The Connection Between Accessibility and Tourism

Géza Tóth*
Lóránt Dávid**

RESEARCH into the connection between tourism and public road accessibility raises a rather large number of methodology-related problems. Thus, the authors do not intend to study this connection, but rather its features and components by applying a loglinear model to the tourism regions of Hungary. In the second part of the analysis, the authors also intend to estimate, by applying the gravitation model, the extent of domestic multi-day holidays with a comparison of estimated and real values. Through this, the authors attempt to reveal the characteristics of domestic tourist flows in Hungary. This study also indicates no absolute connection between the improvement of accessibility and the increase of tourism-generated incomes. Incomes from international tourism are far more susceptible to favourable accessibility than domestic ones. In the context of the size of incomes, the role of interaction between the regions and accessibility groups is also relevant. For this, the authors conclude that for all four accessibility groups – both domestic and international tourism incomes – at the same regions is the highest the multiplier. The difference was found in the value of multipliers indicating differences among the regions and in accessibility between the domestic and international incomes. Based upon the difference between the theoretical and actual tourist flows, we conclude that in the Hungarian context, theoretical flows are somewhat higher compared to actual ones. Among the origin planning-statistical regions, primarily their economic development is of decisive in importance, thus mainly the role of Central Hungarian and the Transdanubian regions can be mentioned. Of the tourism-recipient regions, the Budapest-Central Danube Basin region is outstanding. Similarly, positive deviation is seen in the cases of the Lake Balaton, Western Transdanubia and the Lake Tisza regions, reflecting possibilities for their development. Conversely, the number of domestic tourists visiting the three East-Hungarian tourism regions is lower than the theoretical value.

Key Words: Accessibility, Tourism, Loglinear Model, Gravitation Model, Hungary.

Introduction

The system of tourism regions in Hungary was established in 1998. During the setting up of these regions, the NUTS2 level of European planning-statistical regions was used as a reference. However, the boundaries of these European regions were modified when the tourism regions were established, as the latter made use of existing and coherent holiday districts. As a result, nine tourism regions were established by altering the seven planning-statistical regions. The most important difference between the NUTS2 and resulting tourism regions is that the Lake Balaton Tourism Region, being the second most relevant destination after the Budapest-Central Danube Basin Region, was created from parts of the Central and South Transdanubian and West Pannonian planning-statistical regions. Additionally, the Lake Tisza Tourism Region was created out of settlements in the NUTS2 Northern Hungarian and Northern Great Plain Regions. Though the smallest of such regions, the Lake Tisza Tourism Region underlined how its touristic character differentiated it from its surroundings. Finally, another important difference occurred in the Budapest-Central Danube Basin Tourism Region, which includes not only the NUTS2 level Central Hungary Region, but further incorporates settlements from the Danube Bend Resort District in the Northern Hungarian and Central Transdanubian Regions.

Transport and Tourism

Transport is one of the fundamental preconditions for the existence of tourism. It is a key element that links tourists to destinations to be accessed. Though the connection between tourism and transport previously has been widely examined (Lumsdon and Page 2004; Sharpley 2006; Hall 2005; Gössling and Hall 2006) there are still significant gaps in this research topic. As pointed out by

Knowles (1993), in many cases researchers have taken transport into account as a passive element in tourism, not as an integral part of tourism activities. Otherwise as it analysed by Page and Getz (1997) "To some individual rural tourism businesses, like restaurants and retailing high volume accessibility is essential."

At the interface of transport and tourism, Hall and Page (1999) identify four fields to be studied: the link between source market and host destination, mobility provision and access within the destination, mobility provision and access within an area with a relevant tourist attraction, and the advancement of journeys along a recreation route itself as also representing a tourism experience.

One of the methodologically most complicated issues of studying the connection between transport and tourism is how to separate tourist flows from transport capacities. There are several branches of transport that are used by residents by choice therefore it is rather hard to have roles divided.

The fundamental connection between leisure and transport was defined by Halsall (1992). According to the author, transport is an essential part of tourist (recreational) behaviour and, additionally, it advances the achievement of recreation objectives while representing a recreational activity itself. The continuous decrease in relative travel costs and distances dramatically increases demands for recreational travel. The increasing use of car for tourism especially has increased real travel distances.

While studying the spatial impacts of transport and within those that on tourism, the approach where consequently land-use questions and system are mentioned has become widespread elucidating that an assessable, close and correlative system of connections are discussed. In this context, accessibility determines the degree to which the land-use - transport system enables individuals (and their groups), as well as goods to reach various activities/ destinations (Geurs and Ritsema Report, 2001).

"In tourism, accessibility is a function of distance from centres of population, which constitute tourist markets and of external transport, which enables a destination to be reached. It is measured in terms of distance travelled, the time taken or the cost involved." (Medlik 2003)

The core of the theoretical model (Figure 1) is represented by the land-use - transport system, in other words, the interdependent systems of land-use and transport. Here, this model primarily is intended to be propounded from the point of view of tourism. The land-use subsystem contains the spatial distribution of land-use types (e.g. the character of land-use, built-up density and its spatial differences, the locations and features of tourism destinations). The other component of this subsystem includes the sites of human activities (such is the spatial distribution of all components of recreation activities).

Land-use and the activities indicated are connected by a two-way subsystem: the spatial distribution of activities will define land-use that also responds to activities and their spatial distribution. Or, in other words, the land-use of tourism destinations is mutually defined by both their characters and built-up and the exact sites of recreation activities.

The transport subsystem includes demand for transport (tourist flows) and services provided by the infrastructure (the physical features of infrastructure, e.g. capacity, speed limits; features of the use of infrastructure, e.g. temporal changes in the traffic of the given road-section, timetables of public transport, etc.).

There is also a two-way system of connections existing between the demand for transport and services provided by the infrastructure. These latter ones will determine the character and extent of transport demand (through time, cost and other components). Demand for transport will further impact the quality of the service provided by the infrastructure, the service level.

