



Article

Spatial Distribution of Relationship between Historical Monuments and Tourism: The Case Study of Bihor County in Romania

Grigore Vasile Herman ¹, Lucian Blaga ¹, Claudiu Filimon ¹, Tudor Caciora ^{1,*}, Luminița Filimon ¹, Laura Mariana Herman ² and Jan A. Wendt ³

- Department of Geography Tourism and Territorial Planning, University of Oradea, 410087 Oradea, Romania; gherman@uoradea.ro (G.V.H.); lblaga@uoradea.ro (L.B.); cfilimon@uoradea.ro (C.F.); lufilimon@uoradea.ro (L.F.)
- ² "Iosif Vulcan" National College, Jean Calvin Street, 410210 Oradea, Romania; lauraherman@cnivior.ro
- ³ Faculty of Social Science, University of Gdansk, 80309 Gdansk, Poland; jan.wendt@ug.edu.pl
- * Correspondence: tudor.caciora@yahoo.com

Abstract: Tourism is one of the emerging branches of the economy, playing an important role in the development of specific economies within local communities. In this context, the perspectives of exploiting historical monuments, seen as raw material in the tourism industry, represent a desirable goal worth considering at the locality and territorial administrative unit level. The purpose of this study is to highlight the relationship between historical monuments, viewed as factors generating tourist motivation and tourism. This was made possible by conducting a spatial analysis (at the level of territorial administrative units and localities) of the defining criteria for historical monuments and tourism in Bihor County, Romania. The research methodology involved the use of multicriteria analysis to identify and establish the types of relationships between historical monuments and tourism, at a spatial level. The results of the study aimed to present an image of the spatial distribution of the characteristics of historical monuments and tourism, as well as to establish and depict spatial relationships between them, thus partially confirming the working hypothesis that the number and importance of historical monuments influence and determine tourist activity within a given area. Thus, although the studied area has 455 historical monuments, they are not exploited from a tourist point of view, with there being no strong relationships, except at the level of 19 territorial administrative units (18.8%), respectively, in 15 localities (3.3%). Among them, the obtained values stand out for the territorial administrative units of Oradea and Biharia, respectively, in the localities of Oradea and Beius.

Keywords: historical monuments; tourism; spatial relationship; tourist motivation; spatial analysis



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1. Introduction

Tourism represents a defining coordinate of today's society, a pleasant and instructive form of spending leisure time [1,2]. The economic and structural mutations of current society, which have occurred against the backdrop of the transition from an industrial to an informational society, have favored, both globally and locally, the establishment of tourism as a distinct economic branch [3]. Within tourism, increasing attention is being paid by stakeholders to cultural tourism and heritage tourism in particular [4–9]. Cultural heritage tourism also plays a significant role in the development of sustainable and cross-border tourism, which plays an important role in the Bihor region, as evidenced by the extensive literature on the subject [10–13].

Cultural tourism is a distinct form of tourism based on cultural elements [14], asserting itself strongly in the last two decades. In 2017, according to estimates, it represented 39% of total international tourism arrivals [15]. The motivation behind the emergence of

cultural tourism concerns various aspects, including the need for knowledge, discovery, and experiencing the diversification of tourist offerings in destination areas, extending the duration of tourism activities, the socio-economic development of regions, and the need for conservation and protection of cultural heritage [16–19].

At the core of the emergence and affirmation of cultural tourism lies the existence of valuable heritage, especially tangible heritage [20–23]. Tangible heritage reflects various aspects of local community life, being the expression of a long historical process of development, formation, and affirmation of local identities, including political-administrative and religious ones [24]. In this context, history, as the science of the past and the lantern of the future, plays an essential role in connecting generations, beliefs, and experiences [25]. Therefore, historical monuments serve as physical and silent witnesses of bygone eras. They are meant to remind us that we are here because others were before us. By learning from their experiences, we can become better, more altruistic, and wiser. This indicates that cultural tourism incorporates a certain segment of the population, better educated, but at the same time, it also aims to educate the masses indirectly, in a pleasant manner.

The legislation concerning the protection of historical monuments, Law No. 422 of 18 July 2001, paragraph 1 [26], defines historical monuments as immovable properties, constructions, and lands located within the territory of Romania as significant for national and universal history, culture, and civilization. Article 2 mentions their integral inclusion in cultural heritage, being protected by law. Tourism can be seen as a positive trigger for the economic potential of cultural heritage, translated into fund generation, conservation benefits, benefits for the local community, heritage protection education, influence policies, etc. [24]. According to UNESCO, the United Nations Educational, Scientific and Cultural Organization and ICOMOS, International Council on Monuments and Sites, historical monuments are objectives and sites recognized for their historical, cultural, architectural, and landscape value and which require global action to protect, conserve, and preserve them for future generations [27,28].

In this context, the aim of this study is to identify and highlight the connections between historical monuments and tourism, from Bihor County, Romania, at the locality and territorial administrative unit level, answering the following research questions: Are there relationships between historical monuments and tourism at spatial level (locality, TAU)? Are there differences between the identified relationships at a spatial level (administrative territorial unit and locality) in Bihor County, Romania?

The working hypothesis of this research addresses the fact that historical monuments are determining factors in the genesis and development of tourism, especially cultural tourism. Given this fact, we can say that if the number and importance of historical monuments are high, then the probability of specific tourism activities imposing and developing is likewise, and vice versa. This is very clearly evidenced by the reporting level, where a clear weakening of the intensity of relationships between historical monuments and tourism is observed at the level of territorial administrative units (TAU) compared to localities. The second hypothesis proposes that improved accessibility to these sites increases tourism, to be evaluated by examining tourist flows post-accessibility enhancements. The third hypothesis argues that integrating historical monuments into local cultural events extends tourist stays, assessed through visitor surveys and event data. Lastly, the fourth hypothesis posits that better-preserved monuments draw more tourists, generating more revenue for further preservation and local development, examined via a comparative economic analysis. These hypotheses aim to provide a clearer understanding of how historical sites impact tourism and guide sustainable development policies in Bihor County.

The importance of this study arises from the necessity of understanding the relationships between historical monuments and tourism in Bihor County, Romania, in the context of the affirmation and expansion of cultural tourism at both the local and national levels. The findings can be extrapolated to develop a model that can be applied to similar heritagerich regions globally. This model aims to balance heritage preservation with tourism development, contributing to sustainable economic growth and cultural conservation.

Land **2024**, 13, 668 3 of 23

2. Literature Review

A proper understanding of the relationships between tourist attractions and other components of tourism is essential in shaping and defining a destination area [29], and the synergistic development of cultural heritage preservation and tourism is fundamental in sustainable heritage tourism [30]. Understanding the connections between heritage buildings, historical monuments/sites, and tourism is the basis for balanced management, where the economic component of tourism contributes to the development of local communities without exposing cultural heritage elements to the risk of deterioration [31–34]. This explains the multitude/existence of studies addressing this issue from various perspectives, depending on the tourism components put into relation and analyzed.

