Transformations of Tourist Functions in Urban Areas Territorially Linked with National Parks

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Abstract. The article analyses and attempts to assess the transformations related to tourist functions in urban municipalities territorially linked with national parks, in the years 2005-2016. The study covered eleven municipalities linked with seven national parks (NP) – Stołowe Mountains NP, Karkonosze NP, Tatra NP, Warta Mouth NP, Wielkopolska NP, Wolin NP, Słowiński NP. Based on the group of diagnostic features, characterizing tourist functions carried out by these cities (e.g. Gołębski’s index, Baretie and Defert index, Charvat index, accommodation density ratio), taxonomic density measures were constructed, which allow identifying the level of these functions’ development. The presented study is important for identifying distances between cities in terms of the selected development aspect in temporal and spatial perspective. The research can turn out useful in the planned city development and management.

1. Introduction

Cities, representing urbanized areas, are not associated with spatial forms of nature conservation. There are, however, as many as 11 urban municipalities and 31 urban-rural ones among 117 municipalities territorially linked with Polish national parks. The vicinity of a city and the naturally valuable ecosystems remains the aftermath of both natural determinants and factors depending on human knowledge and skills. Natural factors are predominantly related to terrain elevation and landforms, which limit the expansion of urban processes (e.g. paludification, steep slopes). The second group of factors includes settlement development patterns and the ability to quantify the level of anthropopression and environmental management processes in a particular area [1, 2]. Having taken into account the rule of local authorities influencing municipal development policy and its implementation, it can be stated that planning is one of the most important tools used in management processes, simultaneously affecting the ultimate shape of space and its protection [3]. The local plan represents the tool for spatial policy implementation, thus playing a crucial role in the decision-making process in a municipal scale. It also functions as the basic tool in the protection of ecosystems [4].

National parks exert a significant impact on local development – in particular by affecting the development of tourism [5, 6, 7, 8]. Therefore, the protected space and the city area are linked by a common tourist product. In the discussed context, it is worth emphasizing that the landscape affecting the attractiveness of leisure time remains the synthesis of both natural and cultural environment [9,10]. It can be assumed that the location of urban areas in the vicinity, or even within the space of national parks, represents an important element influencing high quality of life of their inhabitants [11].
The purpose of the article is to analyse and assess transformations occurring in the tourist function of eleven municipalities in Poland, in the years 2005-2016. These cities are territorially dispersed and linked with the following protected areas: Stołowe Mountains National Park (Kudowa Zdrój), Karkonosze National Park (Jelenia Góra, Karpacz, Kowary, Piechowice, Szklarska Poręba), Tatra National Park (Zakopane), Warta Mouth National Park (Kostrzyn nad Odrą), Wielkopolska National Park (Puszczykowo), Wolin National Park (Świnoujście) and Słowiński National Park (Łeba). The aforementioned cities are highly diversified in terms of size measured both by their population number and their area. The largest of them are Jelenia Góra (80.5 thousand residents in 2016, covering 109 km²) and Świnoujście (41.1 thousand residents, 197 km²). The smallest cities in terms of population number are Leba and Karpacz (3.7 thousand and 4.8 thousand, respectively), and in terms of the area covered Łeba and Puszczykowo (15 km² and 16 km²).

It is worth adding that the presented study is an extension and continuation of the research discussed in previous publications [12].

2. Research method. The construction of the synthetic measure of tourist function development in the analysed cities.

Synthetic measures of development are particularly useful as tools for performing comparisons of local and regional systems – they are recommended by e.g. Bal-Domańska [13], Malina [14], Malina and Zeliaś [15]. It is, therefore, founded to apply them in the research covering tourist function of selected cities.

The first stage of conducted research consisted in the selection of features characteristic for the level of tourist function development in the analysed cities. The study uses the following diagnostic variables:

1) Number of enterprises in tourism sector / number of residents x 100 (Gołębski’s index);
2) Number of enterprises in tourism sector / number of all enterprises in the municipality x 100;
3) Number of enterprises in the tourism sector / 1 km²;
4) Number of accommodation places / number of residents x 100 (Baretie and Defert index);
5) Tourist occupancy rate / number of residents x 100 (Charvat index);
6) Number of accommodation places / 1 km² (occupancy density ratio).

At this stage of research, the coefficient of variation $V_j$ was calculated for every analysed feature. Quasi-permanent variables did not occur; thus all characteristics were included in further proceedings. It should be emphasized that all variables present the nature of stimulants.