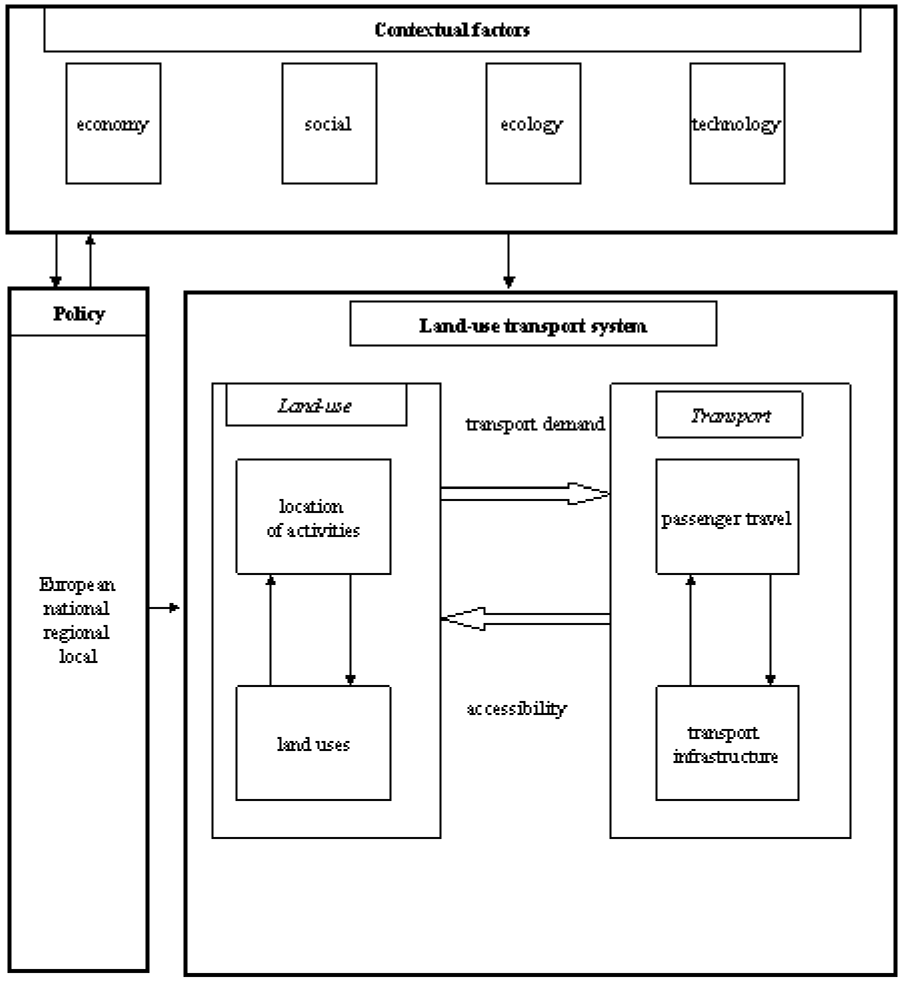


Figure 1: A Theoretical Model of the Land-use – Transport System

Source: Geurs and Ritsema 2001.

The land-use and transport subsystems are connected by a two-way system of connections as well: the spatial distribution of tourism destinations will induce demand in the transport system to overcome distances between the home location and the destination to be accessed. Rather, the accessibility of given locations will determine the travel decisions of individuals and households also resulting in changes in the land-use subsystem.

Contextual factors also fundamentally define the functioning and impacts of the land-use – transport system with reference to tourism. Such factors include various features of the economy (the level of economic growth, primarily regarding the areas of tourist origin); demographic, sociological and cultural features of the population (e.g. distribution of the population by age and incomes, (transport) demands and preferences of the population); the state of the environment (natural resources as, e.g. the amount of fossil fuels used, the environmental quality of the area); technological development (information and communication technologies, vehicle technology). Last, but not least, political decisions will impact the land-use – transport system both directly (by developments in the transport infrastructure, taxes on fuels, local decisions) and indirectly, through contextual factors.

Regional processes result from the land-use – transport system, contextual factors and political decisions. A task of geography or regional science is to explore the impacts of such processes, as well as to evaluate them by applying certain methods whenever possible. Indicators for such evaluations can be classified into two groups. The first group includes indicators describing connections within the land-use – transport system; they are also called intermediary indicators (the proper indicators of accessibility are classified here). The second group includes indicators originating from outside the specified system, in other words, these ones attempt to represent impacts in a broader context (here, social-economic-environmental indicators that intend to demonstrate the place and processes of the entire land-use – transport system are included).

Travel cost is a calculated component of tourism selection; however, distance is only one of the many criteria upon which a target destination is selected. Several tourism destinations are popular and developed despite being at a relatively great distance from their competitors and markets. In many cases, poor accessibility is overcome by other pull factors, and it is even plausible that inaccessibility can represent the pull factor itself.

According to a hypothesis, tourists tend to select destinations to be accessed first based on local possibilities and attractions. Within this decision-making process, destinations with similar endowments are consider-ed. Once the initial choice has been made, tourists will compare destinations based on their accessibility. Thus, accessibility has a primary role in selecting potential destinations. On the other hand, destinations providing competitive advantages for tourists can still attract a significant number of tourists even with relatively poor accessibility. The problem of accessibility therefore is relevant for destinations of similar attributes (e.g., seaside resorts), and less relevant for those sites with unique attractions (e.g., historic towns, spas). Good accessibility itself will not represent a source of competitiveness.

The Role of Accessibility in the Incomes from Tourist Accounts

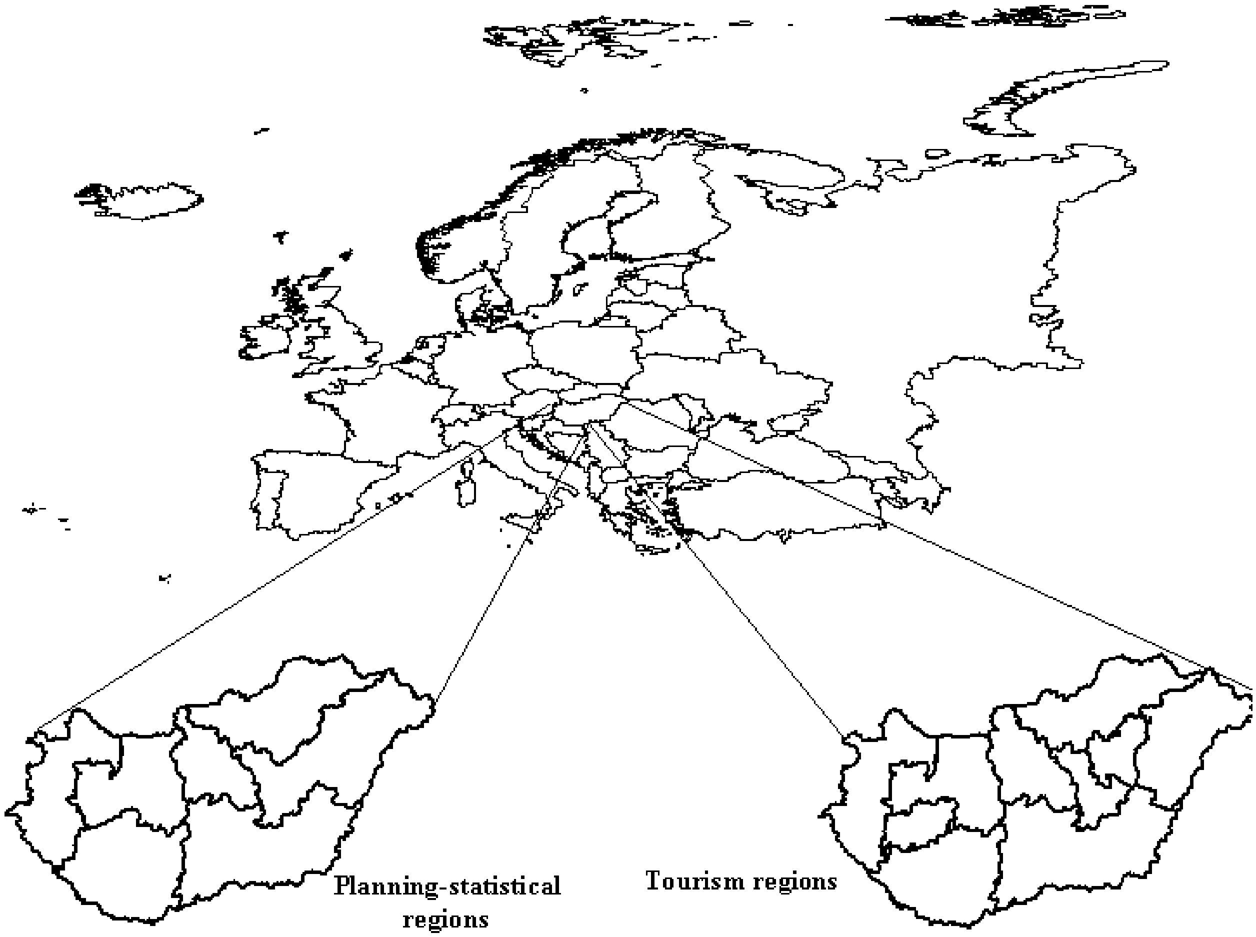
Our study aims to explore to what extent tourism incomes from accommodation receipts is connected to accessible public roads, or whether it is primarily dependent on the local characteristics of the given regions.