Polyzos et al. (2007) quantified the attractiveness of archaeological sites in Greece using linear and exponential equations with several variables, equating this attractiveness with the total number of visitors and the derived financial benefits [35]. Rodzi et al. (2013) presented, in a review article, the studies focused on the relations between tourism and intangible cultural heritage and highlight the positive/negative opinions related to the impact of tourism development on cultural heritage [36]. Mrđa and Bojanić Obad Śćitaroci (2015) analyzed the relations between tourism and cultural heritage with an emphasis on spatial planning of tourism destination in Croatia [37], and Fernández and Escampa (2017) carried out a spatial analysis aimed at tourist activities and services in historical cities Malaga and Plymouth, with the idea of understanding the tourism system from a spatial and functional point of view [38]. Patuelli et al. (2016) analyzed the effect of World Heritage Sites on domestic tourism based on a spatial interaction model, in which the effects for the regions of residence of the tourists and the effects in the destination regions are separated, also taking into account the potential spatial complementarities between the regions [39]. Mura and Kajzar (2019) explored, in a study conducted in the Czech Republic, the correlations between the number of visitors and the number of cultural/historical monuments, as well as between the number of visitors and the number of cultural events [40]. Karagöz et al. (2022) had approximately the same objectives, who related, through spatial analysis techniques, historical and cultural attractions with tourist flows in Turkey [41]. Panzer et al. (2020) linked European cultural heritage and tourism flows, highlighting the attractive role of World Heritage Sites in guiding international tourism flows at a regional level, in European regions [42].

Several studies have aimed to model the relationships between heritage tourism components to increase its efficiency based on local conditions. Studies conducted by Xu et al. [43], Wang et al. [44], van der Zee et al. [45], Selim et al. [46], Tchetchik et al. [47] used spatial syntax methods to improve tourists' spatial cognition by relating the road network to tourists' spatial cognition [43], or to improve tourism services in historic areas by identifying an optimal distribution of services based on the road network [44].

At the same time, an important contribution to the study of the area from the point of view of tourism was made by Hungarian authors, who have studied over time the influence that heritage has on the development of tourism (Bujdoso et al., 2015; Monyók et al., 2020) [48,49]. The studies undertaken by Czuczor et al. [50] and Tatar et al. [51] focused on the possibility of boosting cross-border tourism in Hungary and Romania, while Kozma and Czimre [52] analyzed the role of heritage elements in slogans and logos used to promote Hungarian heritage. Finally, Farkas (2021) focused on analyzing the role of social capital in terms of rural development and implicitly in the development of tourism, analyzing villages from Hungary and Romania [53].

The reviewed literature collectively emphasizes the need for a balanced approach in managing the interaction between tourism and cultural heritage. Effective management must account for economic benefits while safeguarding heritage against the adverse effects of tourism. This balance is crucial for the sustainable development of tourism destinations, enhancing both local economies and the preservation of cultural heritage.

The studies indicate that understanding the spatial and functional aspects of tourism, such as those conducted in Greece, Croatia, and historical cities like Malaga and Plymouth,

Land **2024**, 13, 668 4 of 23

can guide more effective planning and development strategies. Moreover, leveraging spatial analysis and spatial syntax methods can optimize tourist experiences and service distributions in heritage areas, ultimately enhancing both visitor satisfaction and heritage conservation. This comprehensive approach underscores the potential of heritage tourism to contribute positively to local communities, provided that strategies are tailored to local conditions and incorporate protective measures for heritage preservation.

3. Materials and Methods

3.1. Study Area

Bihor County, situated in the northwest of Romania, in the vicinity of the Romanian-Hungarian state border, is a tourist area undergoing significant development and tourism affirmation (Figure 1). This is due to its exceptionally diverse natural framework, in terms of topography, hydrography, and biogeography, as well as its anthropic characteristics, defined by a high degree of originality and specificity.

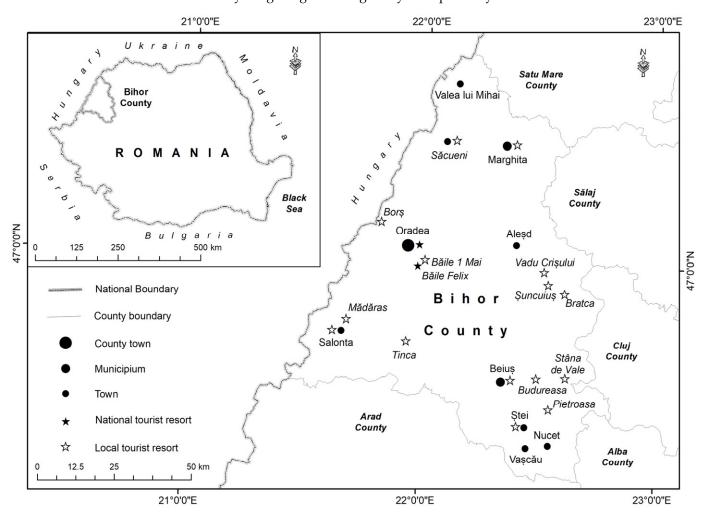


Figure 1. Presentation of the study area at the level of Romania.

The first traces of habitation in Bihor County date back to the Paleolithic era, evidenced by archaeological discoveries in Coliboaia Cave, Măgura Village, Pietroasa Commune. Currently, traces of habitation and of the technological and technical progress recorded by the inhabitants of these areas are recorded throughout Bihor County in the form of historical monuments, in 151 localities (33% of the total), and 83 territorial administrative units (82.2% of the total). The highest density of these has been identified in the old centers of civilization and continuity in Bihor County (Oradea, Marghita, Salonta, Beiuș, and Ștei).

Land 2024, 13, 668 5 of 23

> From a tourist point of view, the analyzed area is defined by the existence of 17 tourist resorts, two of which are of national interest (Băile Felix, the Historic Center Tourist Area—Crișul Repede Corridor, Oradea Municipality), while the rest are of local interest

> Bihor County benefits from a complex natural setting that gives it special touristic values. The natural tourist resources are particularly rich, starting with the geothermal waters, concentrated in the plain area, exploited for tourism in the Băile Felix and Băile 1 Mai resorts [54,55], and up to the spectacular karst from mountain areas [56].

> There are also many nature reserves, nature parks (Apuseni Mountains Natural Park, Cefa Natural Park), and Natura 2000 sites [57–59]. The cultural heritage of the county is the result of the historical past and the ancient heterogeneity of the county. The vestiges of the past can be found at every step and are the testimony of the creative spirit of Romanians, Hungarians, Jews, Slovaks. Oradea Citadel, Biharea Citadel, secession-style buildings, synagogues, churches, and cathedrals, wooden churches, and traditions. Customs of the county's villages are points of reference for Bihor County but also for Romania [60–62].

> The varied natural setting and the resources offered, the historical past, the mix of ethnicities and the result of their creativity, the specific customs and traditions are the strengths that make Bihor County one of the important landmarks on the tourist map of Romania. Having all these aspects briefly presented, we chose to perform the research in this area (Bihor County) which is extremely diversified, complex, and representative of Romania as a tourist destination.

