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THE SPATIAL, TEMPORAL AND STRUCTURAL APPROACH TO INTERREGIONAL TOURISM INFLOWS' SUSTAINABILITY: ON THE EXAMPLE OF FOUR ERASMUS+ SPOT PROJECT CASE STUDY REGIONS

Abstract. Based on produced regional data on tourism arrivals across 297 NUTS2 regions of the EU and EFTA countries covering the temporal scope of 2010–2018, the spatial concentration of tourist inflow in Europe, average annual dynamics of tourist inflow between 2010–2018, and a relative position of the tourist branch of the economy in a given region has been determined. An attempt was made to present a typology of regions according to the weighted intensity and spatial concentration of tourist inflow. Special attention has been given to SPOT project case study regions: Piemonte in Italy, Innlandet in Norway, Łódzkie in Poland, and Centro in Portugal.
Key words: tourist flows, spatial concentration of tourists, weighted intensity of tourism, Piemonte, Innlandet, Łódzkie, Centro.

1. INTRODUCTION

Since the roots of the sustainable tourism concept emerge from sustainable development, which is a term open to a broad interpretation, sustainable tourism is "an exceedingly complex concept with varied definitions due to different

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interpretations of the meaning and use of the concept" (Fennell and Cooper, 2020, p. 23). In general, sustainable tourism takes full account of its current and future economic, social, and environmental impacts, addressing the needs of visitors, the industry, the environment, and host communities (UNWTO, 2022). However, sustainability in tourism interpreted in this way focuses mainly on tourist destinations, i.e., supply, while tourism consists also of tourists' origin areas, i.e. demand, and connections between these areas and tourist destinations, i.e., transport, and communication. This paper focuses on the sustainability of tourist inflows to different European regions, through the spatial, temporal, and structural approaches.

The spatial patterns of the tourist movement and the concentrations of tourists at preferred destinations is not an accidental process but is shaped by individual or collective motivations and the expectation that by travelling to particular places, those motivations may be realised (Williams and Lew, 2015, p. 11). Tourism can be analysed in terms of supply and demand, where the areas of demand are mainly cities and agglomerations, while the areas of supply have the possibility of using resources for tourism product development and offer. Christaller's (1963) centre, a periphery concept based on the dependency theory, considers tourism space existing in the peripheral regions described as the coastal and mountain areas usually placed in the periphery of countries, i.e., main destinations for long-term tourism.

However, over the past few decades, tourism has become so globalised, massive, and common that the above-mentioned concepts in which tourists are generated mostly by large cities and received by the peripheries, do not reflect the reality, especially in Europe. Considering the fact that a large number of tourists also originate from rural areas and that big cities are also big magnets for tourists, as well as the fact that tourism is a dynamic but dependent economic branch. In addition, it should be noted that studies of tourist flows to date have tended to focus on inter-country relations or have included analyses of tourism flows in selected countries – thus there has been a lack of analysis on a broader spatial scale and on a regional basis (Prideaux, 2005; Zhang and Jensen, 2007; Garin-Munoz and Perez Amaral, 2000; Song and Witt, 2006; Kádár, Gede, 2021; Shao *et al.*, 2021; Lozano, Gutiérrez, 2018).

In this article we try to determine the spatial concentration of tourist inflow in Europe, average annual dynamics of tourist inflow between 2010 and 2018, and a relative position of the tourist branch of the economy in a given region compared with the strength of other selected branches. Finally, an attempt was made to present a typology of regions according to weighted intensity and spatial concentration of tourist inflow in the period of 2010–2018. The novelty of this research is the analysis of tourism inflow based on the NUTS2 regional level and proposed typology. Special attention was given to four European regions, i.e., Piemonte in Italy, Innlandet in Norway, Łódzkie in Poland, and Centro in Portugal, being the case study regions in the *Erasmus+ Programme* project *SPOT. Sustainable Spatial Planning of Tourism Destinations* (see SPOT, 2022).

2. DATA AND METHOD OF ANALYSIS

The spatial scope of the analysis covers all tourist flows across 297 NUTS 2 regions of the EU – European Union and EFTA (European Free Trade Association area) as of 2018 and the temporal scope covers the entire period of 2010–2018. It is worth noticing as well that in it all spatial units have been assessed as tourist destinations, therefore, by considering data on tourists inflow only. Tourist outflow is another interesting insight in the analysis of tourism spatial allocation and its conditions, but it poses a separate problem and exceeds the scope of this paper.

We realised that two basic sources of data on the size and spatial allocation of tourist flow volume among 32 relevant countries could be considered as complex and reliable enough: EUROSTAT (2021) and UNWTO (2021). Unfortunately, both deliver information at the national level of spatial detail and are incomplete in spatial and temporal dimensions to some extent. Therefore, estimating data gaps for the country-to-country matrix and disaggregating it to the region-to-region level of spatial detail was necessary (ESPON IRiE, 2021). The first procedure has a multi-level nature, forced by unequal reliability of the data derived by the use of different possible methods and sources. The following hierarchic order of methods has been implemented, in order of decreasing priority (ESPON IRiE, 2021):

1. Cross-reference of different indexes on tourist movement delivered by UNWTO;
2. Interpolation or extrapolation of temporal rows within UNWTO or EUROSTAT data;
3. Analysis of total tourist movement dynamics based on UNWTO and on EUROSTAT data;
4. Harmonisation of data derived from different sources, by use of the *Relative Level of Detail Ratio* (RLDR):

$$Flow\ est_{j,i} = Flow_{j,i,source\ known} \times RLDR = Flow_{j,i,eurostat} \times \frac{Flow\ total_{UNWTO}}{Flow\ total_{eurostat}};$$