As stated above, the system of nine tourism regions in Hungary was established in 1998 based upon the seven European NUTS2 level statistical regions with some modifications made for existing tourism districts. Figure 2 illustrates the differences between these two systems. In this study, primarily the 1998 classification will be used.

Before studying the topic of accessibility and tourism in detail, it should be emphasized that the location of some Hungarian tourism destinations (e.g. thermal baths, health resorts) are not linked to the more relevant transport corridors that primarily connect settlements with a higher density of population and better economic potential. A further issue is represented by the extreme concentration of organised tourism. Of the country's 3167 settlements, only approximately 700 have organised tourism available (public accommodation establishments), while 78 percent of this is distributed among 30 settlements.

The accessibility model is based upon the relationship of settlements to the public road network as of 1 January 2007. The settlements of Hungary are classified into four accessibility groups (Figure 3) as follows:

- Group 1: settlements located 10 km or closer to motorways;
- Group 2: settlements located 10 km or closer to major roads and trunk roads;
- Group 3: settlements located 10 km or closer to secondary roads;
- Group 4: all remaining settlements.


Planning-statistical regions
Tourism regions

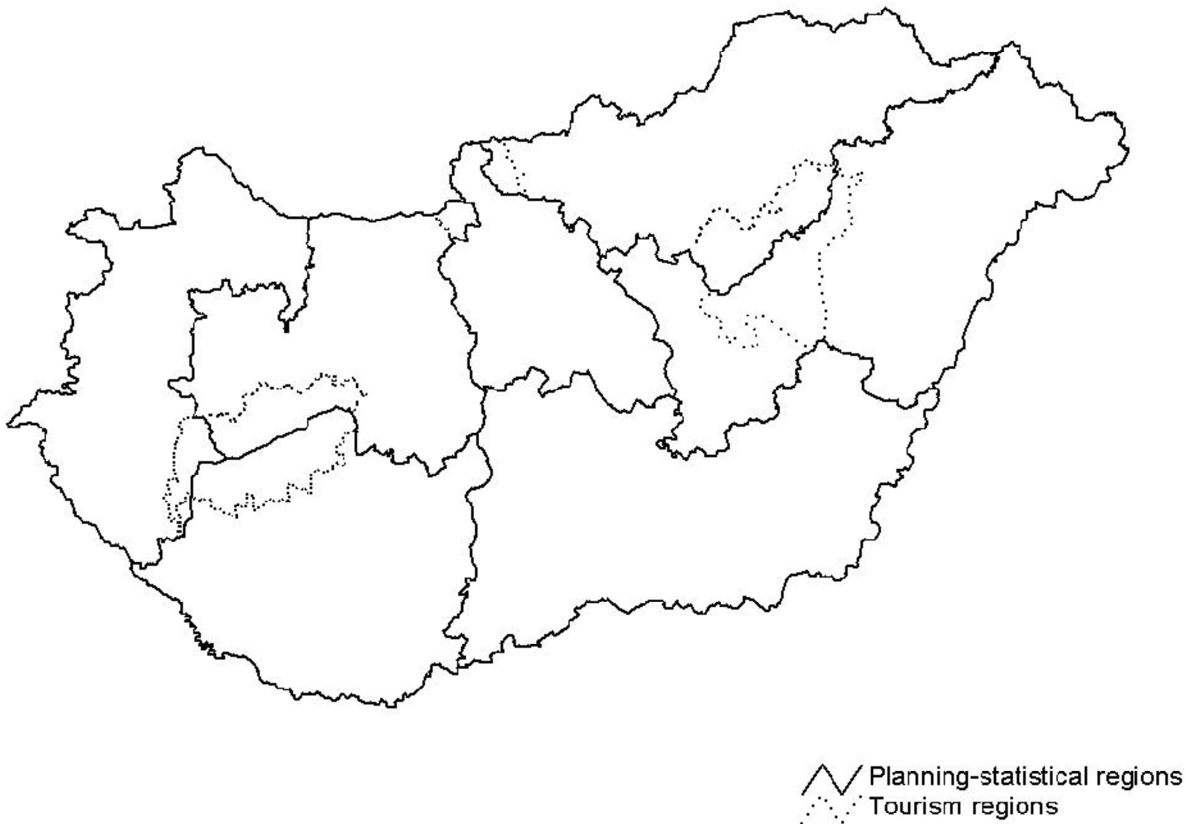


Figure 2: Differences between the Planning-statistical and Tourism Regions in Hungary