3.2. *Implementation of Analyses*

In order to identify and know the relationships between historical monuments (4 variables) and tourism (4 variables) at a spatial level (territorial administrative unit, respectively, and locality), a multicriteria analysis method was used [63,64]. The reason for using these variables was the easy and free access to representative and unitary information regarding historical monuments and tourism for the studied area, which is characterized by a number of 101 territorial administrative units, respectively, in 458 localities. Thus, the current study is based on a limited number of indicators related to public sources of information, which constitutes a weak point of this approach. In order to obtain an aggregate value for each analyzed criteria and subcriteria, the Min-Max Normalization Method was used [61,62,65].

From a methodological point of view, the realization of the present study involved the completion of the following steps:

Identification and processing of information from the databases of the Ministry of 1. Culture (list of historical monuments) and that of Tourism (tourist reception structures with accommodation functions) in order to compile the variables necessary to establish

the type of spatial relationship between historical monuments (X1—archaeological
monuments; X2—architectural monuments; X3—memorial monuments; X4—funeral
monuments), and tourism (Y1—tourism accommodation structures, Y2—tourism
accommodation capacity, Y3—reception and public supply structures, Y4—reception
and public supply capacity) (Tables 1 and 2).
Table 1. Sets of variables established for study analysis

Unit of Measure Data Source Variable X1—Archaeological monuments Number of X1/settlements/TAU X2—Architectural monuments Number of X2/settlements/TAU Ministry of Culture [66] X3—Memorial monuments Number of X3/settlements/TAU X4—Funeral monuments Number of X4/settlements/TAU Y1—Tourism accommodation structures Number of Y1/settlements/TAU Y2—Tourism accommodation capacity Number of Y2/settlements/TAU Ministry of Tourism [67] Y3—Reception and public supply structures Number of Y3/settlements/TAU Y4—Reception and public supply capacity Number of Y4/settlements/TAU

ole 1. Sets of variables established for study analysis.

2. The values of the variables were presented in the form of the following matrix [61–63,65].

$$X = \begin{bmatrix} x_{1j} \end{bmatrix} = \begin{bmatrix} x_{11} & x_{12} & \cdots & x_{1n} \\ x_{21} & x_{22} & \dots & x_{2n} \\ \vdots & \vdots & \vdots & \vdots \\ x_{r1} & x_{r2} & \cdots & x_{rn} \end{bmatrix}$$
(1)

where xij represents the variable value for object Oi.

This represents the data set in matrix form, where each element x_{ij} indicates the value of a specific variable (like the number of archaeological monuments, architectural monuments, etc.) for a particular object or entity (like a locality or administrative unit). The rows r represent different objects, and the columns n represent different types of data or variables collected for each object.

Table 2.	The type of data	expressed by va	riables.

Variable	Criterion	Data	Type of Data
X1—Archeological monuments	nument	Archeological sites Settlements Fortifications Necropolis Fortresses Churches	Quantitative
X2—Architectural monuments	 Historical monument	Palace Churches/wooden churches Conace Houses Urban ensemble	Quantitative
X3—Memorial Monuments	_	Personalities Tomb/Grave Memorial houses	Quantitative
X4—Funeral Monuments	_	Heroes Obelisks/crucifix	Quantitative
Y1—Tourism accommodation structures	Tourism infrastructure	Hotels, Motels, Pensions/guests house, Agritourist houses	Quantitative
Y2—Tourism accommodation capacity	ıfras	Number beds/units	Quantitative
Y3—Reception and public supply structures	rism in	Restaurants, bar, coffee bar, confectionery, fast food	Quantitative
Y4—Reception and public supply capacity	Ton	Number sets/units	Quantitative

3. Normalization of variables (8 variables, 4 for historical monuments and 4 for tourism) using the following formula [61,62,65].

$$Nij = \frac{Xij - min \ Xij}{max \ Xij - min \ Xij} \quad Xj \in S, Nij = [0, 1]$$
 (2)

where Xij is the value of the variable j for the criterion i; Nij is the normalized value of the variable j for the criterion i; $min\ Xij$ is the minimum value of value X of the variable j for the criterion i; and $max\ Xij$ is the maximum value X of the variable j for the criterion i.

The normalization process converts the actual data values X_{ij} into a standardized scale from 0 to 1. This is done by subtracting the minimum value of the variable from the current value and dividing the result by the range of the variable (maximum value minus minimum value). This method ensures that all variables are on a comparable scale, which is crucial for multicriteria analysis to be implemented in this study.

Land **2024**, 13, 668 7 of 23

4. Calculation of the aggregate value following the normalization of the 8 variables for historical monuments and tourism, as follows:

$$q_j = \sum_{i=1}^n N_{ij} \ (i = 1, \dots r)$$
 (3)

meaning that for each j (from 1 to n), the value of N_{ij} will be summed. The result of this summation is qj. This operation is performed for each i, which ranges from 1 to r. In a more applied context, this could represent aggregating or summing up normalized values N_{ij} for different criteria or variables (j) across different units or entities (i) to calculate a total or composite score (qi) for each unit or entity.

After normalization, the values for each variable are aggregated to produce a single value qj for each variable, which represents the cumulative score based on all criteria. This aggregation helps in summarizing the data into a more manageable form for further analysis.

The evaluation of the criterion by the value of the variable is carried out by the synthesis value Qi;

$$Q_{i} = \frac{1}{n} \sum_{j=1}^{n} q_{i} \ (i = 1, \dots r), \ Q_{i} \in [0, 1]$$
 (4)

where Qi is the average value or score for the i-th entity or category, where i ranges from 1 to r, n is the total number of observations or variables considered for each entity or category, and q_i is the individual score or value for the i-th entity or category.

This step calculates the average value Qi for each criterion, which represents the overall score for that criterion across all variables. This average helps in understanding the performance or status of each criterion in the analysis. The formula essentially represents the calculation of an average or mean score for each entity or category, normalized to be between 0 and 1.

5. Determination of the constant value k, in order to classify territorial administrative units/localities into value groups according to the synthetic index related to historical monuments and tourism [45–47]:

$$R(Qi) = \max_{i} Qi - \min_{i} Qi \quad k = \frac{R(Qi)}{4}$$
 (5)

Group 1: $Qi \in (\max\{xij\}-k, \max\{xij\}\}]$ —the highest level ($Qi \in (0, 0.25]$).

Group 2: $Qi \in (\max\{xij\}-2k, \max\{xij\}-k]$ —an average level ($Qi \in (0.26, 0.5]$).

Group 3: $Qi \in (\max\{xij\}-3k, \max\{xij\}-2k]$ —a small level ($Qi \in (0.51, 0.75]$).

Group 4: $Qi \in [\min\{xij\}, \max\{xij\}-3k]$ —a very low level ($Qi \in ([0.76, 1])$).

where R(Qi) represents the range Qi values, max(Qi) is the maximum value within the Qi data set, and min(Qi) is the minimum value within the Qi data set.