5. Model of gravity analysis, by use of (1) Gross domestic product per capita in purchasing power standards (GDP PPS), (2) the number of arrivals with accommodation, and (3) the orthodromic distance between centroids of regions weighted by their internal population distribution:

$$Flow\ est_{j,i} = 9,179 \times 10^7 \times GDP\ PPS_i \times Pop_j \times 294,233 \times dist_{j,i}^{-0,802}.$$

The formula derived from the general gravity model has been applied not only to estimate the last data gaps in the country-to-country matrix but also for the disaggregation of values from the country-to-country matrix across these cells of the region-to-region matrix, which are related to the international movement. For disaggregation values from the country-to-country matrix across the cells of

domestic movement, regional stocks of domestic arrivals at NUTS 2 have been allocated among regions of origin according to the model of each individual country, which was adjusted to national specificity of the distance function.

It is possible to distinguish three basic approaches to the geographical space of flows (Castells, 2004): spatial, temporal, and structural. They have been assumed as the basic framework for a multi-perspective analysis of tourism sustainability, which has been undertaken in this paper. To operationalise the empirical analysis, one indicator has been proposed as a measure of regions' vulnerability in each of these approaches.

In the first, particular relations can be analysed in a number of aspects. ESPON IRiE (2022) ordered them according to four main dimensions: (1) size – perceived as absolute or relative volume of flowing assets; (2) bilateral balance – the relation between inflow and outflow; (3) spatial concentration – the degree of flow's volume accumulation within particular shares of total spatial units' number, area, population, etc., and (4) distance impact – the remoteness of flow's origin or destination, degree of distance dependency of flow's volume, etc. The dimension of concentration in particular is valuable in the context of the paper's objectives, as it allows to assess dependence of a region on specific origins of inflowing tourists. The index of the spatial concentration of tourists' inflow to the region i has been calculated according to the following formula:

$$W_{1,i} = \frac{\sum_{j=1}^{296} flow_{j,i} \times \sum_{j=1}^{296} area_j - \sum_{j=1}^{296} ((2 \times (297-j)-1) \times flow_{j,i} \times area_j)}{\sum_{j=1}^{296} flow_{j,i} \times \sum_{j=1}^{296} area_j}$$

where:

$$\forall j \in N : \left(j \in \{2,3,\dots,296\} \rightarrow \left(\frac{flow_{j,i}}{area_j} \geq \frac{flow_{(j-1),i}}{area_{(j-1)}} \right) \right)$$

The value of 0 means that the distribution of the region's flow volume across all other regions is ideally proportional to their area while 1 means that it is ideally concentrated and the total flow volume of the region i is covered by its relation with only one point. 1 is only theoretical and not possible to achieve for the empirical set of spatial units, which all have some areas.

In the second approach, the average yearly dynamics of tourist inflow to a region within the 2010–2018 period has been calculated. It has been assumed that the regions of sustainable tourism development are able to maintain growth over a long period. The following formula has been applied for that purpose:

$$W_{2,i} = (m_i - 1) \times 100\%$$

where:

$$\sum_{j=1}^{296} flow_{j,i,year} = reg_i\left(year\right) = b_i \times m_i^{year} + \varepsilon_{i,year}$$

The value means y/y change of the inflow's volume in the 2010–2018 period, according to the model of geo-metric temporal progression, expressed in percentage.

During the implementation of the last approach it has been assumed that a high significance of tourism within the entire regional structure of various functional relations disclosing in a certain volume of flowing assets indicates strong tourism dependence. For that purpose, the share of tourists among all 11 inflowing assets (k) analysed under ESPON IRiE (ESPON IRiE, 2022) has been considered. These flows comprise the trade of goods and services, people (migration, tourism, and labour), capital (FDI, remittances, and loans), and knowledge (Erasmus students, H2020 networks, and patents). Equal significance of each of these assets has been assumed and the total volume of all region-to-region matrices has been standardised. Finally, the following formula has been applied in order to assess the dependence of regions on their tourist functional relations:

$$W_{3,i} = \frac{\sum_{j=1}^{296} flow_{Tourism,j,i}}{\sum_{k=1}^{11}\sum_{j=1}^{296} flow_{k,j,i}} \times 100\%$$

In order to synthesise detailed results on the space of flows, in the last step of the research procedure, the method of bi-dimensional territorial typology (e.g. Mazur and Czapiewski, 2016) has been applied. It synthesises quantitative information on the combination of two dimensions, i.e., tourism inflow's size and concentration. For the purpose of tourist inflow's measurement in the dimension of spatial concentration, the index $W_{1,i}$ has been applied, while for the tourist inflow's size assessment, the following index of weighted intensity has been used:

$$WII_i = \sum_{j=1}^{296} \frac{flow_{j,i}}{population_i}$$

Based on the quantitative values of $W_{1,i}$ and WII_i, each individual quantitative value of $W_{1,i}$ and WII_i has been compared with the arithmetic mean and each region has been assigned one of two classes in each dimension. The reason for such a rule was to avoid forcing any predefined empirical representation of the classes. These hierarchical values of indexes have been finally generalised by combining the results within two dimensions, reducing the level of measurement, and assigning the qualitative category of tourism to each spatial unit. This category has been selected from the following predefined list: "post-modern", "supplementary", "global", and "specialised".