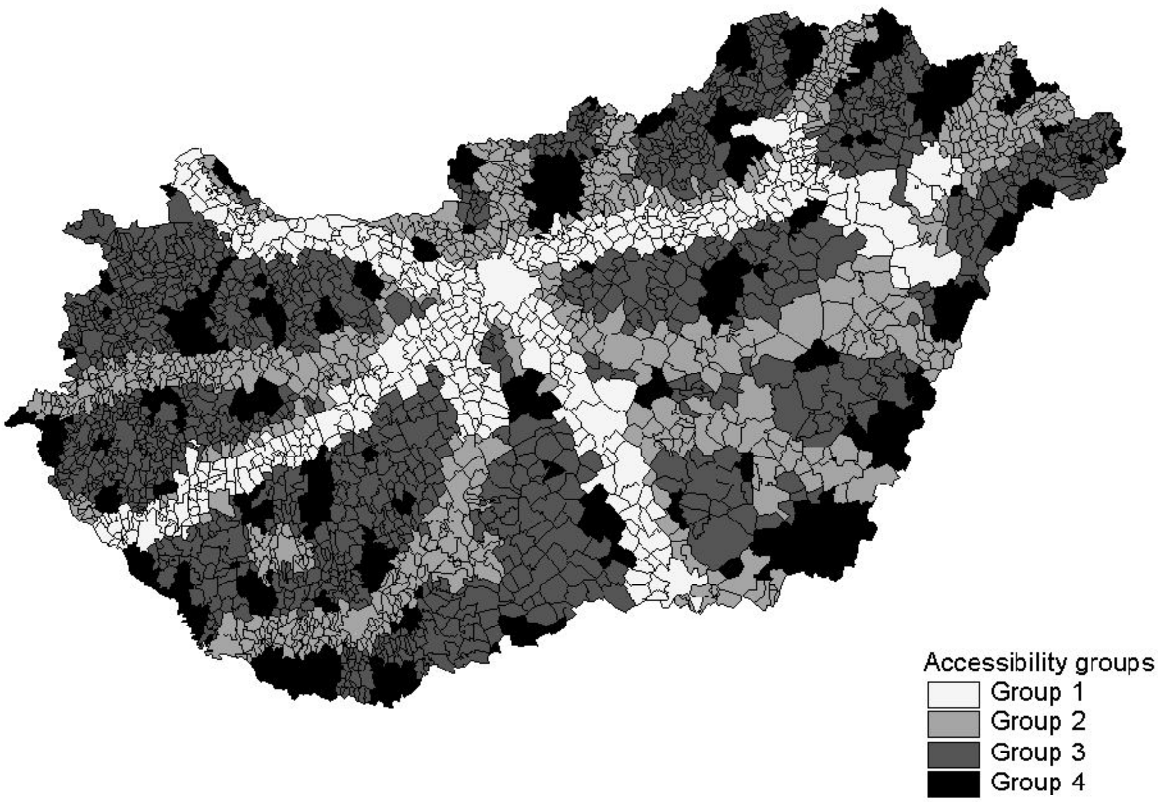


Figure 3: The Settlements of Hungary as a Function of the Public Road Network, 2007

Where there is no destination due to the lack of tourist attractions, it will not be established even as a result of a potential infrastructural development. Our research primarily intends to examine to what degree incomes from a destination depend upon the public road network and local conditions in cases where there is an existing tourist attraction.

As a hypothesis, we assume that there may be a connection between accessibility by public roads and the rate of incomes from tourist accounts (i.e. incomes of public accommodation establishments). In our study, the extent and components of this will be analysed by applying the loglinear model.

The Loglinear Theoretical Model

The loglinear model examines when and in which context our variables are interdependent on each other. The method interprets the connection between variables as follows: in case any of the variables fall into any of the defined categories then this makes the likelihood of such variables falling into another category according to other features high. Such attribution is usually called interaction between the variables (Füstös 1985).

An average contingency table is taken as a starting point (Tables 1 and 2). As, at present, no settlements in the Southern Transdanubia Tourism Region can be classified into the accessibility Group 1, for methodological reasons the unavailable data had to be replaced. This was achieved by placing the minimum values of the contingency table into the empty cells.

Table 1: The Share of Domestic Incomes from Public Accommodation Establishments in 2007 (%)

Accessibility groups	Tourism regions: Budapest–Central Danube Basin	Northern Hungary	Northern Great Plain	Lake Tisza	Southern Great Plain	Central Transda-nubia	Lake Balaton	Southern Transdan-nubia	West Tran nu
Group 1	14.1	3.4	3.7	0.2	3.0	2.5	12.9	–	1.
Group 2	1.7	0.5	6.2	0.0	2.5	1.3	5.7	3.3	0.
Group 3	2.8	6.1	0.7	0.3	1.2	1.5	6.9	2.2	10
Group 4	0.3	1.9	0.1	0.6	0.3	0.2	0.0	0.8	0.
In total	18.9	11.9	10.7	1.1	7.1	5.6	25.5	6.3	12

Source: Calculations based on Data of the Hungarian Central Statistical Office.

Table 2: The Share of International Incomes from Public Accommodation Establishments in 2007 (%)

Accessibility groups	Tourism regions: Budapest–Central Danube Basin	Northern Hungary	Northern Great Plain	Lake Tisza	Southern Great Plain	Central Transda-nubia	Lake Balaton	Southern Transdan-nubia	West Tran nu
Group 1	75.5	0.6	0.9	0.1	1.0	1.7	2.7	–	1.
Group 2	0.4	0.0	1.8	0.0	0.2	0.4	2.0	0.7	0.
Group 3	0.1	0.8	0.2	0.0	0.3	0.3	4.2	0.5	3.
Group 4	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.1	0.
In total	76.1	1.5	2.8	0.2	1.6	2.3	8.9	1.3	5.

Source: Calculations based on Data of the Hungarian Central Statistical Office.

X and Y represent two (random) variables with range carriers with I and J elements, in which:

$$p_{ij}=P(X=x_i, Y=y_j).$$

$$m_{ij}=n\times p_{ij}$$

in other words, mij is a general element of the contingency table, and

$$\xi_{ij}=\log(m_{ij}).$$

Having the logarithms of all elements of the contingency table taken, a ξ-table or in another approach a matrix will be obtained.

According to the notation generally applied, the calculation of any optional rows or columns of the table and the mean of the whole table can be described by the formulae below:

$$\xi_{i*} = \frac{\sum_j \xi_{ij}}{J}, \quad \xi_{*j} = \frac{\sum_i \xi_{ij}}{I}, \xi_{**} = \frac{\sum_i \sum_j \xi_{ij}}{I \cdot J}$$

Consequently, any element of this new table containing the logarithms of the original table can be noted in the following form:

$$\xi_{ij} = \xi_{**} + (\xi_{i*} - \xi_{**}) + (\xi_{*j} - \xi_{**}) + \left[\xi_{ij} - (\xi_{i*} - \xi_{**}) - (\xi_{*j} - \xi_{**}) - \xi_{**}\right]$$

This can be interpreted as (any elements can be generated) as a sum of the total average, the average analogous to the given row, the average analogous to the given column and the appropriate row-column interaction.

Where m_{ij} is the actual number of cases in cells i-j, I is the tourism region (i=9), J is the accessibility category (j=4) (Figure 3), ξ_{i*} is the logarithm of domestic and international incomes from accommodation fees of tourism region No. i for the various accessibility groups, ξ_{*j} is the logarithm of domestic and international incomes from accommodation fees for accessibility group No. j for the various tourism region, and ξ_{ij} is the likelihood that the observed international or domestic income from accommodation fees will fall into the cells i-j of the table, compared to the probabilities defined by all secondary parameters above.