The classification process involves determining a constant value k based on the range of the synthesis values Qi. This formula calculates the difference between the maximum and minimum values of Qi, giving the range of the data. This constant is used to classify the territorial administrative units or localities into different groups or levels based on their scores, which helps in understanding their relative performance or status.

6. Calculation of the relationship index (I) between historical monuments and tourism

The cartographic illustration of the relationship between the two indicators was facilitated by the representation of the distribution of the relationship index values, calculated on the basis of the coefficients assigned to each locality/territorial administrative unit. Thus, the relationship index (I) between historical monuments and tourism is a normalized value, given by the following equation:

$$I = \frac{\text{COEFi} - \text{COEFt}}{\text{COEFi} + \text{COEFt}}, \text{ where } -1 \le I \le 1$$
 (6)

I = index of relationship between historical monuments and tourism;

Land **2024**, 13, 668 8 of 23

COEFi = coefficient given to historical monuments; COEFt = coefficient given to tourist indicators.

This equation calculates index I that represents the relationship between historical monuments and tourism. The index is derived from the coefficients attributed to each category, indicating whether the relationship is strong, weak, positive, or negative. The relationship index is a normalized value that falls between -1 and 1, where values closer to 1 indicate a strong positive relationship, values closer to -1 indicate a strong negative relationship, and values around 0 indicate a neutral or no significant relationship.

7. Determination of the constant value k, to classify territorial administrative units/localities into value groups according to the type of relationship between historical monuments and tourism [61,62,65]:

The spatial analysis (at locality/territorial administrative unit level) of the relationship index assumed its classification into 4 classes, calculated based on the interval between:

$$R(Qi) = maxQi - minQi \quad k = \frac{R(Qi)}{4}$$
 (7)

Group 1: $Qi \in (\max\{xij\}-k, \max\{xij\}]$ —weak positive relationship $(Qi \in (0.5, 1])$. Group 2: $Qi \in (\max\{xij\}-2k, \max\{xij\}-k]$ —strong positive relationship $(Qi \in (0, 0.5])$. Group 3: $Qi \in (\max\{xij\}-3k, \max\{xij\}-2k]$ —negative strong relationship $(Qi \in (-0.5, 0])$. Group 4: $Qi \in [\min\{xij\}, \max\{xij\}-3k]$ —negative weak relationship $(Qi \in (-1, -0.5])$. where R(Q1) is the range of the quantity Q1, $\max(Q1)$ is the maximum value in the set of Q1, and $\min(Q1)$ represents the minimum value in the set of Qi.

Data processing and analysis were carried out both at the locality and territorial administrative unit level in order to capture, with greater precision, the existence of spatial relationships between historical monuments and tourism, using ArcGis 10.8 software and MatLab 9.3. Compared to the previous studies, the element of novelty is given by the idea of the study itself, the indicators taken into account, the way of their quantification and analysis, at a spatial level (at the level of locality, respectively, of the territorial administrative unit), obtained in an area representative for Romania from a tourist point of view.

4. Results

4.1. Historical Monuments from Bihor County, Romania

Historical monuments are a structural part of the heritage elements contributing to the creation of a nation's cultural identity. In Bihor County, 455 such units were identified and entered in the list of historical monuments, distributed in 83 TAUs, respectively, in 151 localities (Figure 2). From the analysis of the distribution of historical monuments over time, at the century level, it was found that they show a relatively upward trend, they multiply, as is natural, starting from the 18th century (Figure 3).

From a structural point of view, they are grouped into the following categories: I. Archaeological monuments—171; II. Architectural monuments—246; III. Public forum monuments—19; IV. Memorial and funeral monuments—19 (Figure 4a–d).

Land **2024**, 13, 668 9 of 23

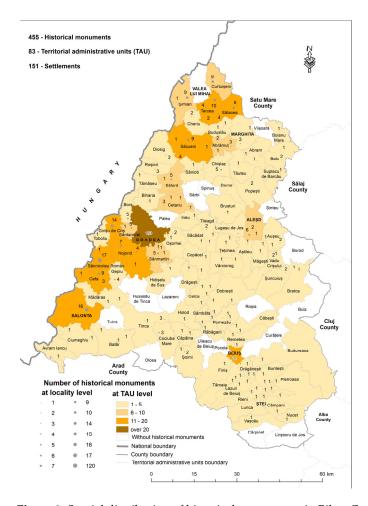


Figure 2. Spatial distribution of historical monuments in Bihor County.

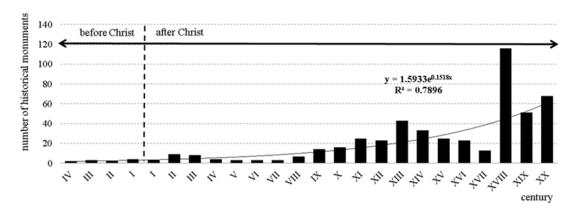


Figure 3. Distribution of historic monuments by centuries.

Archaeological monuments are representative testimonies regarding the reconstruction of aspects of life and civilization that define the area where the Romanian people were formed and evolved. Overall, 171 were identified on the territories of 42 territorial administrative units, respectively, in 56 localities. Most such discoveries were made in the territorial administrative unit of Sânnicolau Român (17 monuments), Girişu de Criş (14 monuments), and Tarcea and Cefa (each with 12 monuments), while at the opposite pole, there were 19 territorial administrative units with an archeology monument each. Regarding the number of discoveries at the locality level, the first places were Sânnicolau Român (16 monuments), Girişu de Criş (14 monuments), Cefa (9 monuments), Curtuişeni (9 monuments), Livada de Bihor (7 monuments), Şimian (7 monuments), and Galoşpetreu

(7 monuments), while at the opposite pole, there were 29 localities with one archaeological monument each (Figure 4a).

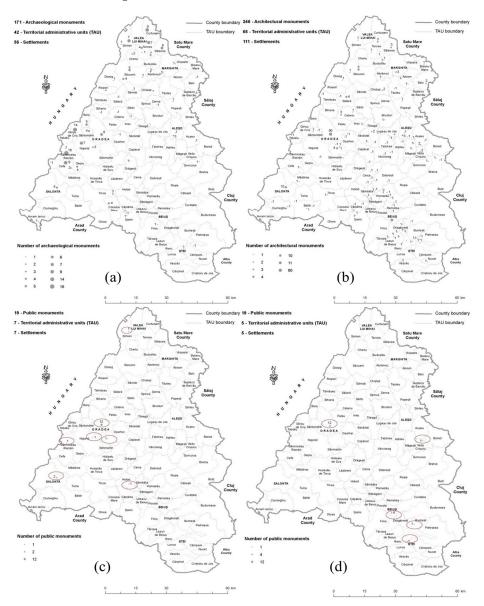


Figure 4. Spatial distribution of the categories of historical monuments in Bihor County ((a)—archaeological monuments; (b)—architectural monuments; (c)—public monuments; (d)—memorial and funeral monuments).

