabla 2	Varijabla 3	Varijabla 4	Varijabla 5	Varijabla 6	Varijabla 7
Klaster 1	5869,67	1558,83	1781,17	1,87	86,33	3,60	52,80
Klaster 2	8865,00	4662,05	2948,60	1,05	201,00	2,50	26,85
Klaster 3	32423,67	12401,10	18577,23	1,30	492,00	3,17	57,37
Klaster 4	15321,50	10527,50	28924,65	2,15	792,50	4,60	69,95
Klaster 5	2552,33	2734,60	2457,57	2,83	82,33	5,27	52,93
Klaster 6	11018,00	10568,90	14636,87	2,30	440,00	4,83	59,67

Table 2: Average values of all variables used in the cluster analysis for each cluster created

Cluster/ variable	Variable 1	Variable 2	Variable 3	Variable 4	Variable 5	Variable 6	Variable 7
Cluster 1	5869.67	1558.83	1781.17	1.87	86.33	3.60	52.80
Cluster 2	8865.00	4662.05	2948.60	1.05	201.00	2.50	26.85
Cluster 3	32423.67	12401.10	18577.23	1.30	492.00	3.17	57.37
Cluster 4	15321.50	10527.50	28924.65	2.15	792.50	4.60	69.95
Cluster 5	2552.33	2734.60	2457.57	2.83	82.33	5.27	52.93
Cluster 6	11018.00	10568.90	14636.87	2.30	440.00	4.83	59.67

7. REZULTATI EVALUACIJE UČINKOVITOSTI

U analizi učinkovitosti, model je 2018. godine identificirao ukupno 60 potpuno učinkovitih poduzeća. U 2019. godini broj je pao na 50. U 2020. godini 39 poduzeća identificirano je kao potpuno učinkovito, dok se u 2021. godini, posljednjoj praćenju godini, njihov broj povećao na 51. Tablica 3 daje detaljan pregled ne samo apsolutnog broja učinkovitih poduzeća u svakoj zemlji, već i konverziju u relativni oblik. Budući da ne postoji isti broj predstavnika u svakoj zemlji, tablica sadrži, uz uobičajeno preračunavanje u postotak učinkovitih poduzeća u zemlji, i dodatni odjeljak koji prikazuje udio učinkovitih poduzeća u odnosu na broj poduzeća u zemlji prema Tablici 1. Tablica 3 prikazuje rezultate klaster analize prema formiranim klasterima, a ne prema abecednom redu.

7. RESULTS OF THE EFFICIENCY EVALUATION

In the efficiency analysis, the model identified a total of 60 fully efficient enterprises in 2018. In 2019, the number dropped to 50. In 2020, 39 enterprises were identified as fully efficient, while in 2021, the last year monitored, their number increased to 51. Table 3 provides a detailed overview of both the absolute number of efficient enterprises in each country and the conversion into relative form. Since there are not the same number of representatives in each country, the table contains, as well as the usual conversion to the percentage of efficient enterprises in a country, an additional section showing the share of efficient enterprises with respect to the number of enterprises in the country according to Table 1. Table 3 presents the results of the cluster analysis according to the clusters formed and not in alphabetical order.

**Tablica 3: Pregled učinkovitih poduzeća po državama
(uključujući usporedbu s vrijednostima u Tablici 1)**

Zemlja	Apsolutni broj učinkovitih poduzeća				% učinkovitih poduzeća od ukupnog broja učinkovitih poduzeća				% učinkovitih poduzeća u odnosu na broj poduzeća u danoj zemlji			
	2018.	2019.	2020.	2021.	2018.	2019.	2020.	2021.	2018.	2019.	2020.	2021.
Francuska	16	9	11	18	26,67	18,00	28,21	35,29	1,62	0,91	1,12	1,83
Italija	13	9	6	12	21,67	18,00	15,38	23,53	0,47	0,33	0,22	0,44
Španjolska	2	3	1	2	3,33	6,00	2,56	3,92	0,38	0,57	0,19	0,38
Hrvatska	3	2	1	2	5,00	4,00	2,56	3,92	0,23	0,15	0,08	0,15
Portugal	1	3	6	3	1,67	6,00	15,38	5,88	0,07	0,21	0,42	0,21
Latvija	0	0	0	0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
Republika Češka	1	0	1	0	1,67	0,00	2,56	0,00	2,27	0,00	2,27	0,00
Slovačka	7	7	5	6	11,67	14,00	12,82	11,76	0,85	0,85	0,60	0,72
Estonija	0	0	0	0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
Slovenija	3	1	1	0	5,00	2,00	2,56	0,00	0,47	0,16	0,16	0,00
Rumunjska	0	1	0	0	0,00	2,00	0,00	0,00	0,00	6,67	0,00	0,00
Finska	3	1	1	1	5,00	2,00	2,56	1,96	0,89	0,30	0,30	0,30
Švedska	1	6	3	2	1,67	12,00	7,69	3,92	0,11	0,68	0,34	0,23
Bugarska	1	0	0	0	1,67	0,00	0,00	0,00	0,15	0,00	0,00	0,00
Poljska	6	4	3	4	10,00	8,00	7,69	7,84	2,11	1,41	1,06	1,41
Mađarska	3	4	0	1	5,00	8,00	0,00	1,96	3,37	4,49	0,00	1,12

