SIMPLE TOURISM SECTOR DEVELOPMENT INDEX: CRISES VALUES

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Abstract
Purpose – The paper aims to construct a simple tourism sector development index reacting to crises occurrences.
Methodology – Paper is two-folded, theoretical background with literature overview and empirical part based on the DEA method. Instead of using a vast number of different individual indicators measuring countries' tourism performance, it is more appropriate to use one composite index to depict complex tourism development issues in a particular country. The composite index proposed in this paper TSDI, was developed using DEA encompassing tourism soundness and macroeconomic data.
Findings – We are especially interested in index values in the 2019 COVID-19 pandemic crises relatively to the previous and following year. Therefore, the data time series include the annual data of selected truisms soundness factors from 2016 to 2020. The paper has three hypotheses dealing with simple tourism sector development index (TSDI) values during crises and the correlation of this calculated index to The Travel & Tourism Competitiveness Index (TTCI) and The Global Competitiveness Index (GCI).
Contribution – The paper may offer some basic policy recommendations for policymakers as it may be applied as a relatively simple tool for professionals to assess future crises or economic shocks implications on the tourism sector. The TDSI proposed in this paper can point at the differences in countries' responses to crises shock that could be influenced by government policies aimed at tourism sector development. TDSI is, due to its simplicity, a good tool for practitioners to use in monitoring and placing recommendations for improvements.
Keywords: Tourism, Composite index, DEA, Crises, Competitiveness.

INTRODUCTION

Over the years, tourism has had a positive multiplicative impact and has become a fundamental component of economic growth and the national and global gross domestic product (GDP) level. On the other hand, however, it seems to be one of the sectors that are also most affected by unfavourable economic shocks. The occurrence of Covid-19 is going to change the world economic landscape and probably the tourism sector terminally. The tourism industry not only generates revenues for a country and cultural wealth, but it is also one of the most important economic engines for growth and development (Loss, 2019). Therefore, we find it meaningful and necessary to use various tourism development and effectiveness indicators to show the positive multiplicative impacts of that sector on the one hand and perceptiveness to adverse economic shocks. UNWTO (2021) argues that over the decades, tourism has experienced continued growth and deepening diversification. It became one of the fastest-growing economic sectors in the world.

In the last few decades, the two most significant crises were the 2008 sub-prime financial crisis and ongoing, 2019 COVID-19 pandemic crises. Although deriving from opposed reasons, they caused global social and economic turndown. The credit crunch, banking crisis evolving to governments' debt crises then and now virus threatening all parts of the social and economic system led to the loss of supply and lack of demand on the other side. Trust issues arose in both crises. Nowadays, lowered public trust in governmental measures and vaccine plans lead to the global recession. Lustig and Mariscal (2020) argue that in the current health crisis, as in the global financial crisis in 2008, it is evident that the markets are not able to produce a solution. Therefore, aggressive policy intervention and globally coordinated action to minimise its economic fallout, size, and time length are needed.

The main research question discussed is whether the tourism sector declined due to crises emergence. We set two hypotheses that read as (1) Values of Tourism Sector Development Index (TSDI) is lower in 2020 compared to 2018 and 2019, and (2) Correlations between TSDI and TTCI and between TSDI and GCI are positive. However, the main aim is to use this constructed TSDI to assess the tourism sector soundness of a particular country or a region, researching its compatibility in movements relatively to primary macroeconomic data for various countries, groups of countries, and average values. We are especially interested in index values in crises from the content view, taking 2019 still ongoing supply-pulled crises into account. The data time series are therefore going to include the annual data from 2014 to 2020.

Paper is two-folded, theoretical background with literature overview and empirical part based on data series applying Data Envelopment Analysis (DEA). We organised this contribution as follows. The first part deals with tourism importance as a part of global GDP and its standings in the crisis's period, where some crisis impacts are highlighted. In the second part, we fold out a short overview of DEA application in tourist sector effectiveness research. Due to the sample of countries used in calculating the proposed index we strictly focus on the literature body concerning DEA method and its application to tourism in Western Balakans' countries. In the empirical part the methodology overview and limitations follow. We build the proposed composite index (TSDI) using DEA. In conclusion, we address the proposed hypotheses and point out several avenues for further research and some suggestions for policymakers and practitioners.

