

Article

Natura 2000 Network vs. Tourism and Investment Potential of Communes—A Case Study of Czarnkowsko-Trzcianecki County

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Abstract: The Natura 2000 is a network of protected areas established in the European Union on the basis of EU Directives. Simultaneously it is the youngest form of protected areas in Poland. Hence conflicts between conservation objectives and opportunities as well as needs of community economic development are quite common. The aim of the present study was to evaluate the tourism and investment potential of Czarnkowsko-Trzcianecki County and determine whether the Natura 2000 network is a factor in increasing the tourism and investment development of the commune or limiting it. We evaluated the tourism and investment potential based on modification of the Gołembski method (i.e., multidimensional comparative analysis) and measured the proportion of the Natura 2000 network in the total area of the commune. The Trzcianka commune was found to have the greatest tourism development and investment potential, but the Wieleń commune was the most attractive in terms of tourism, and Czarnków (municipal commune) was found to have the highest investment attractiveness. Moreover, there was no correlation between the Natura 2000 network and tourism and investment potential of communes. However, these areas had a negative impact on the investment attractiveness of communes, due to socio-economic and technical aspects, which may cause future potential limitation of development.

Keywords: Natura 2000 network; tourism; indicators; Poland

1. Introduction

We live in a socio-economic-ecological system. Unfortunately, socio-economic interests are quite commonly in opposition to ecological aspects. Contradictory interests are particularly important in the case of protected areas. On the one hand, these areas are valuable in terms of nature protection, and on the other hand, there is a society that wants to develop. However, a special case is Natura 2000—a network of protected areas designated in all countries of the European Union. The primary goal of the Natura 2000 network is the protection of biodiversity, but it does not exclude human activity and tries to ensure that people can co-exist sustainably with the natural world [1].

Taking into account the goals of the Natura 2000 network, there is a reasoned need for comprehensive scientific research. Ecological research is of fundamental importance for protecting Natura 2000 sites, while the analysis of socio-economic aspects is important from the point of view of local development. However, a review of recent research on the Natura 2000 network indicated that ecological research prevails, while socio-economic research on the networks is still underrepresented. Moreover, in recent years, many conflicts

have arisen around Natura 2000 sites, making it difficult to implement protective tasks and also make use of opportunities offered by this program for local development [2]. Hence, research on tradeoffs between economic goals, social needs, and the protection of biodiversity in the Natura 2000 network is urgently needed [3].

The aim of the present study was to evaluate the tourism and investment potential of Czarnkowsko-Trzcianecki County and ascertain whether the Natura 2000 network increases the tourism and investment development of the commune or limits it. We evaluated the tourism and investment potential of Czarnkowsko-Trzcianecki County, where the Natura 2000 network is located. The research area, based on the available literature, was distinguished by its diverse tourism potential, and each of the communes in the county was characterized by a different proportion of the Natura 2000 network's area in the total area of the commune.

The article begins with a literature review with a description of the basic information about the Natura 2000 network, functioning and management of these areas in Poland, as well as the current state of knowledge regarding the relationship between the Natura 2000 network and socio-economic development. The next section describes the research area with the characteristics of Natura 2000 sites, as well as the methodology—modification of the Gołembski method (i.e., multidimensional comparative analysis) and the applied statistical analyses. Results on classification of the communes in terms of tourism and investment attractiveness, as well as tourism and investment potential of communes, are presented in Section 4. In this section the relation between the Natura 2000 network and tourism and investment potential of communes is also described. Then the results are discussed in relation to previous research. Finally, recommendations for future development for communes are proposed, limitations of the study are mentioned, and consequent suggestions for future research are made.

2. Literature Review

2.1. *Legal Basis for Functioning of the Natura 2000 Network*

The Natura 2000 network of protected areas was established by European Union Directives: the Directive on the conservation of natural habitats and wild fauna and flora—Habitats Directive [4] and the Directive on the conservation of wild birds—Birds Directive [5]. It is the largest multinational coordinated system of protected areas in the world, the aim of which is to “ensure the long-term survival of Europe's most valuable and threatened species and habitats, listed under both the Birds Directive and the Habitats Directive” [6]. Due to the protection of species included in the Birds Directive as well as species and habitats included in the Habitats Directive, the Natura 2000 network consists of two types of areas: Special Protection Areas (SPA) and Special Areas of Conservation (SAC), as well as marine ecosystems [6].

The beginnings of the implementation of the Natura 2000 network date back to 1992. Initially, it was designated in 12 EU countries, and then in other countries also joining the European Union. Preparations for introducing the Natura 2000 network in Poland began in the late 1990s when preliminary analyses of the resources of habitats and species requiring protection in the network were developed. The first concept of the Natura 2000 network in Poland was developed in 2001, and it was extended in the following years. The Natura 2000 network was introduced into Polish legislation in 2004, making it the youngest form of protected areas. Since 2004, this network has grown significantly and now, in Poland, the Natura 2000 network covers almost 1/5 of the country's land area. It includes 849 habitat sites and 145 bird sites [7]. The key authorities in managing the Natura 2000 network in Poland are the General Director for Environmental Protection and Regional Directors for Environmental Protection—bodies of the General Director for Environmental Protection in each voivodeship. The General Director for Environmental Protection supervises the functioning of Natura 2000 areas through recommendations and guidelines regarding the protection and maintenance of Natura 2000 sites, collecting information about the protection and functioning of Natura 2000 areas, as well as monitoring and controlling.

Regional Directors for Environmental Protection coordinate and supervise the functioning of Natura 2000 areas within the voivodeship's borders [8].