Table 3: Overview of efficient enterprises by countries (including comparison with the values in Table 1)

Country	Absolute number of efficient enterprises				% of efficient enterprises out of the total number of efficient enterprises				% of efficient enterprises relative to the number of enterprises in the given country			
	2018	2019	2020	2021	2018	2019	2020	2021	2018	2019	2020	2021
France	16	9	11	18	26.67	18.00	28.21	35.29	1.62	0.91	1.12	1.83
Italy	13	9	6	12	21.67	18.00	15.38	23.53	0.47	0.33	0.22	0.44
Spain	2	3	1	2	3.33	6.00	2.56	3.92	0.38	0.57	0.19	0.38
Croatia	3	2	1	2	5.00	4.00	2.56	3.92	0.23	0.15	0.08	0.15
Portugal	1	3	6	3	1.67	6.00	15.38	5.88	0.07	0.21	0.42	0.21
Latvia	0	0	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Czech Rep.	1	0	1	0	1.67	0.00	2.56	0.00	2.27	0.00	2.27	0.00
Slovakia	7	7	5	6	11.67	14.00	12.82	11.76	0.85	0.85	0.60	0.72
Estonia	0	0	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Slovenia	3	1	1	0	5.00	2.00	2.56	0.00	0.47	0.16	0.16	0.00
Romania	0	1	0	0	0.00	2.00	0.00	0.00	0.00	6.67	0.00	0.00
Finland	3	1	1	1	5.00	2.00	2.56	1.96	0.89	0.30	0.30	0.30
Sweden	1	6	3	2	1.67	12.00	7.69	3.92	0.11	0.68	0.34	0.23
Bulgaria	1	0	0	0	1.67	0.00	0.00	0.00	0.15	0.00	0.00	0.00
Poland	6	4	3	4	10.00	8.00	7.69	7.84	2.11	1.41	1.06	1.41
Hungary	3	4	0	1	5.00	8.00	0.00	1.96	3.37	4.49	0.00	1.12

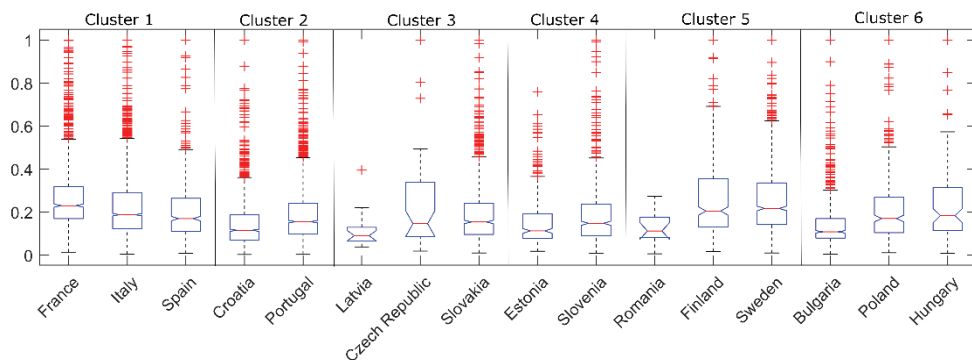
Prema apsolutnom (i postotnom) broju učinkovitih poduzeća u svakoj zemlji u odnosu na ukupan broj učinkovitih poduzeća, može se ustvrditi da je Francuska zauzela imaginarno prvo mjesto. Udio učinkovitih poduzeća ovdje se kreće od 18% do 35%. Italija također ima visok udio učinkovitih poduzeća (obično oko 20%). Vrijedi spomenuti da su obje ove zemlje dio Klastera 1. Također se može primijetiti da dvije zemlje (Estonija i Latvija) nemaju niti jedno poduzeće koje je model identificirao kao učinkovito. Ako se uzme u obzir „veličina zemlje“ u smislu broja poduzeća, onda, na primjer, spomenuta Francuska ima oko 1% učinkovitih poduzeća u toj zemlji (jer Francuska ima puno poduzeća u skupu podataka). U slučaju Rumunjske (koja je zemlja s najmanjim brojem poduzeća), u 2019. godini identificirano je samo jedno učinkovito poduzeće, što predstavlja oko 7% udjela učinkovitih poduzeća u toj zemlji.