Having $\xi_{ij}=\log(m_{ij})$ replaced into the relationship above, an additive formula is obtained as below:

$$\log m_{ij} = \mu + \lambda_i^x + \lambda_j^y + \lambda_{ij}^{xy}$$

$$m_{ij} = e^{\mu} \cdot e^{\lambda_i^x} \cdot e^{\lambda_j^y} \cdot e^{\lambda_{ij}^{xy}}$$

where μ marks the total average, i-indexed λ is the effect of row, j-indexed λ is the effect of column whereas the ij index marks the interaction.

The advantages of this resolution are demonstrated by the following formulae; i.e a resolution was applied where the effects of row and column and the interactions will sum zero or, in other words, their impact on the whole table is zero:

$$\sum_i \lambda_i^x = \sum_j \lambda_j^y = 0 \quad (\prod_i e^{\lambda_i^x} = 1)$$

$$\sum_i \lambda_{ij}^{xy} = \sum_j \lambda_{ij}^{xy} = 0$$

By applying the loglinear model, two cases (i.e. the spatial distribution of domestic and international incomes) were analysed. Our null-hypothesis was that our data was independent, in other words, there was no interaction between the two variables either in the international or in the domestic incomes from accommodation fees. According to this hypothesis, the saturated model (containing all interactions, i.e. in this case the accessibility-region interaction) and the model without interaction will fit each other. Tourism regions will be marked as A, accessibility groups as B.

Results of the Loglinear Model

The threshold $\chi 2$ value (to the level of 95%) is 5.99, however our data indicated values much higher thus values derived by neglecting interactions do not fit the original table of convergence and the null-hypothesis is rejected. In other words, the tourism regions and the accessibility groups, when compared with the Hungarian and international incomes, are not independent from each other, and the actual data cannot be explained by the (exception) of interaction between the two variables.

Hereafter, we aimed to explore the regions' and the accessibility's provable as well as quantifiable impacts on the Hungarian and international incomes of public accommodation establishments. Our study was conducted for the year 2007. The value of e^{μ} in the table according to domestic incomes is 530,762, whereas that of international ones is 122,542. The following table (Table 3) contains the power of e of the appropriate interactions. Consequently, by the following e^{μ} values and the table calculated, basic data for the previous tables can be generated (Tables 1-2).

For example, the incomes from accommodation fees by Hungarian tourists of the settlements for accessibility Group 1 of the Budapest-Central Danube Basin Tourism Region can be obtained when the value of 530,762 is multiplied by, taken from the following table, the impact in the Budapest-Central Danube Basin Region (1.96), the impact of the first group (1.63), and the interaction between these two (4.14). Here, the result will be 7,014,637 (being the basic data of the first row of the adequate table). All other cell values were obtained in a similar way.

Results themselves can provide information (Table 6) on how interactions between variables can influence incomes. Values exceeding 1 increase incomes whereas those less than 1 reduce them.

Based on the above, it can be concluded that no absolute interaction exists between the increase of accessibility and that of incomes. Although areas with the most favourable accessibility (accessibility Group 1) indicate the highest value of interaction, the most favourable value regarding domestic incomes can be observed in Group 3. Of the international incomes, the highest value is also present in Group 1, but here the value of interaction for Group 2 is lower than that of Group 3. Taken as a whole, no absolute connection can be found between the settlements' accessibilities and the rates of tourism incomes.

There is a significant difference between domestic and international incomes in respect to how high the multiplier is in locations with the best accessibility. As with settlements with the best accessibility, the multiplier for international incomes is much higher than that for domestic ones, so it can be concluded that international incomes are much more influenced by locations with favourable accessibility than domestic ones.

Regional interactions basically reflect the spatial differences between incomes. The significant differences of interaction between domestic and international incomes are, however, also worth mentioning. They are derived primarily from the rather high spatial concentration of international incomes compared to the distribution for domestic ones (Figure 4).

These variables have their impact on the incomes not only independently, but in interaction with each other as well. Now, it becomes apparent from the tables and the resulting illustrations (Figure 5-6) that the multiplier for the domestic incomes among the settlements impacted by Group 1 is the highest mainly in the Budapest-Central Danube Basin Region – the settlements with the most significant incomes are Budapest and Ráckeve, whereas for accessibility Group 2, the settlements of Hajdúszoboszló and Szolnok have the highest in the Northern Great Plain Region. The positive impact of Group 3 is represented mainly in the Western Transdanubia Region by Sopron and Bük, while that of Group 4 is found in the Lake Tisza Region, in Berekfürdo and Kisköre.

A difference is seen in international incomes: although for all groups the multiplier is (the highest in the tourism region as for the domestic ones, its bulk is varied). For Group 1, the value of the multiplier for international incomes is nearly 2000 times that observed for domestic ones. This refers to the rather great spatial and accessibility concentration of international incomes in Hungary. In contrast in the other three groups, the multiplier is somewhat lower compared to what is seen in the case of domestic incomes; in other words, less favourable accessibility provides less potential for the spatial concentration of international incomes.

Table 3: The Distribution of Multi-day Domestic Trips from the given Regions according to Target Regions in 2007 (%)

From	To Tourism regions								
	Budapest–Central Danube Basin	Northern Hungary	Northern Great Plain	Lake Tisza	Southern Great Plain	Central Transda-nubia	Lake Balaton	Southern Transdan-nubia	West Tran nu
Central Hungarian	31.9	10.5	8.0	1.1	7.7	10.4	19.2	4.6	6.

Central Transdanubian	16.3	3.9	5.0	0.3	6.3	28.1	25.3	6.4	8.
West Pannonian	13.6	2.7	3.2	–	2.4	10.3	28.8	3.7	35
South Transdanubian	16.3	1.6	1.5	0.2	6.7	5.8	16.3	47.1	4.
Northern Hungarian	19.2	31.9	7.7	4.6	8.0	10.5	10.4	6.7	1.
Northern Great Plain	13.3	13.1	56.3	4.5	5.5	1.2	4.0	0.8	1.
Southern Great Plain	16.1	5.8	7.4	1.4	47.3	4.1	11.3	4.0	2.

Source: Calculations based on Data of the Hungarian Central Statistical Office.