The architectural monuments (246 monuments) are spread throughout Bihor County, in 65 territorial administrative units, respectively, in 111 localities. Most such monuments are located in the urban centers and their related territorial administrative units: Oradea (90 monuments), Beiuş (11 monuments), Salonta (10 monuments), and Săcueni (4 monuments) (Figure 4b). The architectural monuments of Oradea represents the premise of the municipality's inclusion in the European Art Nouveau network and its designation as the Art Nouveau capital, being the only municipality in Romania with this status.

The public monuments (19 monuments) are located in seven localities as follows: 12 monuments in Oradea, 2 monuments in Salonta, and 1 monument each in Holod, Nojorid, Sânnicolau Român, Băile Felix, and Ṣimian (Figure 4c).

The memorial and funerary monuments (19 monuments) are located in five localities as follows: 12 monuments in Oradea, 4 monuments in Beiuş, and one monument each in Ştei, Săud, and Topa de Criş (Figure 4d).

Following the normalization and quantification of the four criteria related to historical monuments (Table 1) in Bihor County, at the locality and territorial administrative unit level, the synthetic value of historical monuments was calculated, a value that was between 0 and 1.

Thus, following the analysis, it emerged that in 307 of the localities (67.0%), respectively, in 18 territorial administrative units (17.8%), the synthetic value of historical monuments was equal to 0, a fact that is explained by the lack of historical monuments (Figure 5).

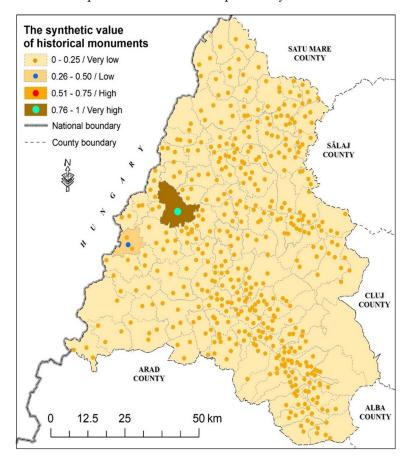


Figure 5. Spatial distribution of the synthetic value of historical monuments.

The highest values of the synthetic index related to historical monuments were identified in the case of territorial administrative units: Oradea (0.83), Sânnicolau Român (0.27), and Girişu de Criş (0.20). Oradea is represented by 120 historical monuments (26.4%), of which 90 are architectural monuments, 12 are public forum monuments, 12 are memorial and funerary monuments, and 6 are archaeological monuments. Sânnicolau Român is represented by 18 historical monuments (4%), of which 17 are archaeological monuments and 1 is a public monument. Girişu de Criş is represented by 14 historical archaeological monuments (3.1%). At the locality level, as in the case of territorial administrative units, the highest values of the synthetic index related to historical monuments were identified in the case of the localities of Oradea (0.84), Sânnicolau Român (0.27), and Girişu de Criş (0.21). Oradea is represented by 120 historical monuments (26.4%), of which 90 are architectural monuments, 12 are public forum monuments, 12 are memorial and funerary monuments, and 6 are archaeological monuments. Sânnicolau Român is represented by 17 historical monuments (3.7%), of which 16 are archaeological monuments and 1 is a public forum monument. Girişu de Criş is represented by 14 historical archaeological monuments (3.1%).

The analysis of the synthetic values of the historical monuments highlighted the existence of three categories of TAU: with a very good value (between 0.76 and 1; Oradea territorial administrative unit, 1.1%), poor (between 0.26 and 0.5; Sânnicolau Român territorial administrative unit, 1.1%), and very weak (between 0.0 and 0.25; 90 territorial administrative units, 97.8%). In nine territorial administrative units (8.9% of the total studied units), no historical monument was identified. A similar situation was also found regarding the analysis of the synthetic values of the historical monuments at the locality level. Thus, three types of localities were identified: those with a very good value (between 0.76 and 1; Oradea locality, 0.5%), those with a poor value (between 0.26 and 0.5; Sânnicolau Român locality, 0.5%), and those with a very poor value (between 0.0 and 0.25; 205 localities, 99.0%). In 251 localities (54.8% of the total studied localities), no historical monuments were identified (Figure 5).

Regarding the synthetic value of historical monuments at the level of TAU, the data exhibit an average (mean) value of 0.0395, with a standard deviation of 0.0959, indicating moderate variability within the dataset. The values range from a minimum of 0.0000 to a maximum of 0.8382. Quartile analysis shows that 25% of the data points are below 0.0028, 50% (median) are below 0.0111, and 75% are below 0.0292, which demonstrates a skewed distribution with a tail extending towards higher values. In contrast, the same indicator analyzed at locality level has a lower average value of 0.0091 and a standard deviation of 0.0465, reflecting less variability compared to TAU level. These values again start at 0.0000, but surprisingly, both the 25th and 50th percentiles are at 0.0000, indicating a large number of zero or near-zero values. The 75th percentile is at 0.0028, with the maximum value slightly higher than at TAU level, at 0.8438 (Figure 6).

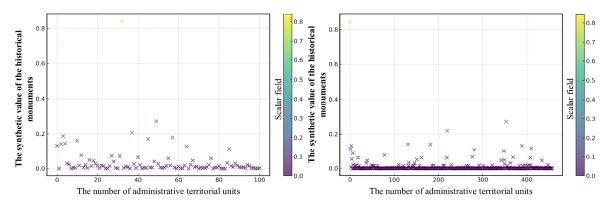


Figure 6. The distribution of the synthetic value of historical monuments at the TAU level (**left**) and locality level (**right**).

The comparative analysis indicates that while both data have a similar range of values, the analysis at the TAU level has higher average values and more variability. The analysis at the locality level shows a significant number of lower or zero values, leading to a lower overall average and less spread of data.

4.2. Tourism in Bihor County, Romania

In order to create a touristic image at a spatial level (locality and territorial administrative units), the number and capacity of accommodation and public catering structures in Bihor County in the year 2023 were used as representation indicators. Accommodation and public catering infrastructure have roles and functions well specified in the valorization of the tourist heritage of Bihor County, among which the retention of tourists in this space by satisfying the primary needs for food and rest.

The analysis of the number and capacity of tourist reception structures with accommodation functions revealed the existence of a number of 815 units, with an accommodation capacity of 18.147 places, spatially distributed in 53 territorial administrative units, respectively, in 90 localities, out of which 11 have tourist resort status (Figure 7a).