The basic documents, obligatory for all sites, are the Natura 2000 Standard Data Form (SDF) and a digital map [9]. The SDF contains basic data about the area with a description, information about the location, natural values, protection status of the area, and relation with other protected area. Nevertheless, the management of Natura 2000 areas in Poland by the unit responsible for supervision is carried out mainly using such tools as Plans of Protective Tasks (PPT) and Plans of Protection (PP). The Plan of Protective Tasks is prepared by the authority supervising the Natura 2000 area for the period of 10 years. The first project should be completed within six years from the date of approval of the area by the European Commission. This document includes, among other things, a description of the boundaries and a map of the Natura 2000 area, identification of threats to natural habitats, and a list of plant and animal species and their habitats. Moreover, the goals of protective measures and monitoring are also described in PPT. The Protection Plan for the Natura 2000 area is established by the Minister of the Environment for a period of 20 years. The project of a plan is prepared by the authority supervising the area. The PP is to diagnose all threats to the objects of protection in the Natura 2000 area and to establish protective measures. It should be a practical tool for the manager of the protected area, helping to properly use resources, set priorities, and plan current work as well as continuity and consistency of activities related to the protection of the area [8]. Both documents, PPT and PP, are very important for local council. Plans should contain guidelines for changes to the existing spatial planning documents at a different level, if they are necessary to maintain or restore the proper conservation status of natural habitats and species of plants and animals. In addition, the plans of protection may specify the conditions of land development and their use, including areas intended for development or the location of tourist and educational infrastructure [10]. Unfortunately, the preparation of plans for Polish Natura 2000 habitats is still in progress. It is planned to develop 407 plans in 2009–2015 (most have been implemented), and another 299 plans are to be developed in 2017–2022. Hence, in many cases, the SDF is still the only document containing information on the impacts and activities affecting the conservation status [11,12]. The tools supporting the protection of Natura 2000 sites in Poland, and at the same time allowing for socio-economic development, also include regulations related to environmental impact assessments (EIA). On the one hand, the EIA procedure involves public consultations, which enable interested stockholders to participate in the work related to the preparation of plans for Natura 2000 sites. On the other hand, the regulations related to EIA define the rules for carrying out the assessment of significant effects on the integrity of Natura 2000, i.e., verification of whether a given plan (program) or project affects a Natura 2000 site [13].

2.2. Natura 2000 Network and Local Development

The Natura 2000 network, both in Europe and Poland, differs significantly from other previously protected areas. Fundamentally, the network focuses on socially sustainable protection, creating a bridge between the conservation of species and habitats with humans' economic, social, and cultural needs. It does not represent, in principal, a significant barrier to local development; on the contrary, it should support such development [14,15]. The existence of the Natura 2000 network does not prohibit business or investment development as long as these activities do not have a negative impact on the Natura 2000 site. Hence, the development of investment on a Natura 2000 site requires specific and innovative methods, not only resource exploitation [14]. According to Tsiafouli et al. [16], agriculture and forestry, fishing, collecting, and tourism were considered the most popular human activities in Natura 2000 sites. In the case of agricultural activities, it is mainly crop and livestock management. However, increased urbanization is also allowed and observed through settlement, transport, mining, extraction, and industrial activities. One of the controversial aspects is the role of leisure and tourism in Natura 2000 sites. On the one hand, the creation of the Natura 2000 sites provides opportunities for tourism development in its

broadest sense, ranging from agritourism farms to the growing importance of ecological and regional products [17]. Moreover, due to their high naturalness, biodiversity, and landscape attractiveness, Natura 2000 sites are becoming increasingly crucial for recreational opportunities, providing benefits in the term of health through recreation and outdoor activities [18,19]. In the case of Natura 2000 sites in Poland, where many areas include river valleys, an additional possibility is water tourism. The consequence of this is the inflow of new investments, which also drives regional recovery and development [17]. It was also noted that the creation of a Natura 2000 site and its appropriate tourism development might support direct and indirect employment [20] and strengthen the regional identity, which might consequently change unfavorable migration trends [17].

Nevertheless, the research conducted by Getzner and Jungmeier [21] emphasized that the development of regional economy in areas where the Natura 2000 network was located depends on the development plans and the involvement of regional stakeholders. In the case of Poland, therefore, the main responsibility in these aspects is in the matter of local council. The local council manages the commune's spatial policy, builds a development strategy, and sets a hierarchy of investment priorities, as well as determines the importance of nature protection for the local economy and improvement of the quality of life [14]. It is also responsible for the development of tourism, which has an effect on protected areas, both from infrastructure and activities themselves [22,23]. The construction of tourism facilities such as trails, lookouts, campsites, and other types of accommodation contribute to the most obvious and direct effect. The most important threats related to tourism infrastructure include: land occupation and removal of vegetation for investment purposes, landscape degradation, environmental pollution due to the operation of tourism facilities, changes in the number of animal populations, changes in the spatial and functional structure, as well as hydrological and soil changes [23]. Tourism activity such as walking, bicycle/horse riding, or camping can also contribute to change in vegetation, including biomass loss, decrease in coverage, or change of species composition [22]. Threats related to the tourism activity also include destruction of the top layer of soil, leaving waste, increased air pollution through increased car traffic, or increased noise [23]. However, changes in the environment caused by tourism depend on many factors, including the appropriate tourism infrastructure, the type of activity, and tourists' behaviors [22].

Despite the possibility of the development of various forms of human activity, conflicts between conservation objectives and opportunities as well as needs of community economic development are still quite common [24]. According to Hartel et al. [25], this phenomenon is particularly intense in developing countries, such as Eastern Europe. In the case of Poland, these conflicts are often a consequence of mistakes that were made when designating Natura 2000 sites. Insufficient communication with stakeholders, failure to provide information about the program, and introduction of new regulations contributed to the perception of these areas as another barrier to development. Unfortunately, the opinions of local stakeholders on the impact of Natura 2000 network on local development are divided, and many people still negatively perceive this form of nature protection [2]. Thus, it is crucial to balance the conflicting goals of biodiversity conservation and the development of society. The European Commission [26] points out that one of the causes of conflicts is the gap between spatial planning and instruments related to the Natura 2000 network. Therefore, the most appropriate approach is to ensure compatibility between environmental and sectoral policies and ensure compliance with national and EU legislation. In addition, it is essential to consider reliable sources of information that are the framework for future spatial policies [26]. For example, in tourism, a good source of information may be the tourism and investment potential, which might be the first stage of a multi-criteria analysis regarding the future development of a selected administrative unit [27].