3. CASE STUDY REGIONS

Five universities from five regions are participating in the Erasmus+ SPOT project. Unfortunately, the data collected in the ESPON IRiE project will make it impossible to perform analyses for the Turkish region, so the following parts of the paper will present results for four regions: Piemonte (ITC1; Italy), Innlandet (NO02; Norway), Łódzkie (PL71; Poland), and Centro (PT16; Portugal). The four regions identified are very diverse in terms of population, with the Norwegian region being the smallest (less than 400,000 people), the Polish and Portuguese regions being of similar size (2.2–2.4 million people) and the Italian region being home to more than 4.3 million people. That said, the Norwegian region is the largest in area (88,000 sq. km) while the other regions remain 3–4 times smaller (24,000–29,000 sq. km).

The analysed regions differ significantly in terms of the number of incoming tourists. An important caveat here is that the values given below do not consider tourists originating from within the analysed regions, so the data refers to inter-regional flows only.

The annual average number of tourist arrivals to the Centro region in Portugal within the period 2010–2018 was 7.1 million. Arrivals to Centro were dominated by the two Portuguese regions to the north and south, namely Norte and Área Metropolitana de Lisboa. In addition, tourists from Spain, the United Kingdom, Ireland, France, and the Benelux countries accounted for a significant share of arrivals. On average, more than 4.9 million tourists came to Piemonte each year – with the vast majority coming from the Lombardy region and some other Italian regions. More than 3.4 million people also visited the Innlandet region – in this case the majority of tourists were from the Norwegian adjacent regions. In addition, the Swedish, Danish, and North German regions featured to a lesser extent. The smallest number of interregional tourists was recorded in the Łódzkie region – just under 2.3 million people. They mainly came from Polish, Czech, Slovak, and German regions (Fig. 1).

In general, it should be noted that there is a concentration of incoming tourists in the surveyed regions within the same country. The highest rate of inbound tourism was recorded in Piemonte, with 60% of tourists coming from Italy (including 43% from Lombardy). For Innlandet it was 53%, Łódzkie 45%, and Centro 29%. Similar correlations can be seen in terms of the average distance from which tourists arrived in the surveyed regions.

In the case of the Piemonte region, in the ERASMUS+ SPOT project, the special attempt illustrates the case study of the "vineyard landscape of Piedmont: Langhe-Roero and Monferrato." In the past, this territory was poor and marginal, and in recent years it has become remarkably rich and with great potentialities for growth and development. This territory was inscribed into the UNESCO World

Heritage List in 2014. Its introduction into the list has increased the visibility of the Langhe-Roero and Monferrato as "living cultural landscape" globally, thanks to its cultural resources, both tangible and intangible, as well as natural features, i.e., exposition to natural hazards, especially landslides and floods.
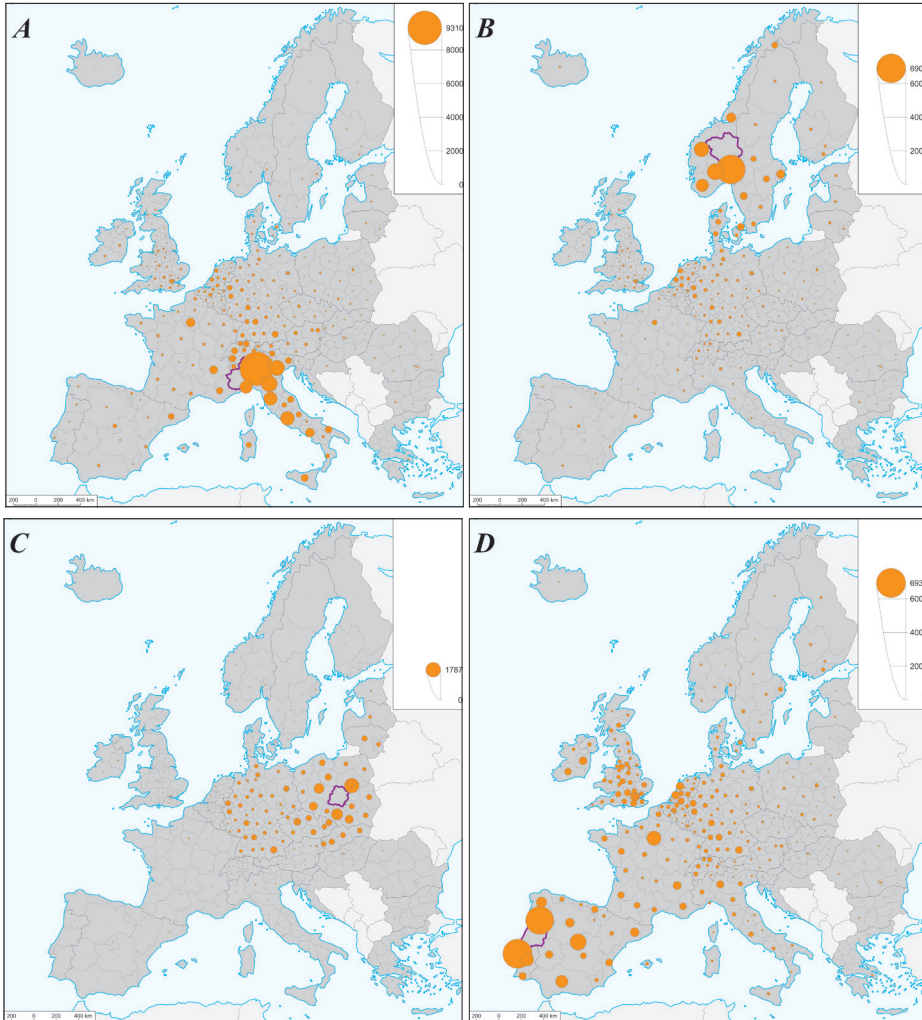

Fig. 1. Spatial distribution of the origins of interregional tourists coming to Piemonte (A), Innlandet (B), Łódzkie (C), and Centro (D) in the period of 2010–2018, in standardised flow units: 100 means an average number of tourists per one cell of region-to-region matrix (per one ordered pair of regions within EU+EFTA area)

Source: own work.