According to the absolute (and percent-age) number of efficient enterprises in each country in relation to the total number of efficient enterprises, it can be stated that France received the imaginary first place. The share of efficient enterprises here ranges from 18% to 35%. Italy also has a high proportion of efficient enterprises (typically around 20%). It is worth mentioning that both these countries are part of Cluster 1. Notably two countries (Estonia and Latvia) do not have a single enterprise identified as efficient by the model. If the “size of the country” is considered in terms of the number of enterprises, then the aforementioned France has about 1% of the efficient enterprises in that country (because it has many companies in the dataset). But in the case of Romania (the country with the fewest enterprises), only one efficient enterprise was identified in 2019, which is about 7% of the share of its efficient enterprises.

Na Slici 2 dan je detaljan prikaz distribucije neučinkovitih poduzeća u 2018. godini. Pomoću boxplotova moguće je pratiti ne samo varijabilnost rezultata učinkovitosti poduzeća među zemljama, već i usporediti, na primjer, medijan učinkovitosti među zemljama. Zemlje na Slici 2 (i na sljedećim Slikama 3, 4 i 5) poredane su prema rezultatima klaster analize. S obzirom na apsolutni broj učinkovitih poduzeća, može se reći da je većina poduzeća identificirana kao neučinkovita modelom. Ako je cilj procijeniti cijeli gospodarski sektor, može se reći da je medijan učinkovitosti 0,1689, tj. manje od 17% razine učinkovitosti poduzeća. Francuska ima najvišu razinu medijana učinkovitosti u 2018. godini. Finska i Švedska također imaju više medijane rezultata. Ako bi se tražio najbolji cijeli klaster zemalja, to bi bio Klaster 1. Zapravo, rezultati Klastera 5, koji uključuje Finsku i Švedsku (tj. zemlje odmah iza prvorangirane Francuske), značajno su podrivali rezultate Rumunjske, koja znatno zaostaje. No, kao što je već spomenuto, Rumunjska je zemlja s najmanjim brojem predstavnika i stoga je potrebno uzeti njezine rezultate s oprezom. Ako se traže zemlje s najnižim razinama učinkovitosti u 2018. godini, srednje vrijednosti pokazuju Latvija, Bugarska, Rumunjska i Estonija.

A detailed view of the distribution of inefficient enterprises in 2018 is presented in Figure 2. Through boxplots, it is possible to track not only the variability in the resulting efficiency scores of enterprises across countries, but also to compare, for example, median efficiency across countries. The countries in Figure 2 (and in the following Figures 3, 4 and 5) are ordered according to the results of the cluster analysis. Considering the absolute number of efficient enterprises, conceivably most of the enterprises were identified as inefficient by the model. If the objective is to evaluate the whole economic sector, than the median efficiency is 0.1689, i.e. less than 17% level of enterprises efficiency. France showed the highest level of median efficiency in 2018, and Finland and Sweden also have higher median scores. If seeking the best whole cluster of countries, it is Cluster 1. In fact, the results of Cluster 5, which includes Finland and Sweden (i.e. the countries just behind the first France), significantly undercut Romania's results, which lags far behind. But, as aforesaid, Romania is the country with the smallest number of representatives and hence its results should be taken more tentatively. Regarding the countries with the lowest efficiency levels in 2018, the median values are in Latvia, Bulgaria, Romania and Estonia.