3. Materials and Methods

3.1. Study Area

Czarnkowsko-Trzcianecki County, with an area of 1806 km², was chosen as the study area. It is located in the western part of Poland, in the Wielkopolskie Voivodeship (Figure 1). The county consists of eight communes:

- Czarnków (municipal commune) with an area of 10 km²
- Czarnków (rural commune) with an area of 346 km²
- Drawsko (rural commune) with an area of 163 km²
- Krzyż Wielkopolski (municipal-rural commune) with an area of 174 km²
- Lubasz (rural commune) with an area of 167 km²
- Połajewo (rural commune) with an area of 142 km²
- Trzcianka (municipal-rural commune) with an area of 374 km²
- Wieleń (municipal-rural commune) with an area of 430 km²

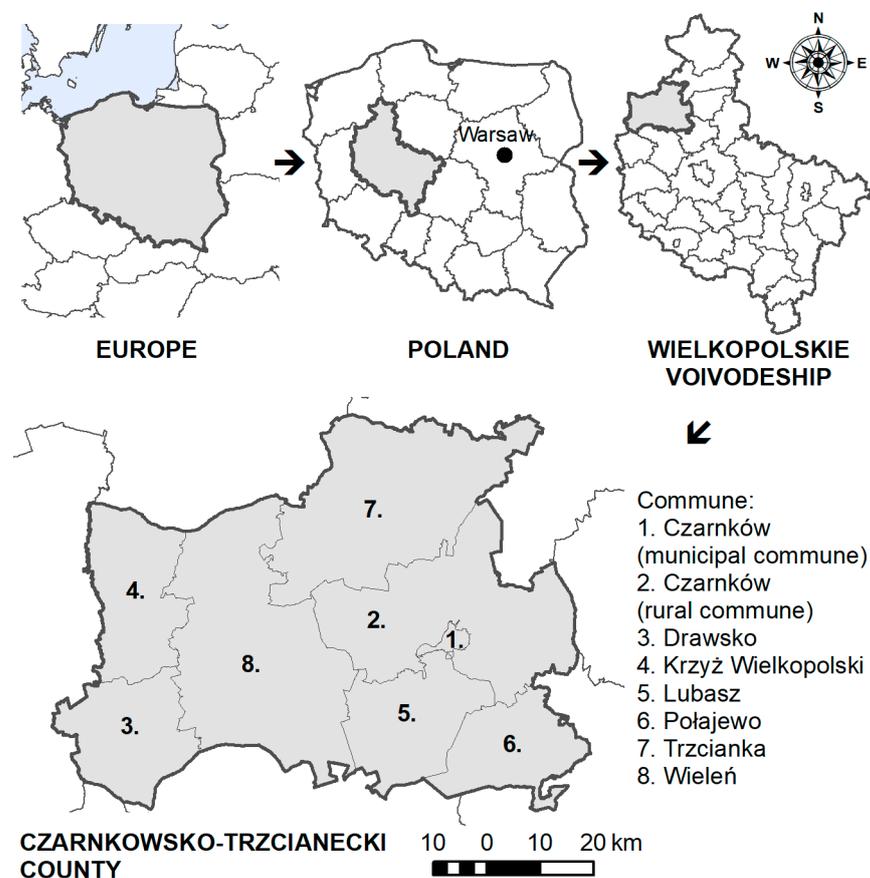


Figure 1. Location of Czarnkowsko-Trzcianecki County in the Wielkopolskie Voivodeship. Source: own work based on data from national geodetic and cartographic resources.

Nature is a great advantage of the region but also an impediment to socio-economic development. Due to the uniqueness of flora and fauna, some of the green areas in this region have been included in the Natura 2000 network (Figure 2). In addition, other protected areas are established in the county, such as nature reserves, protected landscape areas, and nature monuments [28].

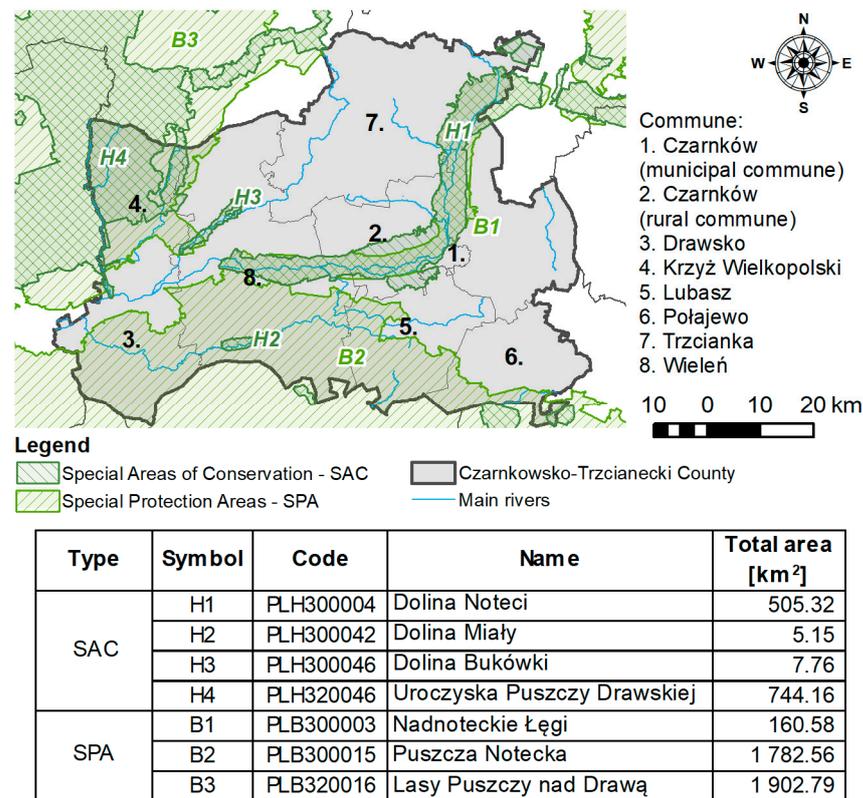


Figure 2. General information about Natura 2000 network in Czarnkowsko-Trzcianecki County. Source: own work based on data from national geodetic and cartographic resources.

Potential tourists may be encouraged to visit the Czarnkowsko-Trzcianecki County mainly due to the natural values. High biodiversity contributed to the creation of seven Natura 2000 sites located within the county. There are four Special Areas of Conservation (SAC) and three Special Protection Areas (SPA), most of which are located near to river valleys (Figure 2).