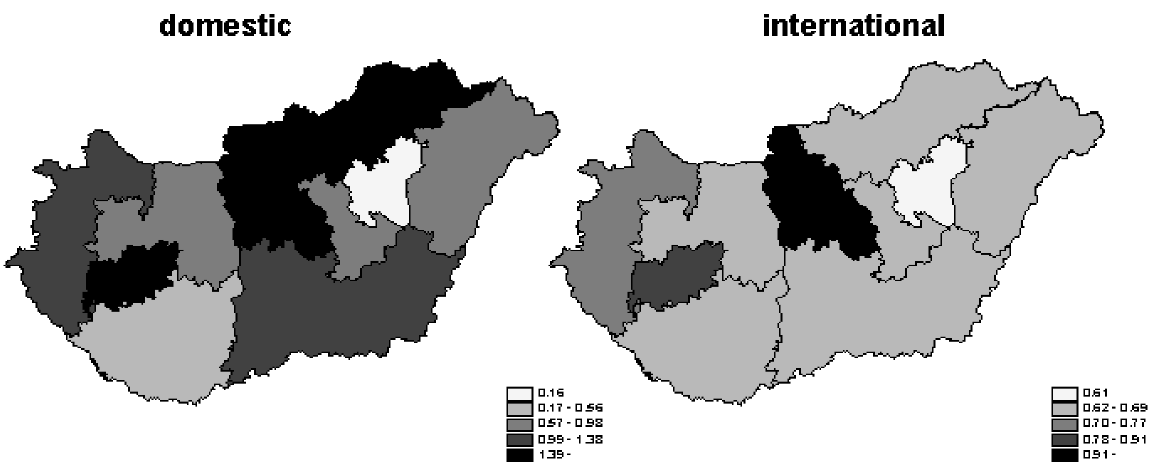


Figure 4: The Rate of Regional Interactions in Respect to Domestic and International Incomes from Accommodation Fees, 2007

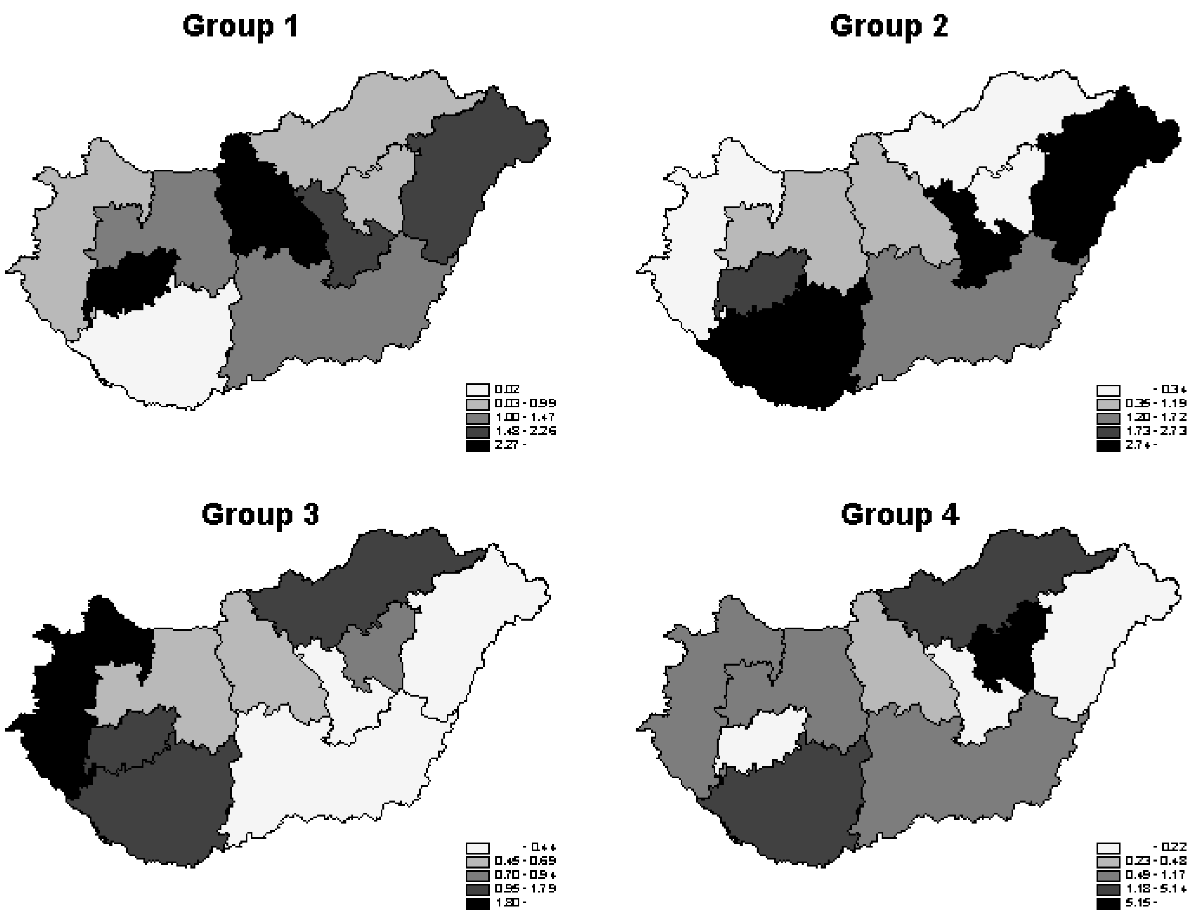


Figure 5: Interactions between Tourism Regions and Accessibility Groups in the Case of Domestic Incomes from Accommodation Fees, 2007