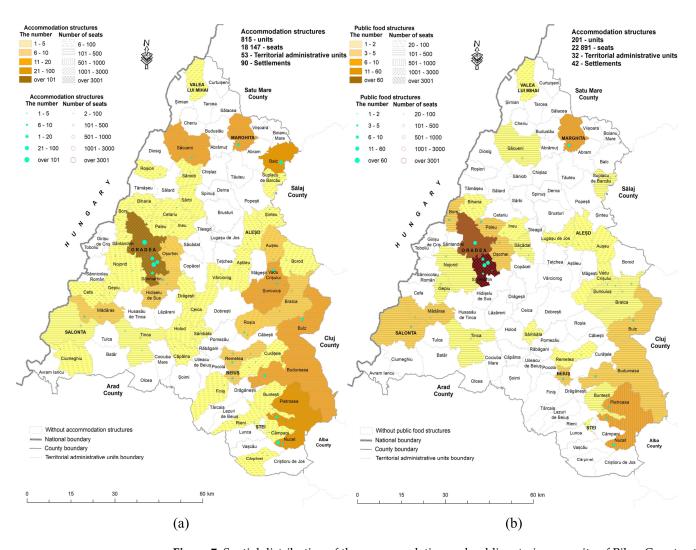


Figure 7. Spatial distribution of the accommodation and public catering capacity of Bihor County at the locality and TAU level ((**a**) accommodation capacity; (**b**) public catering capacity).

The most accommodation units were identified in the territorial administrative unit of Sânmartin (273 units) and Oradea (237 units), with 17 territorial administrative units with one accommodation unit each at the opposite pole. At the locality level, the most accommodation units were identified in Oradea (237 units), Băile Felix (139 units), Sânmartin (61 units), and Băile 1 Mai (44 units), while in 37 localities, only one accommodation unit each was registered.

The analysis of the distribution of accommodation capacity at the level of territorial administrative units highlighted the predominance of the units Sânmartin (8810 places), Oradea (3725 places), and Nucet (721 places), while at the opposite pole, there were Roșiori, and Cefa, each with six places of accommodation. At the locality level, the most accommodation places were identified in the localities of Băile Felix (5716 places), Oradea (3725 places), Băile 1 Mai (1433 places), and Sânmartin (1176 places), while at the opposite pole, there were the localities of Sighiștel, Inand, Curațele, Giulești, Vaida (with 6 places to stay), and Gheghie (with 2 places to stay).

The analysis of the number and capacity of tourist reception structures with public catering functions revealed the existence of a number of 201 units, with a public catering capacity for tourism of 22.891 places, spatially distributed in 32 territorial administrative units, respectively, in 42 localities (Figure 7b).

The most public catering units were identified in the territorial administrative units of Sânmartin (76 units), Oradea (51 units), Nucet (9 units), and Pietroasa (8 units), with

15 territorial administrative units with one public catering unit for tourism at the opposite pole. At the locality level, the most public catering units were identified in Oradea (51 units), Băile Felix (50 units), and Băile 1 Mai (15 units), while in 24 localities, only one unit of public catering for tourism was registered.

The analysis of the distribution of places within public catering structures at the level of territorial administrative units highlighted their predominance in Sânmartin (10,468 places), Oradea (4506 places), Marghita (1459 places), and Nucet (886 places), while Ştei (34 places) and Remetea (20 places) were at the opposite pole. At the locality level, the most places in the public catering structures were identified in the localities of Băile Felix (7930 places), Oradea (4506 places), Băile 1 Mai (1690 places), and Marghita (1459 places), while at the pole opposite, there were Ștei (34 places) and Meziad (20 places).

The analysis of the spatial distribution of accommodation structures in Bihor County and their related capacity highlights the existence of two major poles of their concentration, respectively, Oradea—Sânmartin, with 510 and 62.6% accommodation structures and 12.535 and 69.1% accommodation places, respectively, and the mountainous area of Nucet—Pietroasa—Budureasa—Bulz—Şuncuiuş, with 109 and 13.4% accommodation structures and 2218 and 12.2% accommodation places, respectively. In addition to the two poles mentioned, there are also three secondary poles of concentration of structures and accommodation that overlap the localities of Marghita, Beiuş, and Salonta (Figure 7a). A relatively similar situation can also be found from the distribution of the number and capacity of public food structures (Figure 7b).

Following the normalization and quantification of the four criteria related to tourism (Table 1) in Bihor County, at the locality and territorial administrative unit level, the synthetic value of tourism was calculated, a value that was between 0 and 1.

Thus, following the analysis, it emerged that in 362 of the localities (79%), respectively, in 46 territorial administrative units (45.5%), the synthetic value of tourism was equal to 0, a fact that is explained by the lack of specific tourism activities. The highest values of the synthetic index related to tourism were identified in the case of territorial administrative units Sânmartin (1), Oradea (0.59), Nucet (0.10), Pietroasa (0.08), and Marghita (0.08). At the locality level, the highest values of the synthetic index related to tourism were identified in the case of the localities of Băile Felix (0.89), Oradea (0.80), Băile 1 Mai (0.23), Sânmartin (0.15), and Marghita (0.11).

The analysis of the synthetic values of tourism highlighted the existence of three categories of territorial administrative units: with a very good value (between 0.76 and 1; Sânmartin, 1.1%), good (between 0.51 and 0.75; Oradea, 1.1%), and very poor (between 0.0 and 0.25; 91 territorial administrative units, 97.8%). Regarding the analysis of tourism synthetic values at the locality level, the existence of two types of localities was noted: those with a very good value (between 0.76 and 1; Băile Felix, and Oradea, 1.0%) and those with a very poor value (between 0.0 and 0.25; 205 localities, 99.0%) (Figure 8).

The average value of tourism at the TAU level (Figure 9) is 0.024, suggesting that, on average, the elements in this dataset have a modest magnitude. The standard deviation is quite significant at 0.11, pointing towards a considerable diversity in the data points, reflecting varied or dynamic conditions within the dataset. The range of values extends from 0 to 1, highlighting some extreme or outlier values that significantly deviate from the common range. In contrast, the synthetic value of tourism at the locality level (Figure 9) has a mean that drops to 0.0073, indicating that the overall magnitude of values leans towards the lower end of the scale. This is further corroborated by the standard deviation of 0.058, which, although lower than at the TAU level, still signifies a spread of data around the mean. Interestingly, the percentiles reveal a pronounced clustering of data at the lowest spectrum, with 25%, 50%, and 75% of values stationed at 0, portraying a skewed distribution with a heavy concentration of minimal or negligible values.

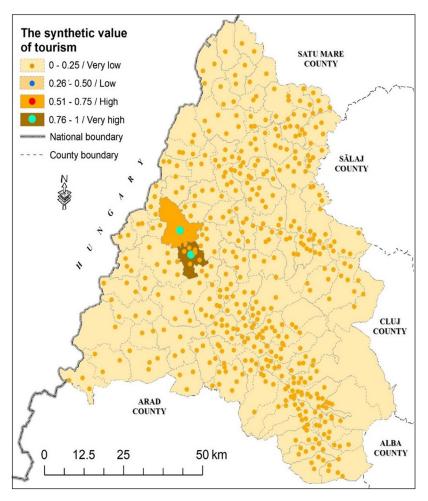


Figure 8. Spatial distribution of the synthetic value of tourism.