The proportion of the Natura 2000 network's area in the total area of the commune was diverse. The Krzyż Wielkopolski commune had the highest share of Natura 2000 sites (78% of the commune's area). Almost 78% of the commune's area was occupied by a Special Protection Area, Lasy Puszczy nad Drawą (PLB320016), where the most valuable part in terms of nature is located centrally, at the fork of the Drawa River and its tributary Płociczna River. There was also a Special Area of Conservation—Uroczyska Puszczy Drawskiej (PLH320046)—which covered nearly 53% of the commune's area. However, this area's location in Krzyż Wielkopolski was almost identical to the Special Protection Area—Puszcza Notecka. The Drawsko commune was characterized by a similar proportion of the Natura 2000 network's area in the total area of the commune. In the case of this commune, over 73% of its area was covered by Natura 2000 sites and it is a Special Area of Conservation—Puszcza Notecka (PLB300015). The Natura 2000 network occupied 56% of the commune's area in the Lubasz commune. In the case of the Czarnków (rural commune) and Połajewo commune, the share of the Natura 2000 network was smaller. In both communes, the network covered about 26% of the commune's area. The lowest proportion of the Natura 2000 network's area in the total area of the commune was in Czarnków (municipal commune) and Trzcianka commune—15% and 12%, respectively. In the case of both communes, the most important area is the Special Area of Conservation—Dolina Noteci (PLH30004), which includes a fragment of the Noteć valley.

3.2. Methodology

A method that is often used for multidimensional comparative analysis is the Golemski method [29]. This method makes it possible to compare and objectively evaluate spatial objects (e.g., counties or communes) that have many characteristics. In the present research, a modification of the Golemski method of multidimensional comparative analysis, proposed by Lisiak-Zielińska and Ziernicka-Wojtaszek [30], was used to evaluate the development of the tourism and investment area of Czarnkowsko-Trzcianecki County. Information about the communes (the smallest administrative unit with reliable statistical data) was obtained from the Bank of Local Data (as of 2019), available studies on the communes, and spatial data—Topographic Objects Database (BDOT) from national geodetic and cartographic resources (as of 2017–2020).

The analysis was based on 49 diagnostic characteristics assigned to two spheres: tourism and investment attractiveness. Each sphere consisted of four divisions. In the case of tourism attractiveness, they were tourism assets; the state and protection of the environment; transport accessibility; hotels and eating establishments; and supplementary facilities. For investment attractiveness, the following divisions were distinguished: service infrastructure; technical infrastructure; population relations; and commune's finances.

After data collection, the diagnostic features were standardized according to the 'maximum shift' method proposed by Lisiak-Zielińska and Ziernicka-Wojtaszek [30]. In this method, the value of a given diagnostic feature in the commune was subtracted from the maximum value observed in the analyzed group of communes for that feature. It was performed in order to transform the distinguished negative features into positive stimulants. Due to standardization, all features contributed to the increase in the value of the tourism and investment potential (Table S1). Then, the obtained results for the diagnostic features were normalized according to the following formula by dividing the characteristic value by the reference standard value (1):

$$n_{ij} = y_{ij} / y_{jmax}, \quad (1)$$

where:

n_{ij} —normalized value of the j -th indicator in the i -th commune,

y_{ij} —value of the j -th indicator in the i -th commune,

y_{jmax} —maximum value of the j -th indicator among analyzed communes.

After standardization and normalization, weights were assigned to the diagnostic features according to the proposal of Lisiak-Zielińska and Ziernicka-Wojtaszek [30] with the modification of some weights (Table S1). The values of the weights depended on the importance of each feature in the assessment of a particular division and thus also on the assessment of tourism and investment attractiveness. First, a synthetic measure for each division was calculated by adding up the results, according to the following Formula (2):

$$Md_i = \sum_{j=1}^n w_j \times n_{ij}, \quad (2)$$

where:

Md_i —synthetic measure for the d -th division in the i -th commune,

w_j —weight of the j -th indicator in the d -th division,

n_{ij} —normalized value of the j -th indicator in the i -th commune.

Then, the weighted average of the synthetic measures for the spheres (tourism and investment attractiveness), taking into account the weights of each division, was calculated, using the following formula:

$$Ms_i = \sum_{k=1}^n W_k \times Md_i, \quad (3)$$

where:

Ms_i —synthetic measure for the s -th sphere in the i -th commune,

W_k —weight of the k -th division in the s -th sphere

Md_i —synthetic measure for the d -th division in the i -th commune.

In the last step, the tourism and investment potential of the commune was calculated as a general synthetic measure by calculating the weighted average of the spheres (Table 1).

Table 1. Spheres and divisions with their weight.

Sphere	Weight of Sphere	Division	Weight of Division
tourism attractiveness	0.50	tourism assets [TA]	0.60
		state and protection of the environment [EP]	0.10
		transport accessibility [TA]	0.10
		hotels, eating establishments and supplementary facilities [HC]	0.20
investment attractiveness	0.50	service infrastructure [SI]	0.32
		technical infrastructure [TI]	0.25
		population relations [PR]	0.23
		commune's finances [CF]	0.20

Source: own work based on Golembki [29].

Normalized features were analyzed using statistical software. Heatmap analyses were performed to reveal similarities and differences between features and communes for tourism and investment attractiveness. The two-dimensional variables were visualized in different colors. With the aid of Ward hierarchical clustering and Euclidean distance measurement, a tree diagram was created with grouping for clusters. The cluster analyses of standardized results were performed for features and communes.

Spearman's rank correlation analysis was performed to detect the relation between the proportion of the Natura 2000 network's area in the total area of communes and communes' tourism and investment attractiveness and general synthetic measure of tourism and investment potential. Spearman's rank correlation analysis was also carried out to evaluate the relationship between the selected divisions and the Natura 2000 network. In both cases, the correlation was calculated between pairs of variables based on the results obtained for all analyzed communes. The level of significance was set at $\alpha = 0.05$. The data were analyzed with statistical software (STATISTICA 13.1) and the R computational platform (R Core, 2014).