In the case of the Innlandet region, special attention is given to winter tourism. However, the mountains of south-eastern Norway are more than just ski resorts. Today, much owing to the expenditure of second-home dwellers, the summer season has increased the importance of many places, and their managers are working hard to turn their destinations into four-season destinations. However, every important mountain destination has alpine slopes with ski lifts (36 in total).

In the case of the Łódzkie region, the selected case study is the Bełchatów industrial district. Nowadays, that area is facing new challenges related to the expected shutdown of both lignite mining and energy production, resulting from the introduction of the goals of European Green Deal. Tourism, as well as logistics, and energy production based on renewable, is indicated as an industry potentially mitigating all negative social, demographic, and economic effects resulting from the recent decisions.

Finally in the case of the Portuguese Centro region, special attention is paid to coastal zone, treated as a strategic importance in environmental, economic, social, cultural, and recreational terms, which highlights the need for a protection and enhancement policy. Beaches near the town of Peniche require a significant intervention, given the growing tourist demand and the degradation of its urban seafront at an exceptionally beautiful point.

4. ANALYSIS

Spatial, temporal, and structural approaches have been applied for the analysis of tourism inflows to NUTS2 regions within the EU and the EFTA area. The results are presented in this section.

4.1. Spatial approach

The highest spatial dependency of tourist inflow is displayed by regions located in a consistent zone spreading from Ireland, through Great Britain and Benelux, towards northern France, western Germany, and Switzerland (Fig. 2). This seems to be easily justified if one considers the fact that it can be stimulated to some extent by noticeable population density, high GDP per capita, and a relatively small area of NUTS 2 regions. Therefore, adjacent areas are posing a reach reservoir of potential tourists living in a short range and with good transport accessibility, which makes short but frequent tourist visits possible. Also, the small size of units has some impact itself, which is one of the statistical effects commonly indicated in spatial analyses as the *modifiable areal unit problem* (e.g. Viegas *et al.*, 2009). Some short tourist travels can be evidenced in this part of Europe, while they could be hidden

as intra-regional elsewhere. The second consistent area of high spatial concentration has been identified in these regions of the Balkan Peninsula, which are non-coastal ones, especially in Romania or western Bulgaria. It is more difficult to justify such results in this area going beyond reference to pure regional specificity of tourism.
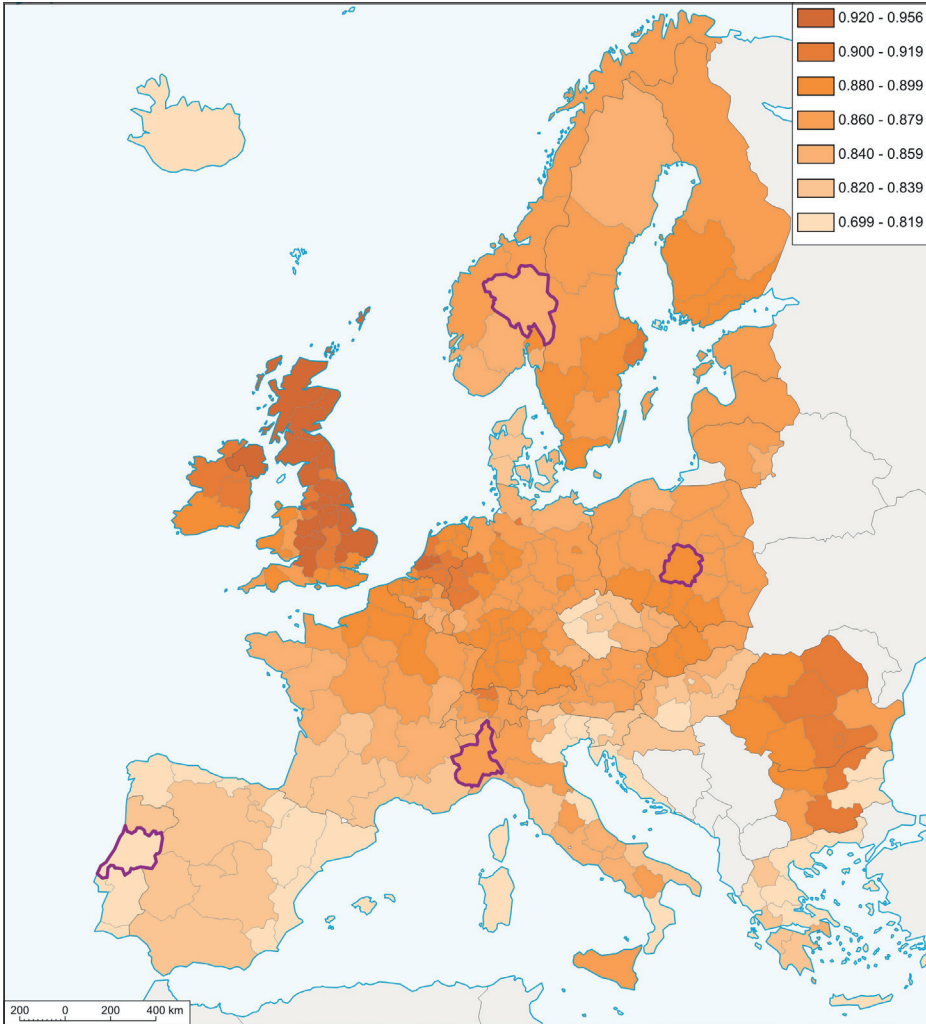

Fig. 2. Regions according to the index of spatial concentration ($W_{1,i}$) in the period of 2010–2018
Source: own work.