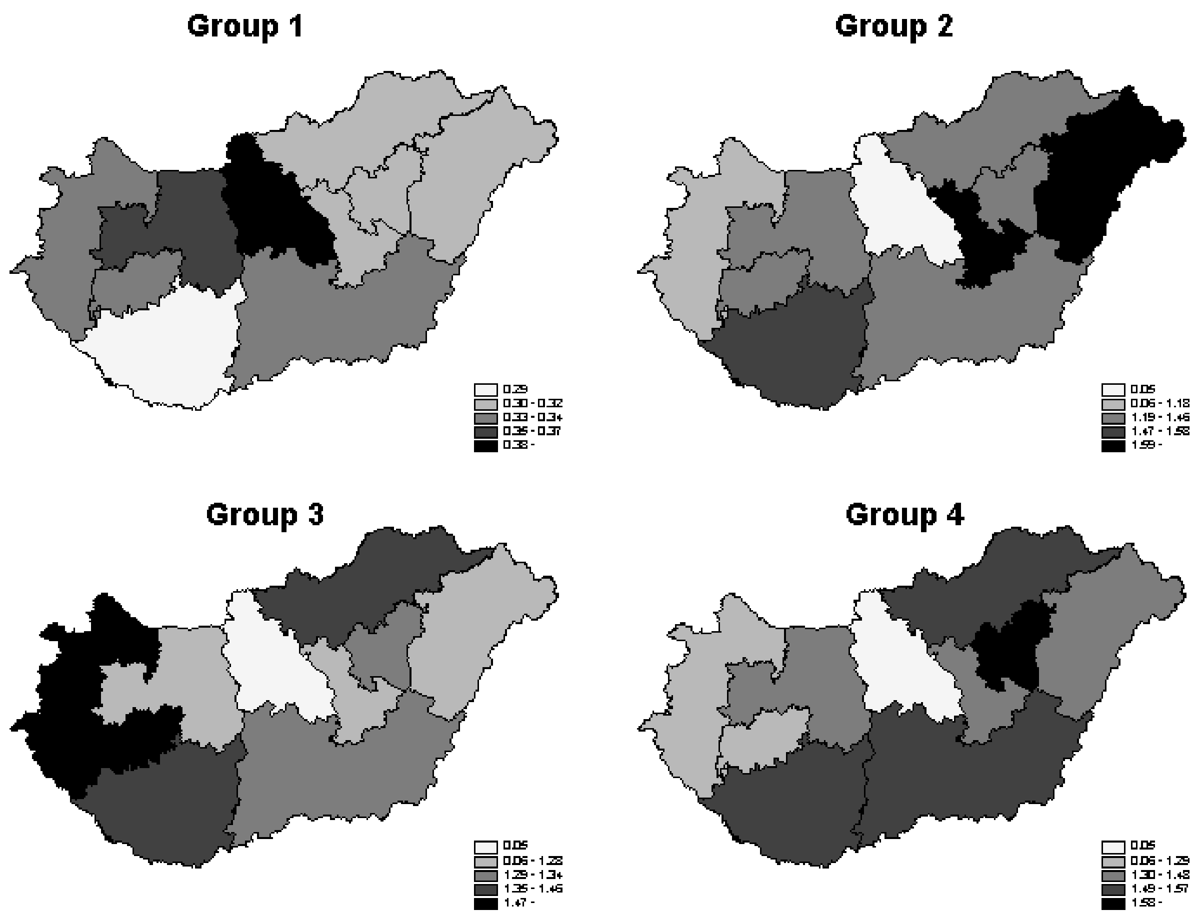


Figure 6: Interactions between Tourism Regions and Accessibility Groups in the Case of International Incomes from Accommodation Fees, 2007

A Study of Domestic Tourist Flows in Hungary

As a next step, we attempted to study what connection can be discovered between the theoretical accessibility calculable in respect to tourism and actual domestic flows. In this study, the number of multi-day inland travels from given regions to target regions were compared through the bulk of 'theoretical' movements estimated by applying the gravitation model.

The basic data originates from a survey conducted by the Hungarian Central Statistical Office, entitled 'Travel Practices of Residents' (hereafter TPR), whose representative sample of 12,000 answers the most relevant questions regarding the tourist travel practices of the population.

Regarding the tourism activity of the population, it can be concluded that tourism may have significant potentials in Hungary in the formation of quality of life, recreation and value generation. In 2007, only 42 percent of the Hungarian population was involved in domestic tourism – without overnight 'holidays' or, in other words, took multi-day domestic travel at least once. In the period between 2004 and 2006, there was an increase in the travel activity of the population, the number of trips and the spare time spent on travelling and consumption expenditures on travel, at current prices, increased by 37 percent. Following this, in 2007, activity decreased with a drop in the number of trips, though it was accompanied by an increase in travel length (to 106 million days) and, at current prices, consumption also increased by 11 percent in a year (Hungarian Central Statistical Office 2008).

In our study, we focussed on this group and its flows. Theoretical flows were modelled by attempting to apply the gravitation model. According to the law of gravitation, the force of gravitation between two bodies is directly proportional to the product of the gravitational masses of the two bodies (Pi and Pj) and is inversely proportional to the square of the distance between them (dij) (Stewart 1948; Isard 1998).

$$D_{ij} = g\left(\frac{P_i P_j}{d_{ij}^{\gamma}}\right)$$

where D_{ij} is the flow predicted, according to the model, from i to j; P_i is the population of the settlements from where potential trips for tourism purposes can be launched (all settlements in Hungary are included here); P_j is the number of guests accommodated at public and private accommodation establishments of the settlements to which potential journeys for tourism purposes can be launched (only settlements with public and private accommodation establishments are included); d_{ij} is the distance between settlements on public roads, in minutes; γ and g are constants, with g in this case equals 1.

The entire population was included in the model despite the fact that, in reality, it is unlikely that everyone would participate in tourist flows. In the implementation of tourism activities, significant differences can be observed regarding age, gender, property status, family status and many other aspects. By including the entire population as potential tourists in the model, a theoretical maximum was defined in which the bulk and spatial distribution of the actual flows can be well measured.

Theoretical movements, according to the data for comparison from the TPR, were calculated as from the given planning-statistical regions to the tourism regions or, in other words, movements were summarized for the planning-statistical regions of origin and receipt.. In our calculations, it was also important to study the values that the constant γ could obtain. Consequently, our calculations were conducted for constants between 1 to 8 and the strength of the correlation between the calculated and obtained actual values were analysed.

Table 4: Weighted Averages of the Correlation Coefficients in the Case of Various γ Constants of the Gravitation Model

γ	1	2	3	4	5	6	7	8
R	0.69	0.88	0.87	0.86	0.85	0.84	0.82	0.80

In order to decide which model with constants applied describes best the domestic tourist flows, weighted means were calculated for the values obtained and data from the TPR, having the correlation coefficients weighted, as the role of the given regions in the Hungarian tourist flows appears to be rather different from the total visits to the tourism regions.

As seen from Table 4, the highest value of correlation coefficients between the actual and theoretical data was obtained for the second distance power. Only a little behind is the connection between the values calculated by applying models with higher powers to actual values. As concluded by Dusek in his work on the gravitation model (2003): “With the increase of power, the intensity of intraregional connections will become more susceptible to distances and along with this, the relevance of masses will continuously decrease.” As only a little difference is seen between the constants, domestic tourist flows can be regarded as susceptible to distance.

Finally, we intended to compare the values of the model best describing (according to our calculations) tourist flows and (applying square-constant and the actual values). For this, both datasets were standardised, followed by having the actual values subtracted from the theoretical ones revealing the difference between the two sets of values (Table 5).

The algebraic sign of the values obtained only refers to the relationship between the theoretical and actual data. As a consequence of this, there are regions from where the launched tourist flows to all tourism regions respectively are higher compared to the theoretical one (i.e. have a negative algebraic sign), despite being lower in total.

In the national context, it can be concluded that theoretical flows are somewhat higher than actual ones. Among the planning-statistical regions, flows launched from the Central Transdanubian Region exceed the theoretical value by the greatest amount. Also, more intensive tourist flows, as compared to the theoretical one, are launched from the West Pannonian, Central Hungarian, South Transdanubian and the Southern Great Plain regions. On the contrary, primarily in the case of the Northern Hungarian Region, although also to a lower extent in the Northern Great Plain, the values of actual flows are behind that of the theoretical movements.