4. Results

4.1. Assessment of Tourism Attractiveness

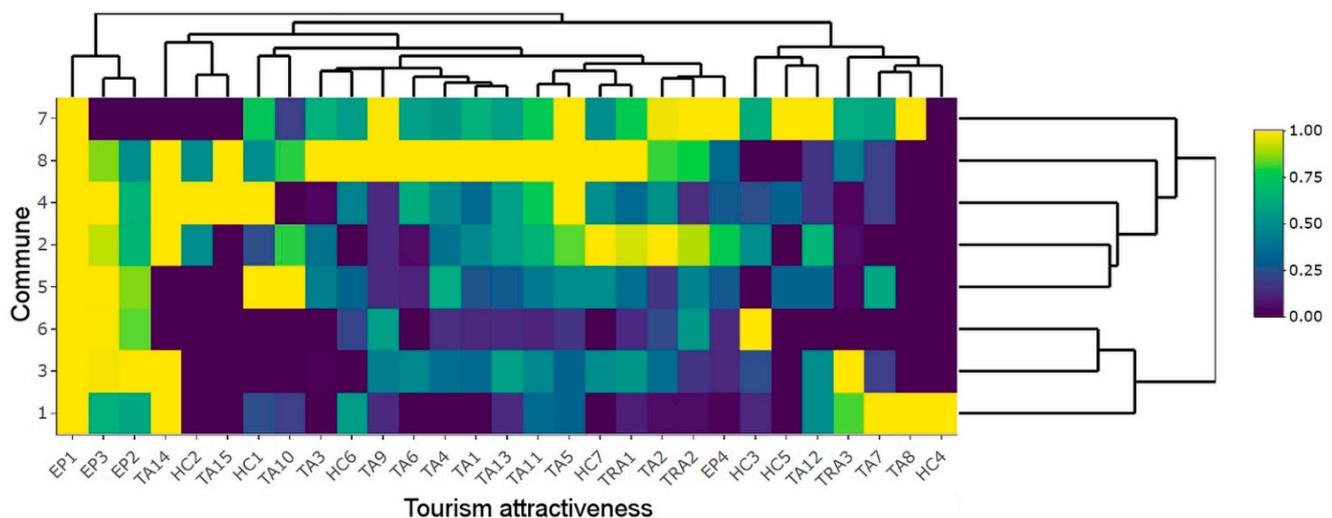
The conducted research indicated that the tourism attractiveness of the analyzed communes ranged from 0.141 to 0.359. The most attractive commune in terms of tourism was Wieleń (0.359). The influence of tourism assets on the final tourism attractiveness of the commune was observed (58.2%). The other divisions had a smaller share in terms of tourism—from 10.7% to 18.7%. In second place was Trzcianka commune (0.314). This commune also was characterized by an influence of tourism assets (53.3%). The share of the divisions related to environmental protection, transport accessibility, and other facilities was similar, at approximately 15%. The value of tourism attractiveness for Czarńków (rural commune), Krzyż Wielkopolski, and Lubasz was lower—0.271, 0.252, and 0.234, respectively. The tourism attractiveness of the communes was most influenced by their tourism assets, as well as by the state and protection of the environment. In the case of Lubasz and Krzyż Wielkopolski, a very small share of transport was observed (7.2% and 4.2%), which may limit the visits of potential tourists. Next in the ranking were the communes of Drawsko (0.196) and Czarńków (municipal commune) (0.155). Drawsko commune was one of the weakest communes in the county in terms of hotels, eating establishments and additional facilities. This division, with a share of 4.4%, significantly lowered the attractiveness of this commune. The Połajewo commune (0.141) was the least attractive commune in the county in terms of tourism, which had poor tourism assets—it accounted for only 19.4% of tourism attractiveness. Transport accessibility was also a problem in this commune, as in the communes of Lubasz and Krzyż Wielkopolski (Table 2).

Table 2. Tourism attractiveness and percentage share of divisions in the sphere of tourism attractiveness for each commune.

No.	Commune	Tourism Attractiveness	TA ¹	EP ²	TRA ³	HC ⁴
1.	Czarnków (municipal commune)	0.155	39.8	36.0	12.6	11.6
2.	Czarnków (rural commune)	0.271	41.1	31.0	14.1	13.8
3.	Drawsko	0.196	38.7	39.6	17.3	4.4
4.	Krzyż Wielkopolski	0.252	39.6	29.2	4.2	27.0
5.	Lubasz	0.234	43.6	33.7	7.2	15.5
6.	Połajewo	0.141	19.4	52.3	9.6	18.7
7.	Trzcianka	0.314	53.3	15.9	15.2	15.6
8.	Wieleń	0.359	58.2	18.7	12.4	10.7

¹ Tourism assets; ² State and protection of the environment; ³ Transport accessibility; ⁴ Hotels, eating establishments, and supplementary facilities.

The heatmap analysis revealed some tendencies. The cluster analysis of standardized results made it possible to indicate four groups of communes in term of tourism attractiveness. The first group was one of the most attractive communes in terms of tourism—the Trzcianka commune. This commune was characterized by significantly lower values of features related to the state and protection of the environment in comparison to other communes. The second group was the Wieleń commune, with the highest attractiveness. It was observed that this commune achieved the highest values of features in the tourism assets (TA3, TA9, TA6, TA4, TA1, TA13, TA5). Simultaneously, the observed values in the case of factors such as the number of restaurants and cafés (HC3), swimming pools and areas (HC4 and HC5), as well as fairs, exhibitions, events, and museums (TA7 and TA8), were similar. The third group included communes with average tourism attractiveness, such as Czarnków (rural commune), Krzyż Wielkopolski, and Lubasz. The last group represented communes with the lowest tourism attractiveness—Pojajewo, Drawsko, and Czarnków (municipal commune) (Figure 3).