Table 1. The set of diagnostic variables and their values

| City/feature | Gołębski’s index | Number of enterprises in tourism sector / number of all enterprises in the municipality x 100 | Number of enterprises in tourism sector / 1 km² | Baretie and Defert index | Charvat index | Occupancy density ratio |
|--------------|------------------|----------------------------------------------------|-----------------------------------------------|--------------------------|----------------|-------------------------|
| Karpacz (2005) | 5.69             | 28.83                                               | 757.89                                        | 132.88                   | 11225.03       | 176.87                  |
| Kowary (2005)  | 0.54             | 4.72                                                | 172.97                                        | 3.60                     | 281.97         | 11.57                   |
| Piechowice (2005) | 0.69                | 5.87                                               | 104.65                                        | 6.36                     | 974.46         | 9.63                    |
| Szklarska Poręba (2005) | 3.86                    | 24.95                                               | 360.53                                        | 72.43                    | 7098.04        | 67.72                   |
| Kudowa-Zdrój (2005) | 1.02                    | 9.55                                               | 305.88                                        | 15.10                    | 1310.55        | 45.41                   |
| Jelenia Góra (2005) | 0.51                     | 3.48                                               | 404.59                                        | 2.51                     | 253.16         | 20.02                   |
| City/feature         | Gołębski’s index | Number of enterprises in tourism sector / number of all enterprises in the municipality x 100 | Number of enterprises in tourism sector / 1 km² | Baretie and Defert index | Charvat index | Occupancy density ratio |
|----------------------|------------------|------------------------------------------------------------------------------------------------|-----------------------------------------------|--------------------------|-----------------|------------------------|
| Kostrzyn nad Odra    | 0.65             | 6.04                                                                                          | 246.81                                         | 0.77                     | 89.96           | 2.89                   |
| Zakopane             | 4.54             | 23.88                                                                                         | 1491.67                                        | 30.46                    | 4207.78         | 100.13                 |
| Leba                 | 18.47            | 52.29                                                                                         | 4720.00                                        | 304.10                   | 14215.50        | 777.07                 |
| Puszczykowo          | 0.46             | 2.83                                                                                          | 252.94                                         | 2.01                     | 225.51          | 10.94                  |
| Świnoujście          | 1.39             | 8.67                                                                                          | 291.79                                         | 19.15                    | 2274.64         | 40.20                  |
| Karpacz             | 7.30             | 8.99                                                                                          | 892.31                                         | 231.82                   | 17522.51        | 283.54                 |
| Kowary               | 0.47             | 4.11                                                                                          | 143.24                                         | 2.67                     | 143.27          | 8.08                   |
| Piechowice           | 0.79             | 6.52                                                                                          | 116.28                                         | 8.61                     | 535.95          | 12.74                  |
| Szklarska Poręba    | 4.65             | 24.58                                                                                         | 412.00                                         | 74.36                    | 5870.15         | 65.95                  |
| Kudowa-Zdrój        | 1.21             | 11.56                                                                                         | 358.82                                         | 32.85                    | 3718.85         | 97.44                  |
| Jelenia Góra       | 0.53             | 3.33                                                                                          | 388.07                                         | 2.87                     | 364.96          | 21.19                  |
| Kostrzyn nad Odra    | 0.47             | 3.79                                                                                          | 182.61                                         | 1.47                     | 166.17          | 5.78                   |
| Zakopane             | 5.20             | 24.41                                                                                         | 1690.48                                        | 43.83                    | 5048.36         | 142.48                 |
| Leba                 | 18.64            | 54.46                                                                                         | 4640.00                                        | 251.07                   | 12209.79        | 625.00                 |
| Puszczykowo          | 0.58             | 2.83                                                                                          | 350.00                                         | 1.75                     | 238.70          | 10.63                  |
| Świnoujście          | 1.33             | 8.69                                                                                          | 277.66                                         | 26.49                    | 3491.70         | 55.28                  |

Source: authors’ compilation based on the Central Statistical Office database.

In the course of the second stage of research the level of tourist function development in cities was analysed using the non-model synthetic measure $h_i$. Applying synthetic measures allows quantification using a single number, the status of a particular phenomenon development describing which usually requires using many diagnostic features. As a result, it is possible to carry out comparative analyses and to arrange objects in terms of their development level [16]. Synthetic measures represent a valuable instrument for analysing various manifestations of socio-economic transformations, including their spatial aspect.