There is also a consistent part of southern Europe where a relatively low spatial concentration of tourist inflow is evidenced. Especially coastal regions of the Mediterranean area can be indicated in this regard. Thanks to their extraordinary

conditions for 3S (Sea, Sun, and Sand) tourism, they can attract many people coming from other parts of the continent, especially from large spatial units of Scandinavia. The places of tourist origin are noticeably spread due to that. Nevertheless, the strong seasonality of this phenomenon, and in turn its temporal concentration on the yearly scale, is another issue to be considered in the context of tourism sustainability. Also, some regions of Scandinavia display a relatively low spatial concentration of incoming tourist origins. They pose quite closed tourist areas, where internal tourist movement within this part of Europe takes the high share of the total (prices, cultural and linguistic proximity, etc.) Therefore, it is rather obvious that the large size of spatial units here and their low population density creates conditions for dispersed tourist movement and spatial concentration below average.

Concerning the four case study regions, the highest spatial dependency of tourist inflow can be found in the Łódzkie region in Poland, which is followed by Italian Piemonte, Norwegian Innlandet, and Portuguese Centro. These results show that the Łódzkie region is the most dependent on surrounding regions, notably Polish ones, so domestic tourists play an important role. The vicinity of the Polish capital city Warsaw only supports the overall interpretation mentioned above. On the other extreme, the Portuguese Centro region's demand is diffused much further away, supporting the assumption of its extraordinary conditions for tourism which attract many people coming from distanced parts of the continent.

4.2. Temporal approach

There is also interesting evidence from the analysis conducted within the temporal approach (Fig. 3). It can be noticed at both, the continental and national levels. In the former, it is clear that the process of convergence is proceeding and the eastern part of the study area attracts much more tourists than a decade before, not only in terms of absolute values but also in relation to the west. Average yearly growth exceeding 5% is not rare there. Considering the results at a more detailed level, the important diversity of the situation at numerous national borders can neither be neglected. One can clearly state that some smaller countries experienced extraordinary growth in the investigated period and they are outstanding from their neighbours in this regard. Iceland, Portugal, Slovenia, Croatia, and Lithuania can be listed here. There are, however, also examples of stagnating countries. Unfortunately, apart from Nordic Europe, there are also such tourism industries of global range as France or Italy among them.

Out of four SPOT case study regions, the highest growth of tourists can be observed in the Centro region (Portugal), slightly smaller in the regions of Piemonte (Italy), and Łódzkie (Poland), while the Innlandet region (Norway) experienced stagnation between 2010 and 2018.
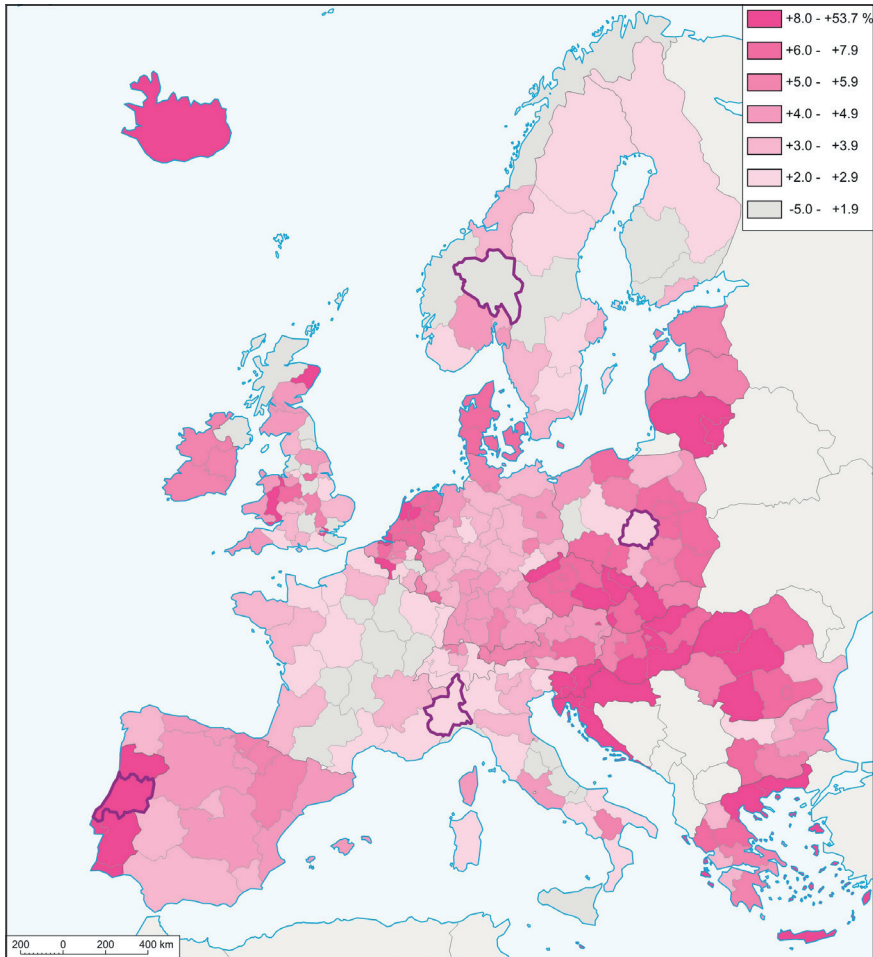
Fig. 3. Regions according to the index of average yearly dynamics of tourist inflow ($W_{2,i}$) in the period of 2010–2018.