**Figure 3.** Heatmap and cluster analysis of features in tourism attractiveness sphere for all communes.

4.2. Assessment of Attractiveness for Investors

The highest value (0.402) was observed for Czarnków (municipal commune) in terms of investment attractiveness. Well-developed technical infrastructure (31.0%) had the greatest impact on the value of investment attractiveness. The share of the other divisions was smaller. However, it should be remembered that Czarnków (municipal commune) is relatively small compared to other communes. Hence it is easier to develop good technical infrastructure. In second place was Trzcianka commune (0.311), with the largest proportion

of service infrastructure (44.4%). The attractiveness for investors of the other communes in Czarnkowsko-Trzciancki County is lower and ranges from 0.251 to 0.173. Communes such as Czarnków (rural commune), Krzyż Wielkopolski, Lubasz, and Połajewo were characterized by a similar share of all divisions in the overall attractiveness value in terms of investment. The Wieleń commune (0.251), on the other hand, had a large share of the service infrastructure (39.7%). It was observed that the Drawsko commune with the least value of investment attractiveness (0.173) was distinguished by a small share of the division related to population relations (6.3%), with a simultaneous high influence of the commune's finances (42.2%) (Table 3).

Table 3. Investment attractiveness and percentage share of divisions in the sphere of investment attractiveness for each commune.

No.	Commune	Investment Attractiveness	SI ¹	TI ²	PR ³	CF ⁴
1.	Czarnków (municipal commune)	0.402	25.7	31.0	25.0	18.3
2.	Czarnków (rural commune)	0.210	17.9	21.2	24.1	36.8
3.	Drawsko	0.173	20.7	30.8	6.3	42.2
4.	Krzyż Wielkopolski	0.192	25.7	27.9	13.1	33.3
5.	Lubasz	0.206	20.0	23.8	21.6	34.6
6.	Połajewo	0.200	21.7	24.1	22.2	32.0
7.	Trzcianka	0.311	44.4	17.4	15.0	23.2
8.	Wieleń	0.251	39.7	16.4	11.3	32.6

¹ Service infrastructure; ² Technical infrastructure; ³ Population relations; ⁴ Commune's finances.

Based on the cluster analysis of standardized results of investment attractiveness, it was observed that the commune of Czarnków (municipal commune), with the highest value of investment attractiveness, was characterized by higher values of features compared to other communes. The highest values were found for most of the features. The lowest value was found for the proportion of expenditure on public roads in the total expenditure of the commune (CF4). However, it should be noted that the expenditure is proportional to the length of roads in the commune but lower than in other communes. The other communes were included in the second group, with different values of the analyzed features. Based on heatmap analysis of analyzed features, it was possible to visualize the highest values of the following features for the Trzcianka commune: banks and money exchange offices (SI3), pharmacies (SI2), and petrol stations (SI1), which contributed to the share of the service infrastructure division in investment attractiveness. Moreover, the cluster analysis of analyzed features revealed that the percentage of the population using the gas network (TI5), population density (PR4), sanitary drainage network length (TI4), number of shops and markets (SI6), and water distribution network length (TI2) are different features in relation to the other features (Figure 4).

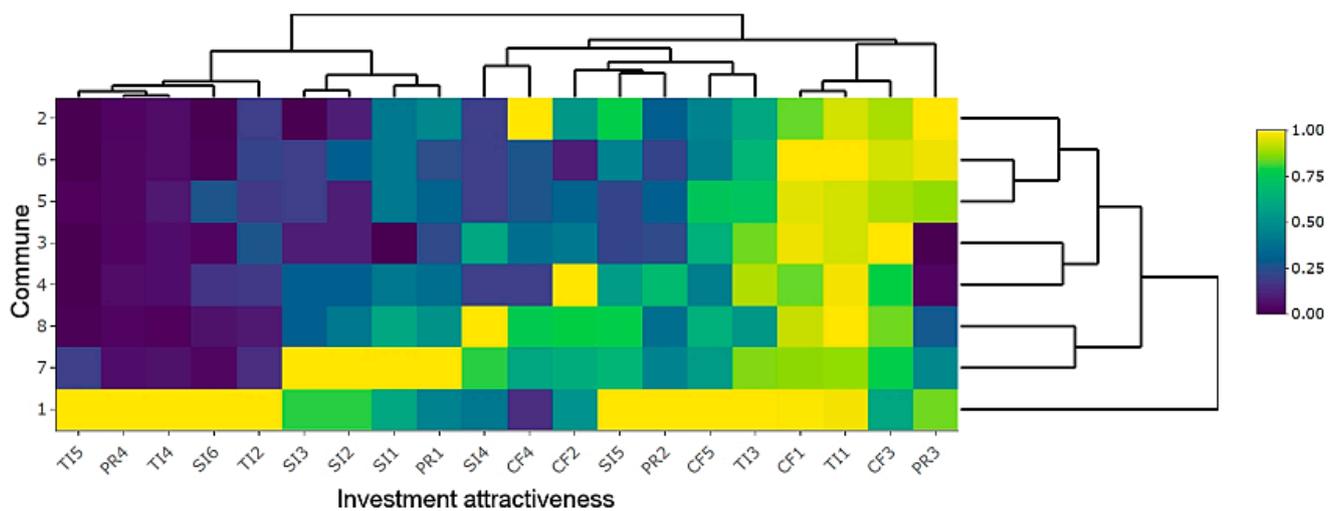


Figure 4. Heatmap and cluster analysis of features in investment attractiveness sphere for all communes.

4.3. Natura 2000 Network vs. Tourism and Investment Potential of Communes

The Trzcianka commune showed the greatest development potential in terms of tourism and investment (0.624). Compared to other communes, this commune was not the most attractive in terms of either tourism or investment. However, in both spheres, it obtained a similar value of indexes, which influenced the final value of the general synthetic measure of the potential. Interestingly, the Natura 2000 network share in the total area of the commune was the lowest in the county (12%). In second place was Wieleń (0.610), which attained the highest tourism attractiveness index and 58% coverage by the Natura 2000 network, followed by Czarnków (municipal commune) (0.557). A significant share of the investment attractiveness was observed in the general synthetic measure of the potential in the case of Czarnków (municipal commune). Due to its urban character, this commune has limited opportunities for the development of tourism, especially in the field of nature tourism. Further in the ranking were the communes of Czarnków (rural commune) (0.481), Krzyż Wielkopolski (0.443), Lubasz (0.439), and Drawsko (0.369). Apart from Czarnków (rural commune), these communes were characterized by a high proportion of the Natura 2000 network's area in the total area of the commune (from 56% to 78%). The commune with the lowest result was Połajewo (0.342). This commune was characterized by low tourism attractiveness. At the same time, its investment attractiveness was also one of the lower values observed in the county. The share of the Natura 2000 network in the area of this commune was only 26%, and it was a homogeneous forest (Figure 5).