The arithmetic mean of normalized values is expressed by $h_i$ ratio. The obtained measures are normalized in $<0;1>$ interval. The higher the given measure value the higher the object’s position in the developed ranking.

In order to standardize the units of measurement of individual characteristics and their orders of magnitude, the normalization was carried out in accordance with formula 1:
\[ z_{ij} = \frac{x_{ij}}{\max_i x_{ij}} \quad (i = 1, \ldots, n \ j = 1, \ldots, p) \quad (1) \]

where:
- \( z_{ij} \) – the normalized value of \( i \)-th object for \( X_j \) feature
- \( x_{ij} \) – the value of \( i \)-th object for \( X_j \) feature

Next \( h_i \) measures for the analysed cities were calculated using formula 2:

\[ h_i = \frac{1}{p} \sum_{j=1}^{p} z_{ij} \quad (i = 1, \ldots, n) \quad (2) \]

where:
- \( h_i \) – the value of non-model synthetic measure in \( i \)-th object
- \( p \) – number of features.

As it has already been mentioned in the introduction, a similar methodology addressing the tourist function management was applied in earlier studies, and similar sets of characteristics were also used in analysing tourist functions by other authors [17, 18].

3. Research results

As a result of the conducted research the following values of synthetic measures were obtained for the studied cities (table 2):

| Locality / year          | 2005 | 2016 |
|--------------------------|------|------|
| Karpacz                  | 0.38 | 0.48 |
| Kowary                   | 0.03 | 0.03 |
| Piechowice               | 0.04 | 0.04 |
| Szkłarska Poręba        | 0.25 | 0.24 |
| Kudowa-Zdrój             | 0.08 | 0.13 |
| Jelenia Góra             | 0.04 | 0.04 |
| Kostrzyn nad Odrą        | 0.03 | 0.03 |
| Zakopane                 | 0.24 | 0.28 |
| Łeba                     | 0.96 | 0.88 |
| Puszczykowo              | 0.03 | 0.03 |
| Świnoujście              | 0.09 | 0.11 |

Source: authors’ compilation

The unquestionable ranking leader, characterized by the highest level of the tourist function development, both in 2005 and in 2016, was of Łeba located on the Baltic Sea and linked with Słowiński National Park. The tourist values, offered by the city, harmonized with its location advantages generating tourist traffic. It is, however, worth observing that in relation to the other analysed cities, the scope of tourist functions’ implementation recorded a slight decline. Karpacz, the traditional centre of mountain tourism and winter sports, located in the south-western part of Poland was ranked the second. Karpacz, contrary to Łeba, recorded the analysed function development, which does not change Łeba’s significant dominance in this area. Zakopane is the third city recording a significant increase in the tourist function, comparing to other cities. Similarly, to Karpacz, Zakopane
is a traditional mountain resort, which has been explored in this respect since at least the 90s of the 19th century, representing the centre of mountain tourism and winter sports.

Among the cities in which the importance of tourism can be described as significant the following should also be listed: Szklarska Poręba, and ex aequo Kudowa Zdrój and Świnoujście. Interestingly, Karpacz and Szklarska Poręba located close to each other, offering similar qualities and traditionally competing with each other, differ significantly in the intensity of their tourist function. It seems that such situation may be an indication of both commitment and effective city management by the local authorities. The cities characterized by an equally similar, low and stable level of the analysed function implementation are Kowary, Kostrzyn nad Odrą, Puszczykowo and ranked at slightly better positions Piechowice and Jelenia Góra.

It should be emphasized that national parks, apart from their nature protection function, are obliged by law to provide tourist areas and conduct environmental education. Such activity, obviously, promotes the territorially linked municipalities – as the driving force supporting the development of tourist function. It is a kind of counterbalance against the limitations imposed on using the protected area. The scale of activities performed by national parks is reflected in the annual number of tourists visiting the protected area and the number of people taking advantage of the environmental education offer (Tab. 3). The analysed units differ significantly from each other – the Tatra National Park is definitely the dominating one. The Warta Mouth National Park is the least popular among the studied units. It is worth highlighting, however, that despite the relatively small number of visitors this Park is highly involved in dynamic educational activities – the number of people participating in environmental education amounts to more than half of the educational sites’ visitors in the Wielkopolski National Park.