1. SIGNIFICANCE OF TOURISM SECTOR IN GLOBAL GDP AND CRISES IMPACT

1.1. Global tourism in numbers

Modern tourism is closely linked to development and encompasses a growing number of new destinations. These dynamics have turned tourism into a critical driver for socio-economic progress (Sharpley 2014). This global spread of tourism in industrialised and developed states has produced economic and employment benefits in many related sectors - from construction to agriculture or telecommunications (UNWTO 2021). Hence, it is an effective means of achieving development in both the industrialised and less developed countries of the world and has in this sense become an essential and

integral element of their development strategies. In 2019, this sector contributed 10.4% to global GDP (World economic forum 2019). On the opposite, some authors (see, for example, Archer et al. 2005) however also point out the negative aspects and pitfalls of tourism, such as negative impacts on the environment, accentuation of negative aspects of society, even the exploitation of local labour, and possible adverse economic effects.

Touristic activities have diminished in the crises aftermath. UNWTO (2009) data showed for the financial crises that the growth in international tourist arrivals became negative (-1%) in the second half of 2008. In 2009 it slid to -8% compared to the same period in the previous year. World economic forum (2009) reported that the tourism industry contracted by 4.8% in 2009. The COVID-19 pandemic influenced that sector severely once again. WTTC (2021) reports that the travel and tourism sector suffered a significant loss in 2020. The contribution to GDP dropped by a staggering 49.1% compared to 2019. In 2019, this sector contributed 10.4% to global GDP, and its share decreased to 5.5% in 2020.

1.2. Crises impact on the tourism sector

In general, tourism reacts to adverse shocks and shrink due to economic or non-economic events. The numbers on tourism are evident from the first part of this section. However, the reasons behind them are more complex and interwoven. We focus on the last two crises occurrence. We discuss some of the selected research angles and perspectives further on.

Smeral (2009, 3) argues that massive changes in consumer behaviour had influenced tourism due to the threat of unemployment, potential loss of income and other issues after the 2008 financial crisis, that put a massive long-term damper on consumption, and consumer cutbacks will disproportionately affect luxury goods in general as well as tourism services in particular. Papatheodorou et al. (2010), in this regard, emphasise that tourism involves discretionary income and has been therefore traditionally considered vulnerable to economic uncertainty and volatility. Hajibaba et al. (2015), as the opposite, point out a crisis-resistant tourists group, which demonstrates a higher risk propensity and resistance to change.

The Covid-19 pandemic has clearly shown all the weaknesses of globalisation. In the past, the driving force behind globalisation was tourism, which will also suffer the most remarkable consequences as a sector in the broadest sense of the word. A pandemic as a health phenomenon has implications for mobility, causes social costs of destinations themselves (Qiu et al. 2020) and increases health risks in tourism (Baker 2015). Sigala (2020) suggests that COVID-19 tourism impacts will be uneven in space and time, and apart from the human tool, estimates show an enormous and international economic impact. Consequently, a biological virus contagion evolved into a financial crisis contagion. Škare et al. (2021), in their study, demonstrated that pandemic crises have long-lasting adverse effects on the tourism industry and economy, which are far beyond those observed during past pandemic crises. The pandemic effects of COVID-19 on the tourism sector have the effect of a common shock. Of course, tourism as a sector reacts to economic crises and other non-economic events, which tend to have economic downfalls for a particular region or even globally, as in the recent Covid-19 pandemic's crises.

Beirman (2018) points out the linkage between the breakdown of safety and security and its descent into a business, sectoral or destination crisis. Safety is a broad term also covering medical risks arising from human activity and natural phenomena. Hall (2010, 406) adds that although most research in tourism on crisis concentrates on economic and financial crises, as also in this paper, there is a surprisingly narrower body of literature focusing on the environmental crisis that has to put forward in the future.

2. LITERATURE OVERVIEW

Due to a vast quantity of available sources on tourism efficiency in general, macro and micro researched, we focused on the more recent literature. We concentrated on the macro level and have limited the literature overview by DEA application and focused on Western Balkans countries. The recent studies, which apply to the same sample, or at least studying one of the Western Balkans' countries, are underpinned in this paper. Most authors researching this field compared Balkan countries to other European countries or the touristically developed countries with high tourist sector efficiency.

Rabar and Blažević (2011) found good and bad practices concerning tourism efficiency on the level of Croatian counties and found out that some counties proved to be ineffective over the observed period, and the others improved their performance (for example, Primorsko-Goranska) based on past experiences.