Source: own work.

4.3. Structural approach

When analysing the results achieved in the structural approach, it is important to notice that tourist inflow has been referred to as other inflows here. Therefore, low or high values not necessarily mean directly such a general position of tourist branch of economy in a region. There are clear examples of the regions of the UK, Benelux or Germany (Fig. 4) where tourism is developed relatively good, but not when compared with the strength of other interlinkages and multi-functional networking in this

part of Europe. Such effect is even clearer in numerous capital regions. Nevertheless, also some areas display a strong position of tourism in relation to other inflows. Generally, three relatively consistent zones can be identified: the entire Iberian Peninsula ranging towards the south and west France, Greece with eastern Bulgaria and Scandinavia (except capital regions, as well as the south of Sweden and Finland) can be indicated here. There are also numerous examples of such situations having more local nature, like e.g. the southern coast of the Baltic Sea with Masurian Lakeland, the mountainous regions of Poland and Czechia, western Austria with the north-eastern borderland of Italy, the Cornwall Peninsula with the coast of Wales, and coastal Croatia. They are predominantly peripheral areas at the national context.
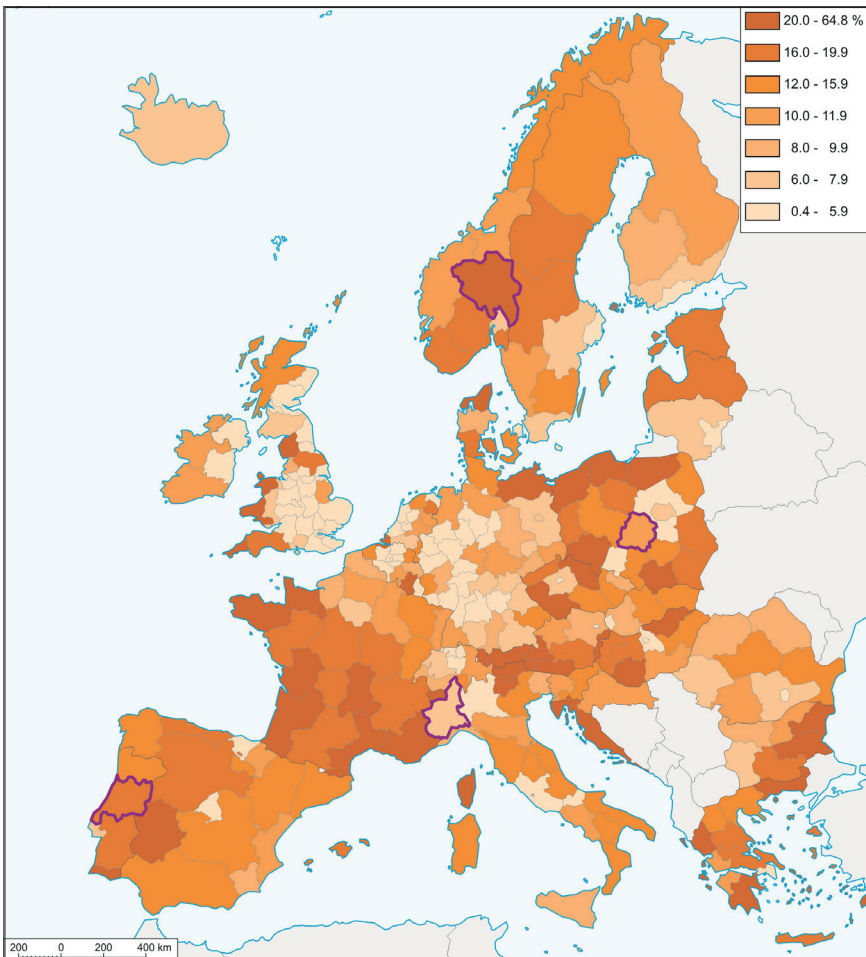

Fig. 4. Regions according to the share of tourist inflow ($W_{3,i}$) in the period of 2010–2018.
Source: own work.

Out of four case study regions, the Norwegian Innlandet region showed the largest importance of tourism in comparison to other flows, i.e., the trade of goods and services, people, capital, and knowledge. Tourism is important also in the Portuguese Centro region, while for the Italian Piemonte and Polish Łódzkie regions tourism is less important, in comparison to other sectors.

5. TYPOLOGY

The developed typology is based on two indicators: weighted intensity and spatial concentration. When interpreting the former, it is very important to recognise the significance of the fact that in this indicator the number of tourist arrivals is related to the number of people living in the region. In contrast, the latter dimension was described in great detail in the previous section of the article.

The typology developed quantitatively revealed a division of European regions into four types, which the article decided to name and describe qualitatively. The first type represents regions with a relatively low inflow of tourists in relation to the number of inhabitants and a high level of spatial dispersion of tourist places of origin, i.e., '**post-modern tourism**.' Regions included in this type are overwhelmingly located in Spain, Italy, Greece, the Czech Republic, Hungary, and Iceland. Thus, these are countries generally considered to be tourist destinations with large numbers of tourists. However, if one relates this figure to the number of inhabitants it appears that these regions still have a relatively low weighted intensity. At the same time, the inflow of tourists to these regions is not concentrated from a limited number of directions. It was, therefore, decided to call this type of tourism 'post-modern tourism' – that is a type of tourism based on individualised travel, the discovery of local resources, and heritage. This type includes the Piemonte region. The SPOT project analyses the vineyard landscapes of Piedmont Langhe-Roero and Monferrato, which fit perfectly into the post-modern tourism type.