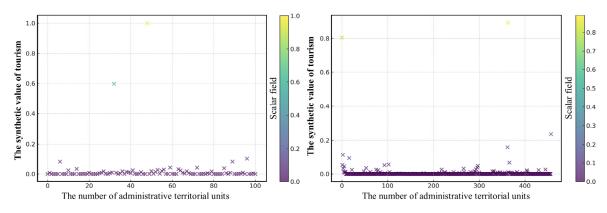


Figure 9. The distribution of the synthetic value of tourism at the TAU level (**left**) and locality level (**right**).

Comparatively, while both datasets share the minimum value at zero, their upper extremes and variability tell different stories. At the TAU level, the higher mean and standard deviation suggest a dataset with greater intensity or variation in measurements, reflecting a more volatile or diverse set of conditions. Meanwhile, at the locality level, a consistency in lower-valued data is shown, hinting at a predominant trend or characteristic within that dataset.

4.3. Relations between Historical Monuments and Tourism

In order to establish the types of relationships between historical monuments and tourism in Bihor County, at the locality and territorial administrative unit level, based on the nine analyzed criteria, relationship indices were calculated, whose values were between -1 and 1. Thus, following the study, it emerged that in 251 of the localities (54.8%), respectively, in 9 territorial administrative units (8.9%), there were no relations between historical monuments and tourism (Figure 10), while in the remaining 207 localities (45.2%), respectively, in 92 territorial administrative units (91.1%), the following types of relationships were identified:

- (1) Weak negative relationships that are characterized by index values between [-1; -0.5] were established in 34.3% of localities, respectively, in 19.6% territorial administrative units. This type of relationship is defined by values of historical monuments equal to zero or lower than those specific to tourism. Values of historical monuments equal to zero were recorded in the case of 56 localities (27.1%), respectively, in nine territorial administrative units (9.8%) (Figures 10 and 11). This is explained by the low share of cultural tourism in relation to other types of tourism, including the spa (Băile Felix, Băile 1 Mai) and mountain (Vadu Crișului, Șuncuiuș, Bratca, Budureasa, Pietroasa, Nucet, Câmpani, Finiș), the proximity of areas with a strong natural tourist potential (Roșia, Bulz, Șinteu, Cărpinet), the existence of some transit areas (Pocola, Valea lui Mihai), and the lack of cultural heritage for various reasons (degradation and their total destruction throughout history, lack of conservation, low level of education regarding the preservation and protection of historical monuments, etc.).
- (2) Strong negative relationships with relationship index values between -0.51 and 0 were identified in 1.0% of localities, respectively, in 5.4% territorial administrative units (Figures 10 and 11). This type of relationship is defined by values of historical monuments lower than those specific to tourism. Thus, for the localities of Borşa and Oşorhei, the values of the historical monuments were 0.0027, while the tourism-specific values were 0.0062 and 0.0074, respectively. A similar situation was also noted regarding the territorial administrative units in this group of relationships. For example, for Balc and Oṣorhei, the values of the historical monuments were 0.020, while the tourism-specific values were 0.033 and 0.024, respectively.
- (3) Strong positive relationships with relationship index values between 0 and 0.5 were identified in 6.3% of the localities, respectively, in 15.2% territorial administrative units (Figures 10 and 11). This type of relationship is defined by values of historical monuments higher than those specific to tourism. Thus, for the localities of Oradea and Beiuş, the values of the historical monuments were 0.84 and 0.11, respectively, while the tourism-specific values were 0.80 and 0.053, respectively. A similar situation was also noted regarding the territorial administrative units in this group of relations. For example, for Biharia and Oradea, the values of historical monuments were 0.014 and 0.83, respectively, while the tourism-specific values were 0.0083 and 0.59, respectively.
- Weak positive relationships with relationship index values between 0.51 and 1 were identified in 58.5% of localities, respectively, in 59.9% territorial administrative units. This type of relationship is defined by tourism values equal to zero or lower than those specific to historical monuments. Tourism values equal to zero were recorded in the case of 111 localities (53.6%), respectively, in 37 territorial administrative units (40.2%) (Figures 10 and 11). This situation can represent a window for future research on the interference of other factors, for example, the lack of inclusion in tourist circuits of monuments, insufficient investments in the tourism sector, and different sectors of activity of the population, considering the predominantly rural profile of these TAUs. Of course, an exact distinction cannot be made between tourist and non-tourist activities [68] to allow us to say that, in the TAUs without tourist units, no tourist activities are practiced, but the extreme values of the calculated index represent an overview, a raw information about the relations between historical monuments and

tourism. In this case, the lack of inclusion of monuments in tourist circuits, the lack of promotion, and poor economic investments in the tourism sector can be justified.

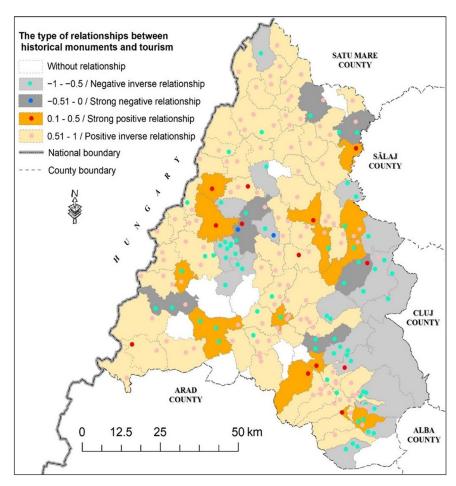


Figure 10. Spatial distribution of types of relationship between historical monuments and tourism.

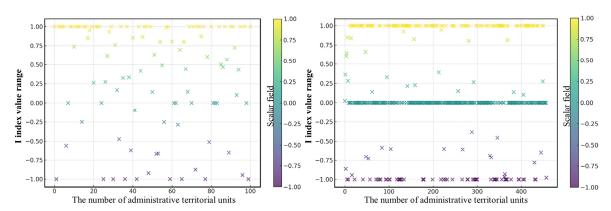


Figure 11. The distribution of types of relationship between historical monuments and tourism at the TAU level (**left**) and locality level (**right**).

The first and fourth groups define an indirect relationship based on the presence of extreme values of the indicators compared to the others calculated and a very large value discrepancy between the historical and tourist indicators. The first group represents the positive indirect relationships, where the values of the historical monuments are much higher than those of the tourist indicators, compared to the last group whose situation is completely reversed. Groups II and III can be approached together because the values of both indicators are moderate and the value differences are smaller. In this value differences

ence (-0.5, 0.5), there are strong relationships between the two indicators, translated by the quantitatively moderate presence in the territory of both accommodation units and historical monuments (Figure 12).

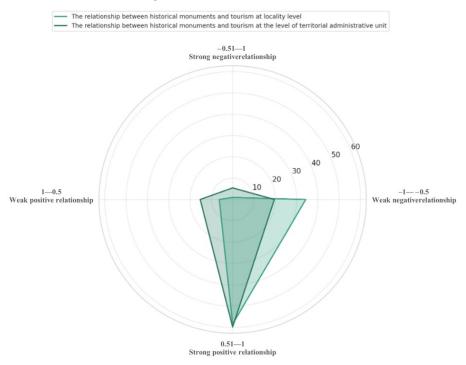


Figure 12. Types of relationships between historical monuments and tourism.