Cvetkoska and Barišić (2017) researched the efficiency of tourism in the eleven countries Balkan region from 2010 to 2015. No country was efficient every year in every researched field. Albania appeared to be the most and Montenegro the least efficient country. Bogetić et al. (2017) argue that Serbia can develop tourism, hence insufficient attractiveness of offers is a problem to boost up the efficiency. Ilić and Petrovska (2018) studied efficiency in Serbia and surrounding countries in 2016. The results show that inefficient countries should reduce tourism costs and the number of beds and increase output parameters. Škrinjarić (2018) focused on 21 Croatian counties from 2011 to 2015 combined economic and environmental factors and established that it is possible to obtain satisfactory economic and environmental results simultaneously.

Prorok et al. (2019) researched, among others technical efficiency of non-EU Balkan countries. Albania and Montenegro have been most effective in achieving complete and pure technical efficiency among Western Balkan countries. Bosnia and Herzegovina, Serbia, and Macedonia have achieved a lower coefficient of total technical efficiency. In contrast, their coefficient of pure technical efficiency showed the non-existence or inefficient implementation of operational activities in tourism and unfavourable conditions for its development.

Radovanov et al. (2020) assessed the sustainable tourism development efficiency of 27 EU countries and five Western Balkan countries from 2011 to 2017 and argue that efficiency scores are relatively high. To improve the results, the authors suggest the share of GDP, tourist arrivals and inbound receipts, and visa requirements, and the rate of use of tourist accommodation units reveal positive and significant effects on relative tourism

efficiency. However, government expenditure on tourism is negatively and significantly influential on the overall efficiency.

3. METHODOLOGY

3.1. DEA methodology – theoretical background

The construction of composite indicators is "a useful tool in policy analysis and public communication" (Nardo et al. 2005, 12) for a comparison between the countries regarding the level of their development in different fields: social, demography, economy, ecology, education, broadband (Mitrović 2015). The composite index will be developed by using DEA.

The process of composite index construction consists of four main phases: (1) identifying and analysing individual indicators using the multivariate statistics, (2) filling in missing data, (3) normalisation and, (4) defining the weights of individual indicators and aggregation model.

To determine the weights for each country and each indicator, the "Benefit of Doubt" approach is used (Charnes et al. 1978, 57). This approach assumes that weights are endogenously determined by the observed performances and benchmark between countries.

The different indicators are not expressed in the same direction. Because of that, the raw values are normalised in an interval between 0 and 1 (the indicators with higher values represent the better performance of the given country and vice versa).

According to (Zhou et al. 2007; Cherchye et al. 2007), the basic DEA model assumed that sub-indices CI (composite indices) for each country *j* (j=0,1,...,m) are calculated as the weighted sum of *n* indicators where the weights are endogenously determined to maximise the value of the composite index for each country. Optimal weights should be determined by solving the next linear programming problem:

$$CI_j = max \sum_{i=0}^{n} y_{ij}\, w_{ij} \tag{1}$$

Where

$$\sum_{i=0}^{n} y_{ij}\, w_{ik} \leq 1 \tag{2}$$

and

$$w_{ij} \geq 0 \tag{3}$$

for any *i=0,1,...,n,* any *j=0,1,...,m,* and any *k=0,1,...,m.*

In order to determine the size of the data set to complete DEA analysis, we used the rule of thumb proposed in (Golany and Roll 1989, 29–30), that the number of analysed countries should be at least twice the number of indicators considered.

After weights calculation for each sub-index using the classical "Benefits of Doubt" approach, we used the DEA Cross Efficiency model to calculate their final values and to rank countries. This tool for interpreting the results consists of creating a table where the number of rows *(j)* and columns *(j)* equals the number of countries in the analysis. For each cell *(ij)*, the efficiency of countries computed with weights that are optimal to country *j* (Doyle and Green 1994, 44).

3.2. Tourism sector development composite index construction for selected European countries

There are some limitations contentwise connected to the simple TSDI construction. We limited the research contentwise in three fields:

- limitations apply geographically to Western Balcans countries compared to touristically developed countries regarding constructed TSDI;
- due to the simplicity of the index, statistical indicators forming the TSDI are limited to four indicators (Table 1) that form demand-side and omit supply-side tourism development indicators. Baggio (2019) overviews touristic sector research, and emphasises demand and supply-side indicators that could be used in these terms. Song et al. (2010), in this regard, state that two dimensions of demand, that is tourists, and their expenditures are two classes of measurements are by far the most common to use in tourism development measurement;
- the constructed simple TSDI is compared to renowned world touristic indices GCI and TTCI.