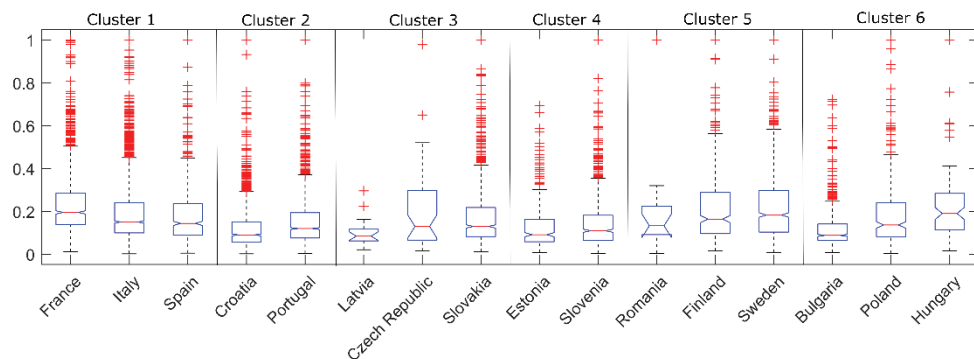
Slika 2: Učinkovitost poduzeća u svakoj zemlji prikazana pomoću boxplotova za 2018. godinu / Figure 2: The efficiency of enterprises in each country plotted via boxplots for the year 2018



Godina 2019. (Slika 3) pokazuje sličnu situaciju kao i 2018. S obzirom na to da većina poduzeća ne posluje u potpunosti učinkovito, medijan je i dalje relativno nizak. Francuska je zadržala vodeću poziciju prema medijanu učinkovitosti, a Latvija je također zadržala najlošiju poziciju. Među klasterima zemalja, prvo mjesto i dalje drži Klaster 1. Drugo mjesto bi zauzeo Klaster 5, budući da te godine rezultati Rumunjske s Finskom i Švedskom već pokazuju veću konvergenciju u usporedbi s prethodnom godinom.

The year 2019 (Figure 3) shows a similar situation to 2018. Since most enterprises do not operate completely efficiently, the median is still relatively low. France retained the top position in median efficiency and Latvia also retained its position as the worst country. If one focuses on whole country clusters, the first position is still held by Cluster 1. The second position would be occupied by Cluster 5, as this year Romania's results with Finland and Sweden are already more converged compared to the previous year.

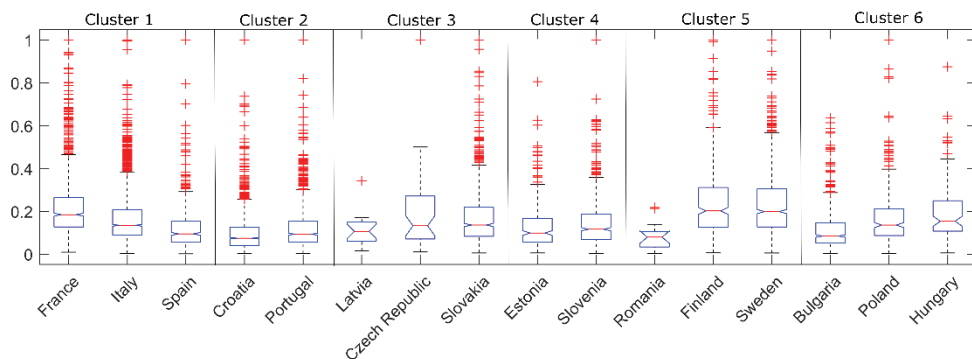
Slika 3: Učinkovitost poduzeća u svakoj zemlji prikazana pomoću boxplotova za 2019. godinu / Figure 3: The efficiency of enterprises in each country plotted via boxplots for the year 2019



Rezultati za 2020. godinu (Slika 4) već su pod utjecajem pandemije Covid-19. Promatrajući cijeli gospodarski sektor, može se primijetiti da je ove godine identificiran ne samo najmanji broj potpuno učinkovitih poduzeća, već je izmjerena i najniža srednja vrijednost učinkovitosti (0,1246, tj. 12,46%). Zanimljivo je, međutim, da utjecaji nisu isti u svim zemljama. Na primjer, sve su zemlje u prvom i drugom klasteru pale na ljestvici (vidjeti Tablicu 4 u nastavku za detalje). To stavlja nordijske zemlje (Finsku i Švedsku) na prva dva mjesta. Zemlje u trećem i četvrtom klasteru također su dobro ocijenjene u pogledu procjena učinkovitosti u vrijeme dolaska pandemije. Zapravo, njihova srednja vrijednost učinkovitosti je na sličnoj razini kao i prethodnih godina.