Another type was distinguished for regions characterised by high weighted intensity and a great variety of tourist flows – '**global tourism**.' These are regions characterised by a large number of incoming tourists in relation to the number of inhabitants and without a clearly defined direction from which tourists would come. Thus classified regions are found primarily in Portugal, Catalonia, the Balearic Islands, the Greek islands, northern Spain, the Mediterranean and Atlantic coasts of France, the coastal regions of Croatia, Germany, Denmark and Poland, southern Austria, and significant areas of Norway and Sweden. For the most part, these areas are geared towards the mass type of beach-related tourism, characterised by a large number of resorts and private guesthouses. At the same time, they are attractive enough to attract people from

different regions. The Centro region of Portugal is also included in this type. The SPOT project analyses the possibility of sustainable development of mass tourism linked to the excellent surfing conditions around the town of Peniche and the protection of nature, especially the dune communities. Several Scandinavian regions are also included in this type, which requires a slightly different interpretation. These regions are, for the most part, very sparsely populated. At the same time, they are characterised by a relatively high influx of internal tourists due to the widespread custom of second homes in Scandinavia. This type includes the Innlandet region in Norway where the SPOT project investigates the link between environmental sustainability in relation to the pressure of mass ski tourism and the construction of second homes.
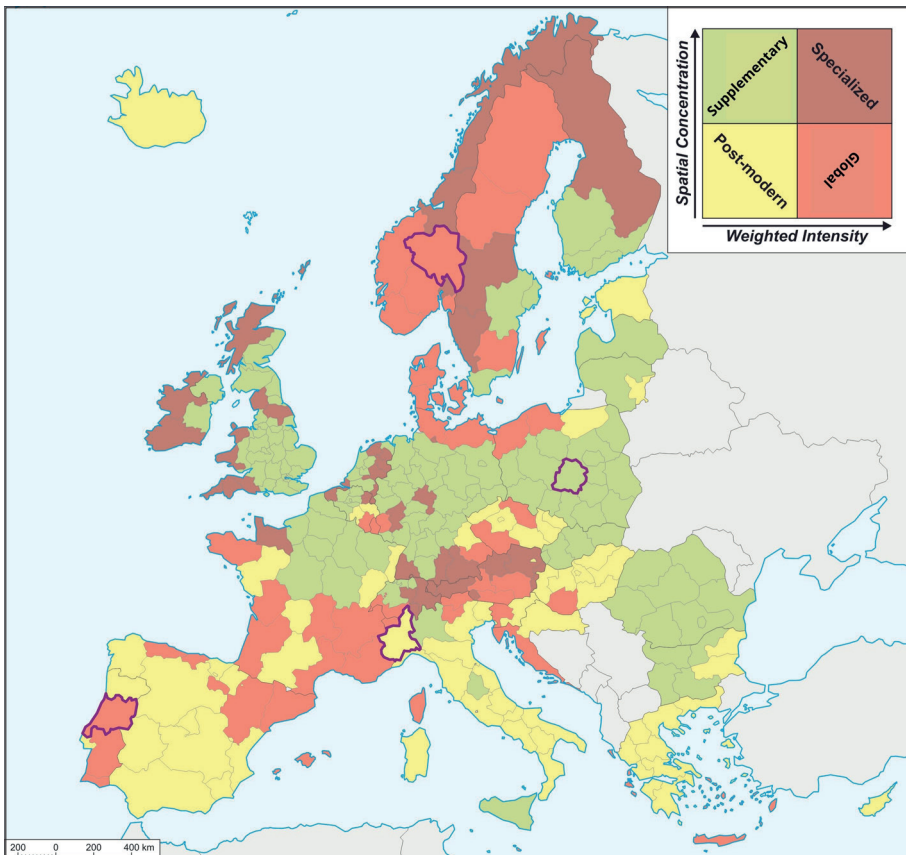

Fig. 5. Typology of regions according to the weighted intensity and spatial concentration of tourist inflow in the period of 2010–2018.

Source: own work.

The third type identified is characterised by a relatively low level of weighted intensity and a high level of spatial concentration – '**supplementary tourism**.' Regions included in this type are mainly located in the UK, northern France, Germany, Poland, Slovakia, Lithuania, Latvia, Romania, Bulgaria, as well as the metropolitan regions of Helsinki and Stockholm. On the one hand, these regions are characterised by a relatively low inflow of tourists in relation to the number of inhabitants and, on the other, by the origin of these tourists from a limited number of other regions. A characteristic feature of regions included in this type is also the relatively lower importance of tourist flows in relation to the other flows analysed in the ESPON IRiE project. Therefore, it was decided to call this type as supplementary tourism – with regard to the number of inhabitants, and other flows, the importance of tourism in these areas is not very significant. Additionally, the high values of the spatial concentration indicator also emphasise the non-mass tourism type dominant in these areas. This type includes the Łódzkie region in Poland. In the SPOT project, the potential for tourism development there is being investigate based on a lignite mine that is still in operation. It is certain that tourism development in this area will be based on people living in only a few of the closest regions in Poland.