Tables 1: **Statistical indicators forming the TSDI**

Index	Indicators used
Tourism Development Index (CEI)	ART – Arrivals at tourist accommodation establishments (#) NOR – Net occupancy rate of bed-places and bedrooms (%) NSP – Nights spent at tourist accommodation establishments (#) GDP – GDP per capita (EUR per capita)

Source: Eurostat and WorldBank database.

The optimal calculated set of weights provides the best position for the given country to all other analysed countries. Any other weighting profile would worsen the relative position of the given country. After creating a cross-efficiency matrix, the average values of weighted individual indicators were calculated. This way, the best possible combination of the individual indicators within a country's index has been delivered (there is no other combination that will enable a country to achieve a greater TSDI index value). In other words, we consider the most favourable situation for each country.

The resulting values of TSDI range between zero (the worst possible performance) and 1 (the best possible performance – benchmark) (Table 2).

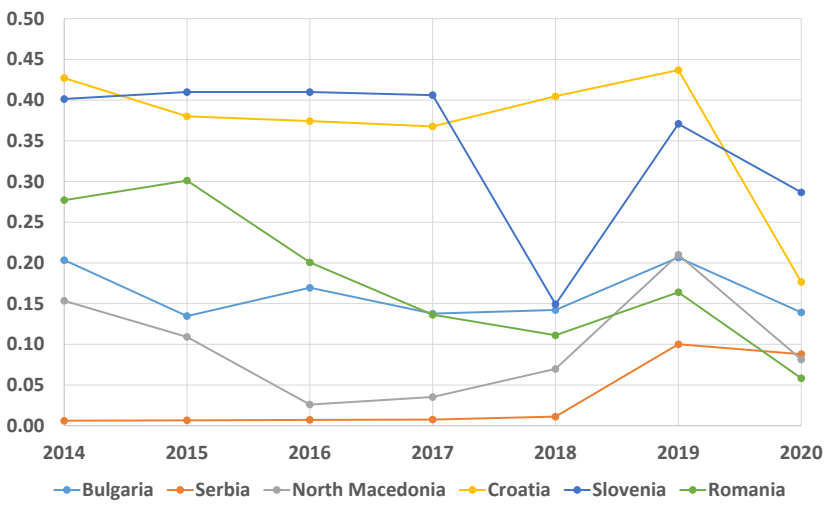
Tables 2: **Calculated values of TSDI (2014-2020)**

Country	2014	2015	2016	2017	2018	2019	2020
Belgium	0.661	0.723	0.587	0.602	0.627	0.675	0.640
Bulgaria	0.203	0.135	0.169	0.138	0.142	0.207	0.139
Czechia	0.389	0.321	0.330	0.327	0.321	0.383	0.315
Denmark	0.675	0.693	0.707	0.605	0.584	0.581	0.473
Germany	0.809	0.797	0.777	0.710	0.749	0.749	0.786
Estonia	0.436	0.419	0.409	0.379	0.340	0.425	0.334
Ireland	0.728	0.793	0.747	0.865	0.824	0.823	0.903
Greece	0.384	0.312	0.267	0.252	0.333	0.294	0.207
Spain	0.849	0.858	0.863	0.900	0.857	0.906	0.725
France	0.907	0.842	0.814	0.849	0.858	0.877	0.784
Croatia	0.427	0.380	0.374	0.368	0.405	0.437	0.177
Italy	0.610	0.571	0.531	0.517	0.753	0.645	0.578
Cyprus	0.547	0.548	0.615	0.644	0.555	0.577	0.191
Latvia	0.354	0.282	0.232	0.206	0.238	0.305	0.173
Lithuania	0.389	0.367	0.352	0.337	0.320	0.408	0.152
Luxembourg	0.677	0.721	0.663	0.561	0.582	0.431	0.213
Hungary	0.387	0.381	0.374	0.364	0.354	0.435	0.208
Malta	0.774	0.808	0.783	0.770	0.704	0.744	0.268
Netherlands	0.845	0.887	0.855	0.846	0.827	0.838	0.633
Austria	0.640	0.585	0.611	0.563	0.631	0.613	0.773
Poland	0.319	0.316	0.309	0.270	0.268	0.346	0.339
Portugal	0.429	0.434	0.452	0.458	0.483	0.528	0.329
Romania	0.277	0.301	0.201	0.136	0.111	0.164	0.058
Slovenia	0.401	0.410	0.410	0.406	0.149	0.371	0.287
Slovakia	0.165	0.156	0.169	0.121	0.111	0.203	0.213
Finland	0.527	0.534	0.520	0.484	0.452	0.129	0.633
Sweden	0.593	0.656	0.660	0.591	0.566	0.571	0.637
N. Macedonia	0.154	0.109	0.026	0.035	0.070	0.210	0.081
Serbia	0.006	0.007	0.007	0.008	0.011	0.100	0.088

Source: Authors' calculation.