The 2020 results (Figure 4), are already affected by the COVID-19 pandemic. Focusing on the whole economic sector, it can be noted that this year not only the smallest number of fully efficient enterprises was identified, but also the lowest median efficiency was measured (0.1246, i.e., 12.46%). Interestingly, however, the impacts are not the same in all countries. For example, all countries in the first and second cluster dropped in the rankings (see Table 4 below for details). This puts the Nordic countries (Finland and Sweden) in the top two places. Countries in the third and fourth clusters were also doing well in terms of efficiency assessments at the time of the pandemic's arrival. In fact, their median efficiencies are at a similar level as in previous years.

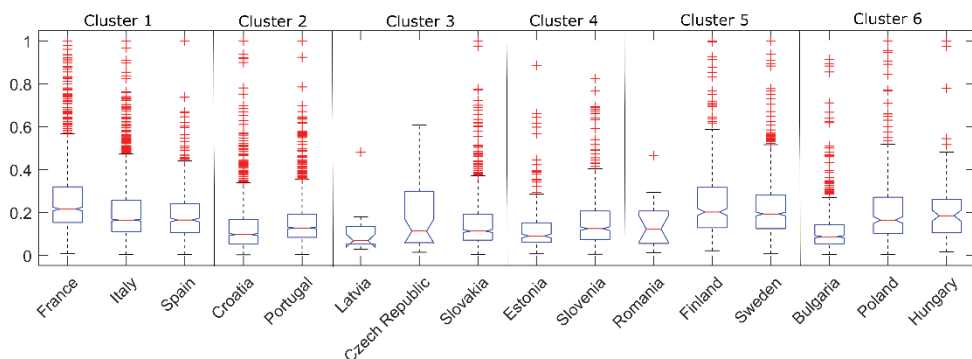
Slika 4: Učinkovitost poduzeća u svakoj zemlji prikazana pomoću boxplotova za 2020. godinu / Figure 4: The efficiency of enterprises in each country plotted via boxplots for the year 2020



Posljednje razdoblje promatranja u ovoj analizi je 2021. godina, a rezultati učinkovitosti prikazani su na Slici 5. Prema vrijednostima medijana (0,1456, tj. 14,56%), oporavak sektora od svih ograničenja je već počeo, jer se već približio vrijednostima iz 2018. godine. Francuska se ove godine vratila na prvo mjesto, a Latvija na posljednje. Detaljan sažetak medijana i izvedenih rangova zabilježen je u Tablici 4.

The last observation period in this analysis is 2021 whose efficiency results are shown in Figure 5. According to the median values (0.1456, i.e. 14.56%), the sector has already started to recover from all the restrictions as it has already approached the 2018 values. France is back in first place this year and Latvia is back in last place. A detailed summary of the medians and derived ranks is recorded in Table 4.

Slika 5: Učinkovitost poduzeća u pojedinim zemljama prikazana pomoću boxplotova za 2021. godinu / Figure 5: The efficiency of enterprises in each country plotted via boxplots for the year 2021



8. SAŽETAK I RASPRAVA

Prema prosječnom rangiranju u Tablici 4, Francuska zadržava prvo mjesto unatoč određenom padu u 2020. godini. S obzirom na to da je Francuska prepoznata kao zemlja s najviše potpuno učinkovitih poduzeća (Tablica 3) u apsolutnom smislu, može se zaključiti da je ona pokretačka snaga u ovom sektoru. Ta poduzeća ne samo da tvore granicu učinkovitosti, već imaju i višu razinu učinkovitosti kao skupina. Drugo i treće mjesto pripalo je nordijskim zemljama (Finskoj i Švedskoj). Iako su ove zemlje slične po svojoj razini učinkovitosti, razlozi za posjet su različiti. Nordijske zemlje se uglavnom posjećuju radi aktivnog odmora na otvorenom, a jezera su im posebna atrakcija. Francuska je poznata kao raj za zaljubljene s jedinstvenom kuhinjom te ima pristup moru i planinama. Zajednički faktor ovih zemalja jest taj da turizam u njima funkcionira tijekom cijele godine. Čak i prema rezultatima klaster analize temeljene na izvješćima Svjetskog gospodarskog foruma, obilježja nordijskih zemalja različita su od onih u Francuskoj (bilo da se radi o međunarodnim turističkim dolascima ili udjelu putovanja i turizma u BDP-u, itd.). Međutim, ta su obilježja bliska u pogledu učinkovitosti sektora.