| National Park       | Number of tourists (in thousands) | Number of visitors to educational sites (in thousands) |
|---------------------|----------------------------------|------------------------------------------------------|
| Stołowe Mountains   | 550.0                            | 17.4                                                 |
| Karkonosze          | 2 000.0                          | 67.8                                                 |
| Słowiński           | 323.4                            | 16.1                                                 |
| Tatra               | 3 683.1                          | 131.3                                                |
| Warta Mouth         | 43.2                             | 5.0                                                  |
| Wielkopolska        | 1 200.0                          | 9.1                                                  |
| Wolin               | 1 500.0                          | 28.1                                                 |

Source: author’s compilation based on the data collected from national parks

The Spearman's rank correlation coefficient was also applied to analyse correlation between the municipal area within the national park borders (%) (Tab. 4) and the level of tourist function development measured using non-model synthetic measure (Tab. 2). This coefficient takes numerical values in the closed range -1 to +1. Since rS = 0.65, a strong positive correlation between these values can be identified. Therefore, a conclusion can be drawn that, contrary to common opinions, spatial forms of nature conservation do not inhibit the tourist function development.
Table 4. National park area in the analysed municipalities (data for 2016)

| National Park (NP) | Location     | Municipal area in ha | NP area in a municipality in ha | Municipal area within the NP borders in % |
|--------------------|--------------|----------------------|-------------------------------|------------------------------------------|
| Stołowe Mountains  | Kudowa Zdrój | 3 390                | 1 085                         | 32                                       |
| Karkonosze         | Jelenia Góra | 10 922               | 1 714                         | 16                                       |
|                    | Karpacz     | 3 799                | 2 014                         | 53                                       |
|                    | Kowary      | 3 739                | 134                           | 4                                        |
|                    | Piechowice  | 4 322                | 508                           | 12                                       |
|                    | Szklarska Poręba | 7 544           | 1 035                         | 14                                       |
| Słowiński          | Leba        | 1 481                | 361                           | 24                                       |
| Tatra              | Zakopane    | 8 426                | 5 071                         | 60                                       |
| Warta Mouth        | Kostrzyn nad Odra | 4 614          | 57                            | 1                                        |
| Wielkopolska       | Puszczykowo | 1 639                | 703                           | 43                                       |
| Wolin              | Świnoujście | 19 723               | 2 499                         | 13                                       |

Source: authors’ compilation based on the Central Statistical Office database.

4. Conclusions
The analysis covered tourist function transformations in eleven urban municipalities linked with national parks. These cities were characterized by a considerable diversification in the level of the studied phenomenon.

A broader analysis allows concluding that tourism exerted an extensive impact on the economy in four out of eleven analysed cities. Leba, Karpacz, Zakopane, Szklarska Poręba were characterized by the significantly higher measure value than the average one, characteristic for the entire group. These cities represent recognizable, in a national scale, tourist centres also gaining international popularity. The local strategic documents provide direct indications regarding their further development be based on the tourist function. It is worth observing that these cities are relatively small and have excellent advantages in terms of their location (mountains, sea), which allows adopting such development path. Kudowa-Zdrój and Świnoujście also have recognizable brands on the domestic tourism market [19, 20], additionally Świnoujście located directly at the Polish-German border also hosts numerous foreign tourists. However, the scale of the discussed function implementation is much lower in these cities than in the first distinguished group. In the case of Świnoujście it can be justified, to a certain extent, by the size of the city and its industrial function, owing to which a large group of residents finds employment – Świnoujście hosts Polish reloading terminal and liquefied natural gas (LNG) regasification terminal. In the case of Kudowa-Zdrój it may be related to the unsatisfactory technical condition of tourist infrastructure, including accommodation facilities and some communication exclusion of the Kłodzko Valley area. There is a chance that the investments undertaken in these areas will, to some extent, eliminate the problem.

The development of Piechowice, Jelenia Góra, Puszczykowo, Kowary and Kostrzyn depends on their tourist function only to small extent. It may result from an economic weakness and general stagnation in some of these cities, e.g. in Kowary [cf. 21, 22], or from focusing their development trajectory on other functions. For example, Jelenia Góra is a multifunctional city [cf. 23], which has been experiencing a dynamically developing industrial sector in recent years. In each case, however, it has taken no advantage or insufficient advantage of the assets at the disposal – i.e. development factors.

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