5. Discussions

Tourism, particularly cultural tourism, represents an important aspect of today's society with profound implications at the social, economic, and ecological levels that require its analysis through increasingly sophisticated multivariate methods. Similar studies have been carried out over time in various places, having the evaluation of cultural heritage [69], urban functionality [70], and social and economic development [63,71,72] as research themes.

On the same note, this study aimed to evaluate the current situation of cultural heritage and tourism, classifying the 101 TAUs, respectively, in 458 localities, according to these two criteria. Territorial discrepancies were highlighted after obtaining the synthetic value of the analysis, which concentrates the values of all indicators belonging to a criterion. Thus, the spatial distribution of the two criteria can represent an important element at the decision-making level regarding the prospective development of relations between historical monuments and tourism.

Thus, the results of the present approach provide valuable information with administrative, educational, and cultural implications. Therefore, we recommend the local public authorities and the factors involved in the development of tourism to concentrate their efforts in the direction of capitalizing on the tangible and intangible cultural heritage of the particularly rich and varied localities of Oradea, Beiuṣ, Biharia, and Ṣtei through tourism. In support of this recommendation are the strong positive relationships that have been established between historical monuments and tourism, relationships that have been facilitated by the social, economic, and administrative functions performed over time by the previously mentioned localities.

Among these localities, the Municipality of Oradea stands out in particular. The existence of close relations between history and tourism at the level of the municipality of Oradea is justified by the following arguments: the municipality of Oradea was and is the most important locality in the studied area, having numerous social, economic, and administrative attributions over time; the traces of these functions in the territorial profile are

well highlighted by the existence of the large share of historical monuments (26.4%), which initially had other uses; being a pole of local convergence and benefiting from a functional infrastructure, Oradea concentrated a large part of the activities in the field of tourism (29.1% of the number of accommodation structures, respectively 20.5% of the existing accommodation capacity); the existence of a number of 120 historical monuments (26.4% of the total), of which 27 are monuments of national interest (50% of the total monuments of national interest in Bihor County), especially the architectural ones (90 monuments), facilitated imposing and developing cultural tourism. In support of this idea, we can emphasize the large number of museum units that have their headquarters in the City of Oradea (nine units, 43% of the total number), among which we mention the Museum of Crișurilor Land, the Museum of the City of Oradea, Casa Darvas Art Nouveau Museum, the Iosif Vulcan Memorial Museum, the Aurel Lazăr Memorial Museum, the Ady Endre Memorial Museum, the Jewish History Museum of Oradea, the National Military Museum "King Ferdinand I" Oradea Branch, the Museum of Freemasonry, etc.

Our study has established a significant relationship between historical monuments and the development of cultural tourism in Bihor County. This relationship is not only crucial for local economic development but also for the preservation of cultural heritage. These insights are particularly applicable to other regions in Europe where cultural heritage forms a core part of local tourism offerings. By integrating cultural heritage into their tourism strategies, European regions can drive higher visitor numbers and enhance tourism revenues, supporting broader economic development. Central and Southeastern Europe, rich in diverse cultural heritage but not fully capitalizing on these assets, stand to benefit significantly from similar research and strategies. These regions could develop targeted policies to conserve and promote heritage sites, which, in turn, could boost economic benefits from tourism. Given the historical significance of these areas, such policies could also support the preservation of cultural identities while fostering sustainable tourism practices. Furthermore, cross-border tourism initiatives could be informed by our findings, encouraging collaboration between countries to create tourism packages that highlight shared cultural heritage. This approach could be particularly effective in Europe, where many countries share historical and cultural ties. For instance, collaborative tourism ventures could emphasize interconnected histories and cultural narratives, enhancing regional tourism experiences. Lastly, the relationship between historical monuments and tourism underscores the need for sustainable tourism practices. Our study suggests that European policy should focus on developing tourism in a way that supports the preservation of cultural heritage. This is particularly relevant for Central and Southeastern Europe, where the potential threat to cultural sites from increasing tourism demands careful management to ensure that these treasures are protected for future generations.

6. Conclusions

The area of Bihor County represents a space of continuous habitation since ancient times (from the Paleolithic). Traces in this sense are the archaeological evidence, quite numerous (171 archaeological monuments), spread unevenly spatially, with their predominance in the plain area, in the vicinity of the current localities of Sânnicolau Român, Girişu de Criş, Curtuişeni, Livada de Bihor, Şimian, Sălacea, Galoşpetreu, etc. (Figure 5).

Identifying and explaining the spatial relationships between historical monuments and tourism is a necessary and delicate operation at the same time, involving many unknown factors. The limitations of the calculated index are underlined by the limited number of indicators taken into account (nine indicators, five for historical monuments, four for tourism), in the relationship of the two aspects, historical monuments and tourism, intervening a multitude of factors from different fields: sociological, economic, cultural, political, etc. Depending on the factors considered, the calculation formula may involve different operations and relationships between the terms considered. In this study, tourism was analyzed through the lens of public accommodation and catering units (the number and reception capacity); thus, a simple operation of adding the coefficients of the two indi-

cators represents a symbolic framework of the tourist situation in each locality, respectively, in the territorial administrative units.

The analysis of the synthetic values of the historical monuments at a spatial level highlighted the territorial administrative units/localities of Oradea and Sânicolau Român, while the synthetic values related to tourism were very high in the territorial administrative units of Oradea and Sânmartin, respectively, in the localities of Oradea and Băile Felix.

From the present study, it emerged that in 251 of the localities (54.8%), respectively, in 9 territorial administrative units (8.9%), there were no relations between historical monuments and tourism, while in 207 localities (45.2%), respectively, in 92 territorial administrative units (91.1%), there were identified four types of relationships: weak negative relationships (18 TAU, 71 localities), strong negative relationships (5 TAU, 2 localities), strong positive relationships (14 TAU, 13 localities), and weak positive relationships (55 TAU, 121 localities) (Figure 10).

From the presented aspects, although the studied area benefits from a high number of historical monuments (455 monuments), they are not exploited from a tourist point of view. In this case, the working hypothesis from which the present study started is confirmed only at the level of 19 territorial administrative units (18.8%), respectively, in 15 localities (3.3%).

However, the results obtained in the present study can represent an informational support in the elaboration of local policies and strategies regarding the development of tourism, outlining, at a spatial level, a synthetic picture of the relations between historical monuments and tourism.

In order to optimize the results obtained in the present study, other studies and research of an interdisciplinary nature are required, involving specialists from various fields of activity with which tourism coexists. Their purpose is to accurately determine a number of aspects such as: the motivation of tourists; the need for protection and conservation of historical monuments; the sustainable use of historical monuments through tourism; methods, procedures, and techniques of conservation, protection, promotion, and valorization of historical monuments; bearing capacity; etc.

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