Ako se ocjenjuju klasteri zemalja u cjelini, prvo mjesto zauzima Klaster 1 zbog niže razine učinkovitosti Rumunjske (što smanjuje učinkovitost Klastera 5, uključujući Finsku i Švedsku). S druge strane, najlošiji prosječni plasman ostvarila je Bugarska. Iako je Latvija bila na posljednjem mjestu 2018., 2019. i 2021. godine, njen uspon 2020. godine donio joj je pretposljednje mjesto. Bugarska i Latvija ne pripadaju istom klasteru zemalja, jer su obje u svojim klasterima na znatno nižim razinama učinkovitosti od ostalih zemalja u klasteru.

8. SUMMARY AND DISCUSSION

According to the average ranking in Table 4, France retains first place despite a certain drop in 2020. Given that it is France that has been identified as having the most fully efficient enterprises (Table 3) in absolute terms, it can be concluded that France is a driving force in this sector. Those companies not only form the efficiency frontier, but also have a higher level of efficiency as a group. Second and third place went to the Nordic countries (Finland and Sweden). Although these countries are similar in their level of efficiency, the reasons for visiting them are different. The Nordic countries are mainly visited for active outdoor holidays. The lakes are a particular attraction. France is known as a lover's paradise with a unique cuisine. Moreover, it has access to the sea as well as to the mountains. The common factor for these countries is that tourism works all year round in these countries. Even according to the results of the clustered analysis based on the World Economic Forum reports, the Nordic countries have different characteristics from France (whether in international tourist arrivals or travel and tourism industry share of GDP, etc.). However, they are close as regards efficiency of the sector.

If the whole country clusters of countries are evaluated, due to the lower level of efficiency of Romania (which reduces the efficiency of Cluster 5, which includes Finland and Sweden), the first position goes to Cluster 1. On the other hand, the worst average ranking was earned by Bulgaria. Although Latvia was in last place in 2018, 2019, and 2021, its move up in 2020 earned it the penultimate place. Bulgaria and Latvia do not belong to the same cluster of countries. Both these countries are in their clusters with considerably lower efficiency levels than the other countries in the cluster.

Tablica 4: Srednja učinkovitost i rang zemlje, uključujući prosječni rang

Zemlja	Klaster	2018.		2019.		2020.		2021.		Prosječni rang
		Medijan	Rang	Medijan	Rang	Medijan	Rang	Medijan	Rang	
Francuska	1	0,2302	1	0,1956	1	0,1843	3	0,2162	1	1
Italija		0,1829	5	0,1507	5	0,1310	8	0,1648	7	5
Španjolska		0,1699	7	0,1442	6	0,0947	12	0,1651	5	7
Hrvatska	2	0,1157	12	0,0904	14	0,0741	16	0,0973	13	14
Portugal		0,1556	8	0,1203	11	0,0932	13	0,1279	8	10
Latvija	3	0,0905	16	0,0847	16	0,1063	10	0,0684	16	15
Češka Republika		0,1465	11	0,1299	10	0,1324	7	0,1134	11	9
Slovačka		0,1541	9	0,1301	9	0,1360	5	0,1132	12	8
Estonija	4	0,1128	13	0,0915	13	0,0987	11	0,0904	14	13
Slovenija		0,1481	10	0,1099	12	0,1164	9	0,1249	9	11
Rumunjska	5	0,1123	14	0,1332	8	0,0795	15	0,1230	10	12
Finska		0,2052	3	0,1644	4	0,2019	1	0,2022	2	2–3
Švedska		0,2172	2	0,1833	3	0,1988	2	0,1931	3	2–3
Bugarska	6	0,1085	15	0,0885	15	0,0846	14	0,0872	15	16
Poljska		0,1704	6	0,1368	7	0,1357	6	0,1649	6	6
Mađarska		0,1837	4	0,1905	2	0,1537	4	0,1850	4	4