Based on Spearman's rank correlation analysis, it was possible to indicate the relation between the proportion of the Natura 2000 network's area in the total area of communes and communes' tourism and investment attractiveness as well as a general synthetic measure of tourism and investment potential. The conducted analysis revealed no correlation between the Natura 2000 network and communes' tourism and investment potential. On the other hand, a negative correlation was observed between the proportion of the Natura 2000 network's area in the total area of the commune and investment attractiveness ($r = -0.714$, $p \leq 0.05$). Therefore, increasing the Natura 2000 network's share in the commune's area contributed to the decrease of its investment potential (Table 4).

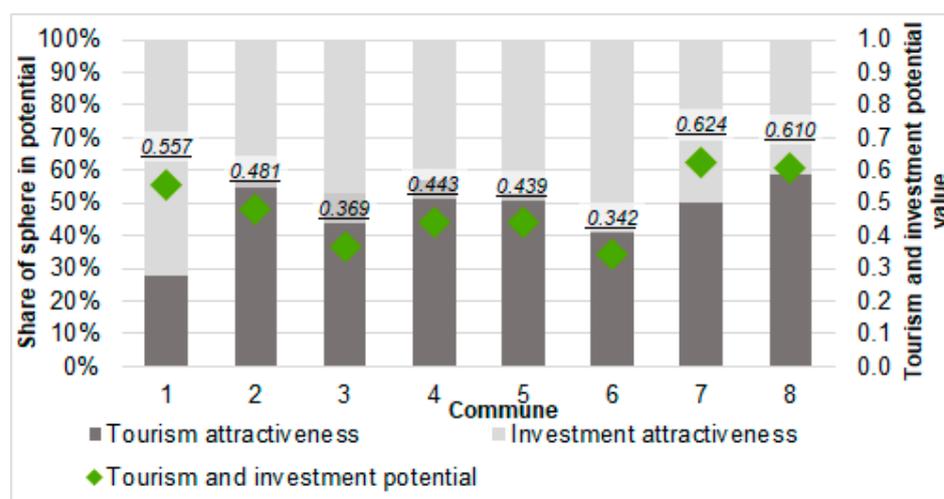


Figure 5. General synthetic measure of tourism and investment potential, where 1—Czarnków (municipal commune), 2—Czarnków (rural commune), 3—Drawsko, 4—Krzyż Wielkopolski, 5—Lubasz, 6—Połajewo, 7—Trzcianka, and 8—Wieleń.

Table 4. Spearman’s rank correlation coefficient between Natura 2000 network’s area, spheres, and general synthetic measure of tourism and investment potential.

	1	2	3	4
1 Natura 2000 network	1.000			
2 Tourism attractiveness	0.119	1.000		
3 Investment attractiveness	−0.714 *	0.262	1.000	
4 Tourism and investment potential	−0.381	0.738 *	0.762 *	1.000

* $p \leq 0.05$.

An analysis of the individual divisions revealed a negative correlation only between the share of Natura 2000 sites and the population relations ($r = -0.810$, $p \leq 0.05$), which took into account the population size and professional activity. Moreover, there was no statistically significant correlation between service and technical infrastructure, which are necessary for tourism development, as well as being important for potential developers (Table 5).

Table 5. Spearman’s rank correlation coefficient between Natura 2000 network’s area and divisions of investment attractiveness.

	1	2	3	4	5
1 Natura 2000 network	1.000				
2 Service infrastructure	−0.524	1.000			
3 Technical infrastructure	−0.310	0.452	1.000		
4 Population relations	−0.810 *	0.381	0.238	1.000	
5 Commune’s finances	0.119	−0.119	−0.238	−0.048	1.000

* $p \leq 0.05$.

5. Discussion

The conducted research allowed us to assess the tourism and investment potential of the Czarnkowsko-Trzcianecki County and examine the relationship between this potential and the Natura 2000 network. The county’s tourism and investment potential was definitely lower compared to the most attractive regions of Poland located on the coast or in the mountains [31]. The obtained values in the range from 0.342 to 0.624 were similar to the results obtained for counties in other parts of Poland, where similar features and Gołembski’s method were used [30–32]. The results were the most comparable with

the tourism and investment potential of Bielsko County (from 0.39 to 0.67) [32]. However, two communes in the analyzed county achieved potential values above 0.600—the communes of Trzcianka and Wieleń. In the case of Bielsko County, only one commune obtained a value above 0.600 (Czechowice-Dziedzice commune). In contrast, the other nine communes had a value below 0.500. The values of tourism and investment potential for Czarnkowsko-Trzcianecki County were within the values obtained for Lubaczowski County (from 0.274 to 0.702) [33] and Staszowski County (from 0.282 to 0.832) [30]. Both in the case of Lubaczowski and Staszowski County, as in the case of Bielsko County, only one commune obtained a higher value than the others. On the other hand, most communes ranged from 0.274 to 0.495, which was comparable with the values obtained for communes from Czarnkowsko-Trzcianecki County [30,33]. Moreover, the smaller range of the tourism and investment potential of the studied county suggests that the potential was more even in contrast to other counties. This means that each of the communes was similarly attractive. However, considering the value of the tourism and investment attractiveness indicator, some could be more attractive for tourism and others for investors. Some studies on the tourism and investment potential or tourism attractiveness showed that the highest values were found in communes that functioned as the county seat [30,32–34]. It is interesting that in the case of the analyzed county, this phenomenon was not observed. The commune of Czarnków (municipal commune), which is the county seat, was only in third place. Communes such as Trzcianka and Wieleń had greater potential, with a much larger area than the Czarnków (municipal commune). Moreover, the largest town in the county is located in the Trzcianka commune. On the other hand, the Czarnków (municipal commune) was characterized by the highest investment attractiveness, which was much higher than the other communes.