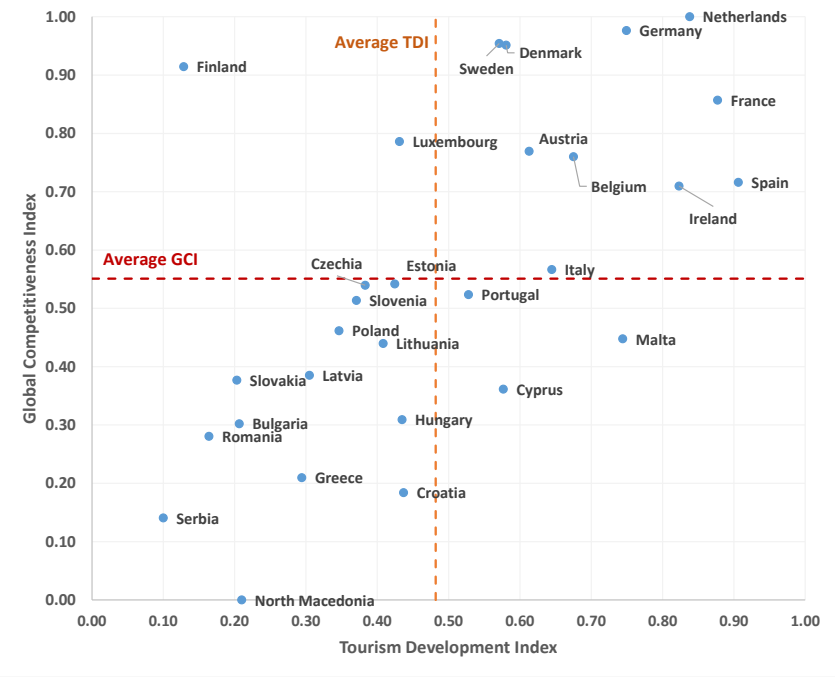
Figure 1 presents the dynamics of TSDI for 2014-2020 for Bulgaria, Romania, Serbia, North Macedonia, Croatia and Slovenia.

Figure 1: **TSDI index (2014-2020)**



Source: Authors' own calculations.

Figure 2: **TSDI and GCI**



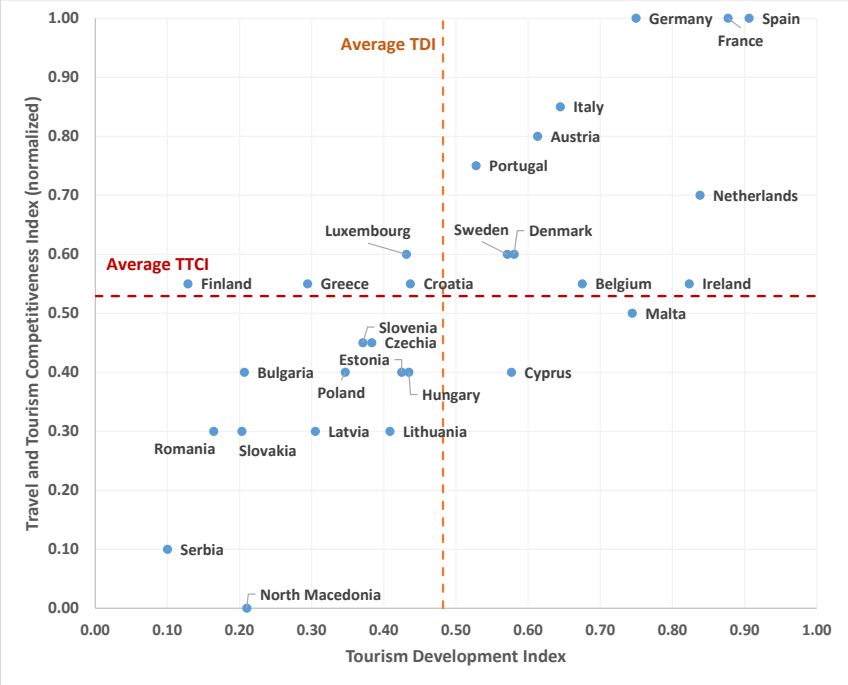
Source: Authors' own calculations.