Table 4: Median efficiency and country ranking, including average ranking

Country	Cluster	2018		2019		2020		2021		Average rank
		Median	Rank	Median	Rank	Median	Rank	Median	Rank	
France	1	0.2302	1	0.1956	1	0.1843	3	0.2162	1	1
Italy		0.1829	5	0.1507	5	0.1310	8	0.1648	7	5
Spain		0.1699	7	0.1442	6	0.0947	12	0.1651	5	7
Croatia	2	0.1157	12	0.0904	14	0.0741	16	0.0973	13	14
Portugal		0.1556	8	0.1203	11	0.0932	13	0.1279	8	10
Latvia	3	0.0905	16	0.0847	16	0.1063	10	0.0684	16	15
Czech Rep.		0.1465	11	0.1299	10	0.1324	7	0.1134	11	9
Slovakia		0.1541	9	0.1301	9	0.1360	5	0.1132	12	8
Estonia	4	0.1128	13	0.0915	13	0.0987	11	0.0904	14	13
Slovenia		0.1481	10	0.1099	12	0.1164	9	0.1249	9	11
Romania	5	0.1123	14	0.1332	8	0.0795	15	0.1230	10	12
Finland		0.2052	3	0.1644	4	0.2019	1	0.2022	2	2–3
Sweden		0.2172	2	0.1833	3	0.1988	2	0.1931	3	2–3
Bulgaria	6	0.1085	15	0.0885	15	0.0846	14	0.0872	15	16
Poland		0.1704	6	0.1368	7	0.1357	6	0.1649	6	6
Hungary		0.1837	4	0.1905	2	0.1537	4	0.1850	4	4

Pandemija COVID-19 (točnije, ograničenja koja su utjecala na turizam) u 2020. godini vidljivo je pogoršala učinkovitost sustava u cjelini. Međutim, detaljna analiza pokazala je da utjecaji nisu u svim zemljama isti. Prema Gösslingu *et al.* (2021), više od 90% svjetske populacije pogođeno je ograničenjima putovanja. Iako zemlje EU-a imaju zajednički zakonodavni okvir, zbog zadržanog suvereniteta snaga ograničenja (i brzina njihove provedbe) bila je različita u pojedinačnim zemljama. Prema Seyfiju *et al.* (2020), nedosljednost u primjeni ograničenja bila je toliko izrazita da je podrivala Međunarodne zdravstvene propise. Simulacije Linke *et al.* (2020) pokazale su da su ograničenja mobilnosti bila ključna za Srednju Europu, Španjolsku i Francusku.

Međutim, potrošači imaju različite motivacije za posjet raznim zemljama EU-a. Tako su zemlje poput Francuske i Španjolske popularne kao ljetne destinacije za odmor zahvaljujući blizini mora. Ipak, ljetni odmor 2020. godine bili su uvelike otkazani (bilo od strane putničkih agencija ili samih potrošača), što je, razumljivo, negativno utjecalo na prihode poduzeća i posljedično na njihovu učinkovitost. Nasuprot tomu, zemlje u srednjoj Europi, poput Republike Češke i Slovačke, poboljšale su pozicije iste godine jer su mnogi potrošači zamijenili putovanja na more u inozemstvo odmorima u lokalnim vikendicama gdje su se osjećali dovoljno izolirano da smanje rizik od zaraze, a ipak mogu uživati na odmoru. U Republici Češkoj vlada je također poticala boravak u vikendicama, jer su putovanja u druge krajeve općenito bila zabranjena osim putovanja na posao ili u kuće za odmor, itd.

Iako naši empirijski rezultati o učinkovitosti pokazuju da se sektor počeo oporavljati već 2021. godine, postoje i drugi izazovi (zelena i digitalna transformacija, održivost i otpornost ili konkurentnost) koje će biti potrebno riješiti prije ili kasnije (Beha, 2023). U tom smislu, isti izvor naglašava važnost institucija. Prema rezultatima iz zemalja u razvo-

The COVID-19 pandemic (more precisely, the restrictions that affected tourism) in 2020 have demonstrably worsened the efficiency of the sector as a whole. However, detailed analysis has shown that the impacts are not the same in all countries. According to Gössling *et al.* (2021), more than 90% of the world's population has been affected by travel restrictions. Despite the common EU legislative framework, countries have retained so much sovereignty that the strength of individual restrictions (and the speed of their implementation) has varied from country to country. Seyfi *et al.* (2020) claim that inconsistent application of restrictions was so strong that International Health Regulations were undermined. The simulations by Linka *et al.* (2020) showed that mobility constraints were key for Central Europe, Spain and France.