For the receiving tourism regions, the Budapest-Central Danube Basin Region is far more remarkable. It receives an exceedingly higher number of domestic tourists then predicted. And it also receives more tourists from all tourism regions than expected according to the theoretical calculations. Similarly, positive deviation is observed in the cases of the Lake Balaton, Western Transdanubian and the Lake Tisza regions. The first two tourism regions received more visitors than predicted only from Central Hungary, whereas the latter one from all regions. Unfortunately, the number of domestic tourists visiting the three East-Hungarian tourism regions is lower than the theoretical value. The most significant gap is observed for Northern Hungary, followed by the Northern Great Plain and the Southern Great Plain regions.

Studying the given movements in detail, mostly the outstanding role of the flows launched from Central Hungary and received by the Budapest-Central Danube Basin Region is eye-catching. Between the two types of regions (planning-statistical and tourism), there are differences in some settlements, however, regardless of this, we can talk basically about inter-regional flows being more intensive than estimated by the model. Among all the tourism regions, the Transdanubian and East-Hungarian regions should be highlighted. In the case of the first region, primarily the role of flows to neighbouring regions is more relevant compared to the theoretical flow, while this is the case for the latter one, from where visits to certain Transdanubian regions is remarkable.

Table 5: Differences between the Standardized Values of the Theoretical and Actual Tourist Flows, 2007

	Central Hungary	Central Transda-nubia	West Pannonia	South Transda-nubia	Northern Hungary	Northern Great Plain	Southern Great Plain	Planning-statistical regions, in total
Budapest–Central Danube Basin	-1.38	-0.88	-0.48	-0.41	-0.17	-0.40	-0.50	-2.15
Northern Hungary	0.11	-0.40	-0.41	-0.41	0.09	-0.34	-0.40	0.33
Northern Great Plain	0.10	-0.39	-0.40	-0.41	-0.28	-0.13	-0.41	0.16
Lake Tisza	-0.02	-0.41	-0.41	-0.41	-0.32	-0.39	-0.41	-0.29
Southern Great Plain	0.08	-0.38	-0.40	-0.38	-0.22	-0.37	-0.35	0.04
Central Transda-nubia	0.05	-0.39	-0.40	-0.39	-0.16	-0.40	-0.40	-0.02
Lake Balaton	0.13	-0.65	-0.64	-0.61	-0.18	-0.39	-0.40	-0.67
Southern Transda-nubia	0.05	-0.38	-0.40	-0.29	-0.25	-0.40	-0.41	-0.01
Western Transda-nubia	0.05	-0.41	-0.56	-0.40	-0.39	-0.41	-0.41	-0.46

Tourism regions in total	-0.57	-1.02	-0.83	-0.44	1.38	0.02	-0.42	0.20

Table 6: Results of the Loglinear Analysis

	Parameter	Domestic Income	International Income
Region	Budapest–Central Danube Basin	1.96	18.59
	Northern Hungary	1.97	0.65
	Northern Great Plain	0.95	0.69
	Lake Tisza	0.16	0.61
	Southern Great Plain	1.24	0.65
	Central Transdanubia	0.98	0.67
	Lake Balaton	1.80	0.91
	Southern Transdanubia	0.56	0.64
	Western Transdanubia	1.38	0.77
Accessibility	Group 1	1.63	3.26
	Group 2	1.09	0.68
	Group 3	2.06	0.74
	Group 4	0.27	0.61
Region accessibility	Budapest–Central Danube Basin – Group 1	4.14	8,011.23
	Budapest–Central Danube Basin – Group 2	0.76	0.05
	Budapest–Central Danube Basin – Group 3	0.66	0.05
	Budapest–Central Danube Basin – Group 4	0.48	0.05
	Northern Hungary – Group 1	0.99	0.32
	Northern Hungary – Group 2	0.22	1.39
	Northern Hungary – Group 3	1.42	1.46
	Northern Hungary – Group 4	3.28	1.55
	Northern Great Plain – Group 1	2.26	0.32
	Northern Great Plain – Group 2	5.63	1.78
	Northern Great Plain – Group 3	0.35	1.23
	Northern Great Plain – Group 4	0.22	1.44
	Lake Tisza – Group 1	0.79	0.31
	Lake Tisza – Group 2	0.11	1.46
	Lake Tisza – Group 3	0.94	1.34
	Lake Tisza – Group 4	11.99	1.64
	Southern Great Plain – Group 1	1.41	0.34
	Southern Great Plain – Group 2	1.72	1.43
	Southern Great Plain – Group 3	0.44	1.33
	Southern Great Plain – Group 4	0.93	1.54
	Central Transdanubia – Group 1	1.47	0.37
	Central Transdanubia – Group 2	1.19	1.42
	Central Transdanubia – Group 3	0.69	1.28
	Central Transdanubia – Group 4	0.83	1.48
	Lake Balaton – Group 1	4.11	0.33
	Lake Balaton – Group 2	2.73	1.42
	Lake Balaton – Group 3	1.75	1.94
	Lake Balaton – Group 4	0.05	1.10
	Southern Transdanubia – Group 1	0.02	0.29
	Southern Transdanubia – Group 2	5.04	1.58
	Southern Transdanubia – Group 3	1.79	1.40
	Southern Transdanubia – Group 4	5.14	1.57
	Western Transdanubia – Group 1	0.74	0.33
	Western Transdanubia – Group 2	0.34	1.18
	Western Transdanubia – Group 3	3.37	2.01

Western Transdanubia – Group 4	1.17	1.29

Conclusions

This study suggested no absolute connection between the improvement of accessibility and the increase of incomes. International tourism incomes are far more susceptible to favourable accessibility than domestic ones. The role of regions indicates significant differences in the distribution of incomes from tourism. Between international and domestic tourism incomes, high differences in interaction can be observed that are primarily a consequence of the rather high spatial concentration indicated by the international incomes, compared to that of the domestic ones, for which the distribution is much more even.

In the context of the bulk of incomes, the role of interaction between the regions and accessibility groups is also relevant. For this, it was concluded that for all four accessibility groups – for both domestic and international tourism incomes – (at the same regions is the highest the multiplier). A disparity was found in the value of multipliers indicating differences among the regions and in accessibility between domestic and international incomes.

From the difference between the theoretical and actual tourist flows we conclude that in the Hungarian context, theoretical flows are somewhat higher compared to actual ones. Among the planning-statistical regions of origin, primarily their economic development is decisive, thus mainly the role of the Central Hungarian and the Transdanubian regions can be mentioned. Of the receiving tourism regions, the Budapest-Central Danube Basin region is also outstanding. Similar, positive deviation is seen in the case of the Lake Balaton, Western Transdanubia and the Lake Tisza regions. This fact also reflects their possibilities for development. Unfortunately, the number of domestic tourists visiting the three East-Hungarian tourism regions is lower than the theoretical value.

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* *Senior Research Fellow, Department of Tourism and Regional Development, Károly Róbert College, Gyöngyös, Hungary.*

** *Head of the Department, Department of Tourism and Regional Development, Károly Róbert College, Gyöngyös, Hungary.*