It is vital to analyse if tourism development influences global economic competitiveness in countries observed in this analysis for economic purposes. Therefore, a simple comparison of the calculated values of the TSDI and the GCI is particularly interesting. Pearson's correlation test indicates a positive correlation between the two sets of index data (TSDI and GCI). According to the results, Pearson's correlation coefficient equals 0.618682.

A brief look at Figure 2 and the calculated data values shows that Netherlands, Germany, France, Spain and Ireland belong to the "top performers" group regarding tourism sector development and global economic competitiveness. Countries like Serbia, North Macedonia, Romania and Bulgaria belong to the "laggards" – the countries with significantly unfavourable conditions and potentials for tourism sector development.

We also analysed correlations between the TSDI and TTCI. Pearson's correlation test indicates a positive correlation between the two sets of index data (TSDI and TTCI). According to the results, Pearson's correlation coefficient equals 0.764496. Germany, Spain and France are "top performers" related to tourism sector development and competitiveness achievement, while North Macedonia, Serbia, Romania and Slovakia are "laggards" (Figure 3).

Figure 3: **TSDI and TTCI**



Source: Authors' own calculations.

CONCLUSION

As we already argued in previous paragraphs of this contribution, tourism represents around 10% of global GDPT and accelerates growth and development, hence the same in countries dealt with in our TSDI structuring and research. Tourism as a sector actively participates in and supports economic and social development, the development of regions. In developing countries, it has an accelerating effect on socio-economic development, but it can also positively affect socially responsible and environmental issues.

The authors constructed the simple composite TSDI index for selected European countries (limitations are given in Section 3.2). The constuced index is different from other similar indices due to its simplicity, narrow set of tourism demand-side indicators are used, and can represent a quick tool for countries', regions' or even smaller destinations' touristic current situation assessment. It could be a starting point to discover possibilities for improvement and compare to others, in this sence higly developed destinations, and threrefore seek opportunities in this important and growing sector.

The occurrence of Covid-19 is going to change the world economic landscape and probably the tourism sector terminally. Within the frame of the leading research question, we confirmed both hypotheses we set at the beginning of this research. The first hypothesis anticipated that the simple TSDI values would be lower in 2020 than in 2018 and 2019 (average values 0.391, 0.456 and 0.482, retrospectively) because of the influence of the COVID-19 crises. The individual tourism indicators (both in developed and developing European countries) deteriorated during 2020 because of restrictions posed to free mobility of passengers and the work of tourist capacities (hotels, restaurants…).

We confirmed the second hypothesis about the positive correlations between TSDI and The Travel & Tourism Competitiveness Index and TSDI and The Global Competitiveness Index based on the research results. According to the results, Pearson's correlation coefficients equal 0.619 (TSDI and GCI) and 0.764 (TSDI and TTCI). The proposed indicator TSDI is also a good measure of the countries' competitiveness regarding the tourism sector development and global competitiveness.

The practical implication of this paper's results lies in the fact that the TSDI Index can serve as a good tool that will allow the classification of goals and priorities when designing tourism development policies of the countries. Such policies require additional investment in new tourism infrastructure, permanent education of the population, research and development processes in enterprises, scientific institutions and universities and investment in environmental protection. Based on recent research presented in the literature and using the proposed methodology, this contribution provides a more comprehensive picture of the global competitiveness of given countries. The values of the calculated TSDI indeces can help set further priorities for political intervention in tourism sector development and improve the country's competitive advantage.

Of course, there are several avenues for further research in this field, among which the authors would like to emphasise the application of TSDI in a broader sample of countries, more extended data series to encompass potential negative impacts of demand-pulled crises in 2008 as oppose to supply-pushed crises in 2019 and to include social responsibility

issues recognition and implementation impact on TSDI. Some essential suggestions for policymakers can be derived from the results of the research carried out in this contribution, such as which of narrowly picked variables that constitute indices are in comparison to the region or some other benchmark country or average or index value, on the lower level and could be improved with strategic planning and aiming shortly. The simplicity of the index could better understand the wider public (policymakers, decision-makers, tourism workers) and a simplified modelled reality of a sector with many inter-related and inter-dependent factors.

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