However, consumers have different motivations for visiting different EU countries. Countries like France and Spain are popular summer holiday destinations thanks to their access to the sea. Nevertheless, summer holidays in 2020 were widely cancelled (either by travel agencies or consumers themselves), which understandably had a negative impact on companies' sales and consequently on their efficiency. In contrast, Central European countries, such as the Czech Republic and Slovakia, improved in the 2020 rankings as many consumers swapped foreign seaside holidays for staying in local cottage areas where they felt sufficiently isolated to minimise the risk of contracting the disease but were able to enjoy their holidays. In the Czech Republic, staying in holiday homes was also encouraged by the government, as travel to other regions was generally forbidden except for commuting to work or holiday homes, etc.

Although our empirical efficiency results show that the sector has already started to recover in 2021, according to Beha (2023) there are other challenges (green and digital transformation, sustainability and resilience

ju poput Malezije koje su proveli Lee *et al.* (2020), dokazana je pozitivna veza između vladinih akcija (kontrola korupcije i politička stabilnost) i turizma. Međutim, u slučaju EU-a još uvijek nema dostupnih studija koje detaljno opisuju kako vladine odluke utječu na učinkovitost poduzeća i, posljedično, na turizam u cjelini. Stoga bi se buduća istraživanja trebala usredotočiti na ovo područje.

9. ZAKLJUČAK

U ovom članku procjenjivana je učinkovitost smještajnog sektora u zemljama EU-a. Za razliku od drugih studija, ovdje je makroekonomski prikaz izveden iz mikroekonomskih podataka pojedinačnih poduzeća. Posebna je pozornost posvećena razdoblju najtežih ograničenja zbog pandemije COVID-19. Kao što pokazuju empirijski rezultati, 2020. godina obilježila je pad učinkovitosti smještajnog sektora. U 2021. godini već su postojali znakovi oporavka, ali medijan učinkovitosti sektora još nije dosegao razinu prije pandemije. Zemlje poput Francuske i Italije znatno su pale na ljestvici za 2020. godinu. Nasuprot tomu, nordijske zemlje (Finska ili Švedska) ili srednjoeuropske zemlje (poput Češke i Slovačke) uspjele su održati relativno istu razinu učinkovitosti tijekom tog razdoblja. Ovi rezultati ukazuju na to da, kako se turizam razlikuje od zemlje do zemlje, tako se mijenja i razina učinkovitosti unutar zemlje, što uključuje i promjene u učinkovitosti nakon vanjskih šokova poput pandemije COVID-19.

Međutim, biti će potrebno procijeniti utjecaj pandemije tijekom duljeg razdoblja (nakon što budu dostupni potrebni podaci). Bilo bi korisno nadopuniti analize ne samo podacima iz preostalih zemalja EU-a, već je moguće proširiti analizu i na druge zemlje pogođene pandemijom (npr. SAD).

or competitiveness) that need to be addressed sooner or later. To that effect, the source stresses the importance of the institutions. According to the developing countries' results like Malaysia (Lee *et al.*, 2020), a positive relationship between government actions (corruption control and political stability) and tourism has been demonstrated. However, there are no studies yet in the EU on how government decisions affect the efficiency of enterprises and, hence, the entire tourism sector, which suggests future research focus.

9. CONCLUSION

This article evaluated the efficiency of the accommodation sector in EU countries. Unlike other studies, here the macroeconomic view was derived from the microeconomic data of individual enterprises. Special attention was paid to the period of the most severe restrictions due to the COVID-19 pandemic. As the empirical results show, 2020 marked a decline in the efficiency of the accommodation sector. In 2021, there are already signs of recovery, but the sector's median efficiency has not yet reached its pre-COVID level. Countries such as France and Italy have dropped considerably in the 2020 rankings. In contrast, Nordic countries (Finland or Sweden) or Central European countries (such as the Czech Republic and Slovakia) have managed to maintain relatively the same level of efficiency during this period. These results show that as tourism varies across countries, and so does the level of efficiency within a country including the changes in efficiency in the aftermath of external shocks such as the COVID-19 pandemic.

However, it will be necessary to assess the impact of the pandemic over a longer period (once the necessary data are available). It would be useful to complement the analyses not only with data from the remaining EU countries, but it is also possible to extend the analysis to other countries affected by the pandemic (e.g. the USA).

Zahvale

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