The fourth type is characterised by both high values of weighted intensity and spatial concentration. Regions included in this type are, therefore, visited by a relatively large number of tourists in relation to the number of inhabitants, but they come from a relatively small number of destinations – '**specialised tourism**.' The spatial scope of this type includes primarily the Alpine regions of Switzerland, Austria, Germany, and Liechtenstein, as well as Ireland, Wales, Scotland, northern Finland, a few selected regions in Sweden, Norway, and a few German, Dutch and Belgian regions. A characteristic feature of these regions is their low population levels and peripheral location, combined with a high level of tourist attraction but not based on mass tourism – mountainous areas, cold seacoasts, high levels of forest cover, and lakes. These areas receive a relatively large number of tourists who are geared towards enjoying specialised forms of tourism, e.g. skiing, mountain walking, fishing, and hunting, and general contact with nature. In the case of Ireland, the UK, and Scandinavia, these are mainly domestic tourists or those from neighbouring countries. In the case of the Alps, = there is a noticeable concentration of tourists from adjacent regions and some dozen metropolitan regions from across Europe. None of the regions treated as a case study in the SPOT project were included in this type.

6. CONCLUSIONS

In conclusion, the three dimensions of interregional tourism inflow sustainability should be addressed again. In the spatial dimension, it can be indicated that the areas characterised by the greatest attractiveness for mass tourism, based primarily

on beach-based tourism offers, are characterised by the greatest level of spatial dispersion of flows. This means that the influx of tourists is observed from many and varied regions. This is particularly the case in Mediterranean countries. The dominant type there is 'global tourism', which is based on high levels of tourist flow intensity and multiple spatial linkages.

In temporal terms, tourism flows were characterised in the period 2010–2018 by one of the largest increases in the entire group of 11 flows studied in the *ESPON IRiE* project. This growth occurred primarily in regions hitherto poorly integrated in tourist flow processes, i.e., mainly Central and Eastern European region. On the one hand, this means an increase in convergence in the social dimension, but, on the other hand, it indicates the potential for further growth of tourism in this region in line with economic development. Admittedly, the increase in tourism also resulted in a diversification of tourist destinations in the spirit of post-modern tourism though contributing to an increase in average trip length.

In structural terms, tourist flows are among the most important of all the inter-regional flows analysed. In a relatively large number of regions, their share exceeds 20% of the total volume of flows, and in a few, it is even more than half. The high concentration of tourism flows, in general, should be assessed negatively, due to the low resilience of the region's economy to possible external shocks – for example, to the tourism crisis in 2020–2021 caused by pandemic austerity. Thus, it should be assessed that tourism flows in Europe in the period between the two crises (the 2008 financial crisis and the 2020 epidemic crisis) were not sustainable in any of the dimensions analysed. The mutual impact of the negative effects resulting from the different approaches only reinforces this overall conclusion. It will be important to conduct similar comparative studies after 2025 when it will be possible to understand the new trends in tourism flows forming after the shocks of the Covid-19 pandemic and the new geopolitical circumstances.

The analyses showed that the four regions selected as case studies in the *Erasmus+ SPOT* project were characterised by very large differences in the characteristics studied. Each of the regions had different conditions resulting from the influx of tourists and thus fell into different types developed on the basis of a comparison of weighted intensity and spatial concentration with each other. Thus, the conclusions and recommendations developed during the detailed fieldwork in the analysed regions have the potential to become more generalised.

Beyond an essential cognitive added value, this paper rises also a very general question about the potential for the application of the space of the flows concept in contemporary geographical studies of dynamic phenomena. The concept of the space of flows is an undoubtedly emerging matter of interest for geographers nowadays and a dynamic increase of infrastructural abilities for big datasets gathering and transforming is not enough to explain that. The reason can be justified from all three perspectives: objective, subjective, and pragmatic. Considering the first perspective, it is possible to encompass and develop a better understanding of our

more and more dynamic world, as the size and importance of the "flows" (the object of this study) is constantly growing. An enormous cognitive potential was triggered and demonstrated as a sample in this paper on the other. From a subjective perspective, the space of flows seems to be an extremely attractive matter of study for geographers because it enables them to address more accurately the question of where the exact places of origins and destinations of flowing assets are (…and, consequently, why there exactly). The last perspective is strictly linked to the symptoms of the growing interest in this concept among institutions implementing spatial policy and financing research activities for higher effectiveness of it.

Nevertheless, while a numerous dynamic, "flowing" phenomena exist and have been analysed as an inherent part of geographical space for years, they are still usually perceived as nothing more than static intersections of this space. The actual empirical recognition of it demands data on individual, bilateral relations between spatial units, in particular temporal intersections, instead of only an overall balance of an area or a time period. Therefore, the space of flows still plays a role of some abstract and intangible theoretical concept rather than a substantial way of empirical description, only superficially recognised sphere in terms of methodological layer and its development seems to be the most desirable objective in this regard.

The paper delivers an initial proposal of some solutions to the methodological discussion on the measurement and description of the space of flows. Three approaches (spatial, temporal, and structural) with four basic aspects (size, balance, concentration, and distance impact) distinguished, as well as an attempt to operationalisation it by means of a substantial set of indexes, can pose some kind of onset. The second significant input is an attempt to converge a traditional quantitative and postmodern approach in tourism geography, as an example of cognitive added value of the space of flows concept application. At a larger scale, tourism used to be researched quantitatively and perceived as a complex system of characteristics, circumstances and consequences, but encompassed overall or by looking at a spatial or temporal intersection. The postmodern shift in the theory emphasises individualism and authenticity as one of the main determinants of postmodernity and contemporary tourists moving away to alternative places. It is mostly investigated by qualitative social methods. Both approaches have inherent constraints in understanding the entire system. The paper provided an example of how a quantitative study of the set of individual bilateral relations enables one to identify some spatio-temporal regularities in individual decisions of tourists.

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