The studied Czarnkowsko-Trzcianecki County had an average tourism potential, which was also observed in previous publications of Czajkowski [28] and Horbaczevska [35] (data from 2011 and 2018). Despite different methods of assessing the tourism attractiveness of the commune, all studies indicated similar results. Valorization in terms of rural development and agritourism classified this county as an area with very good conditions for the development of agritourism, which has resources of national or international importance [36]. Both Czajkowski [28] and Przezbórska [36] emphasized the importance of natural conditions. According to Czajkowski [28], the county had numerous architectural monuments. However, nature and its resources can bring significant benefits to this region. Przezbórska [36] indicated the Czarnkowsko-Trzcianecki County as an area with very good conditions for developing agritourism, which has resources of national or international importance and is characterized by a low population density and a large share of forests and waters in the total area. In the conducted research, it can be observed especially in the case of the Wieleń commune, which focused on developing tourism infrastructure due to the favorable natural conditions, which contributed to the high tourism attractiveness. The investment attractiveness assessment showed that the communes of Czarnków (municipal commune) and Trzcianka are the most attractive in the county. The obtained results showed that Wieleń is more attractive in terms of investment than the commune of Krzyż Wielkopolski and the least attractive was the Drawsko commune. A similar tendency for Czarnków (municipal commune) and Trzcianka was observed by Konecka-Szydłowska and Kulczyńska [37] in studies conducted in 2000 and 2008, which showed the greatest diversification of the economic structure in major towns of these communes. However, these cities were classified as cities with an average level of socio-economic development in comparison to other cities in the Wielkopolskie Voivodeship. Moreover, the Krzyż Wielkopolski town represented a class with a low level of development, and Wieleń was a town with a very low level of development. Unfortunately, the towns from such communes as Czarnków (rural commune), Drawsko, Lubasz, and Połajewo were not analyzed [37].

The conducted research revealed that the Natura 2000 network had a negative impact on the investment attractiveness of communes in Czarnkowsko-Trzcianecki County. On the national scale, there were different relationships between Natura 2000 sites and

the investment attractiveness of the county, whereas, in the case of the Wielkopolskie voivodeship, no relationship was found [38]. Research where communes were the analyzed unit showed that rural communes with Natura 2000 sites did not differ in terms of socio-economic development from other units. It was found that Natura 2000 sites do not limit the socio-economic development of communes and only modify the way of preparing and implementing investments [39]. In addition, research conducted by Getzner and Jungmeier [21] indicated that protected areas might have significant implications for the regional economy. The impact of these areas on local development depends on assumptions about future development and actions taken by stakeholders. In conducted research, a negative relationship was observed between the Natura 2000 network and population relations (population figure and professional activity) in detailed analysis. Kołodziński [40] pointed out that the socio-economic development of protected areas is generally not very favorable due to the low degree of urbanization, low population density, insufficient number of non-agricultural economic entities, and high unemployment. Therefore, these are the factors that were taken into account in the division of population relations. In other studies, conducted on a national scale, significant but very low correlations between the Natura 2000 network and investment attractiveness of counties were noted in the category of labor resources, technical infrastructure, and social infrastructure [38]. Therefore, the investment attractiveness might be more often influenced by the status of an analyzed unit and its location than the share of Natura 2000 sites. No statistically significant relationship was observed between the proportion of the Natura 2000 network's area and its tourism attractiveness in the commune's area. On the other hand, many tourism trails are designated in protected areas, including areas belonging to the Natura 2000 network. According to Ciapała et al. [41], tourism and recreation are inherent elements in Natura 2000 sites, which may threaten the values of these areas. Therefore, it is important to take into account such activities when planning new Natura 2000 sites, as well as when managing the existing ones. Moreover, studies conducted by Rocchi et al. [18] indicated that only a few sites are suitable for nature-based tourism development. Therefore, Witkowski et al. [42] suggested supporting the development of less conflicting forms of tourism and recreation in or around Natura 2000 sites.

6. Conclusions

The evaluation of tourism and investment potential might be the first stage of a multi-criteria approach to planning the development of an administration unit. However, after evaluation of the potential, different options for sustainable development should be carefully examined. In the case of Czarnkowsko-Trzciancki County, the following development options can be considered by local councils:

- The Trzcianka and Wieleń communes, as examples of communes well developed in tourism and investment aspects, should continue to develop and work for socio-economic development by increasing tourism and investment attractiveness; tourism development is more recommended for the Wieleń commune;
- The Drawsko, Krzyż Wielkopolski, and Lubasz communes, as examples of communes with a large share of the Natura 2000 network in a river valley, should consider development based on tourism, especially water tourism; development in terms of investment is inadvisable, especially in the case of investments that might contribute to the degradation of the natural environment;
- The Czarnków (municipal commune), as an example of a commune with a low share of protected areas and well-developed infrastructure, should continue to develop in terms of investment; it is worth considering the development of cultural tourism as one of the elements of local development;
- The Czarnków (rural commune) and Połajewo communes, as examples of communes with low tourism and investment attractiveness, should conduct a more detailed analysis of development opportunities, including a survey of stakeholders' opinions, and then develop a local development policy.

The conducted research revealed that the Natura 2000 network did not impact tourism and investment potential. However, it had a negative impact on the investment attractiveness of communes. A detailed analysis showed a relationship only between Natura 2000 sites and social aspects, which are one of the elements of investment attractiveness. There were no limitations to investment development in the study area due to the poor condition of infrastructure or the commune's finances. Interestingly, no relationship was found between the proportion of the Natura 2000 network's area and its tourism attractiveness in the commune's area.

Further research, especially spatial analyses, requires verification of the distance from Natura 2000 sites, which may have an impact on the development of the commune: do communes in close range to the Natura 2000 sites (without investment restrictions) or communes with Natura 2000 sites have better opportunities for local development? Another interesting issue concerns those particular communes where, despite the presence of Natura 2000 sites, significant tourism and investment potential was observed. The question is which factor is more significant: the environmental values, or the socio-economic capital and co-financing from EU funds?

Supplementary Materials: The following are available online at <https://www.mdpi.com/article/10.3390/su132111668/s1>, Table S1: Divisions within which diagnostic variables and their weights and character.

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