CONCEPT OF PERCEPTUAL CARRYING CAPACITY AND ITS USE IN THE CREATION OF PROMOTIONAL MATERIALS OF TOURIST DESTINATION

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Abstract

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The aim of this article is to introduce results of research of perceptual carrying capacity of selected area. Concept of perceptual tourist carrying capacity aims to find the number of visitors of tourist destination that the visitor is willing to accept before deciding to prefer travelling to another tourist destination. In order to determine the perceptual carrying capacity the visual method is used. The photos of destination that depict different level of visitors are presented to respondents when using this method. The primary research method used in this investigation was the questionnaire survey which was conducted via online questionnaires. The questionnaire used computer-generated images that depict different number of visitors of the particular destination – nature trail around the church of St. John of Nepomuk in Žďár nad Sázavou (UNESCO monument). The questionnaire also contained samples of photos taken from photo gallery section of CzechTourism agency (photo.czechtourism.com), which were used to determine the preferred destination for recreation. The survey was conducted within the period from May 2012 to July 2012 on a sample of 736 respondents from The Czech Republic.

perceptual carrying capacity, sustainable tourism, visual method

During last decades, tourism has become one of the largest and fastest growing economic sectors in the world. International tourist arrivals have shown growth from 227 million in 1980 to 529 million in 1995, and 983 million in 2011 (UNWTO, 2012). This progress has not only positive effect to the economy but also negative effect to the environment which constitutes the inner value, the ground on which the tourist activity is built. Non-controlled development of tourism could alter the environmental equilibrium leading to degradation of natural resources. The vicious circle between tourism and environment is obvious – degradation of environment may cause degradation of tourism itself. Other negative aspects of tourism are the impacts in socio-cultural and economical spheres (Coccossis, Mexa, 2004). In the socio-cultural sphere, tourism can affect the quality of life of local residents, change values and attitudes of local people, habits and authenticity of culture, etc. The negative impact of tourism in the economic sphere may mean an increase in the dependence of the tourism labor market instability caused by the seasonality of work and the outflow of labor from other key sectors, increased load infrastructure; increase in the price level in the area, etc (Pásková, 2008). Therefore, protection of environmental and socio-cultural resources should be one of the primary aims of sustainable tourism.

One of the concepts used in the assessing impacts of tourism is the concept of tourism carrying capacity (TCC). This concept has been under consideration for at least as long as there has been increasing concern about impacts of tourism (Coccossis, Mexa, 2004). Carrying capacity concept was primary used in the natural resource

professions. In particular, it has proven a useful concept in wildlife and range management where it refers to the number of animals of any one species that can be maintained in a given habitat (Manning, 2001). According to the UNWTO, the tourism carrying capacity and its individual components can serve as indicators of sustainable tourism (WTO, 2004).

There are many definitions of tourism carrying capacity, but the most common is from World Tourism Organization (Coccossis, Mexa, 2004, p. 38) "The maximum number of persons that may visit a tourist destination at the same time, without causing destruction of the physical, economic, socio-cultural environment and an unacceptable decrease in the quality of visitors' satisfaction". Pásková (2008) divides carrying capacity to six dimensions: *physical carrying capacity, economical carrying capacity, environmental carrying capacity, institutional carrying capacity, socio-cultural carrying capacity and psychological carrying capacity.* Different approaches to the dividing of the carrying capacity can be found mainly in the interpretation of the psychological (or also as states Hunter and Green, (1995) perceptual) carrying capacity and socio-cultural carrying capacity. For example, Veal (2010) uses these two concepts together – psychological/social carrying capacity and applies to both visitors as well as residents. In this paper, the perceptual (psychological) carrying capacity will be used only in the context of visitors – tourists, ie the level of population, buildings or damage of the landscape that the visitors are prepared to accept before they start seeking alternative destinations (Pásková, 2008).

The issue of perception of the number of visitors in destination could be found in numerous studies. For example Arnberger, Haider, and Muhar (2004) conducted their research on visitors of the Vienna city park Wienerberger (Austria). Sterl, Wagner and Arnberger (2004) were researching the amount of canoes in the Austrian Danube Floodplains National Park (Austria). Manning (2003) researched perception of visitors in the Yosemite National Park (USA). Kalisch and Klaphake (2007) conducted their research in German National Park Hallig Hooge. All above mentioned authors used visual method in their researches. This method is described in the methodical part of this paper.

MATERIAL AND METHODS

The aim of this paper is to present the results of primary research aimed on the evaluation of perceptual carrying capacity of selected area, conducted via ex-situ distributed questionnaire. The objectives of the research are to identify preferences of customers in the tourism market in the dependence of their perception of crowding of visited destinations. This paper refers to the evaluation of basic statistical indicators of the reference sample from data collection in spring and summer 2012, and aims to prepare data for further evaluation research.

Research results are based on the processing of primary data from questionnaire which was distributed online via ReLa Questionnaire System (Research Laboratory), which was created as a project of researchers of the Institute of Marketing and Trade FBE Mendel University in Brno. Statistical software STATISTICA, version 10 was used for calculations of the basic statistical parameters. Presented results are based on 736 questionnaires (after elimination of questionnaires with incomplete identification data). Stratified sampling method was used; however, the perfect match with set strata was not achieved.

The sample of respondents consists of:
- Different social groups, 34.99% are students, 30.86% are employees and 19.92% of respondents are working students.
- Different groups in terms of size and location of residence. The largest sample of respondents comes from municipalities with size up to 2,000 inhabitants (32.44 %), from municipalities with 100,000 or more inhabitants (27.70 %). Third and fourth largest samples come from municipalities with size 20,000 to 49,999 inhabitants and 2,000 to 4,999 which are represented with 11.9% respectively 11.06% of respondents. The largest group of respondents lives in Region Jižní Morava – 47.51%, second largest group in Region Vysočina – 15.91%. Third and fourth largest groups comes from Zlínský Region – 9.47% respectively Olomoucký Region – 9.23%.
- Different levels of completed education. The most represented category are people with secondary education (with leaving exam), 61.72%.
- Different age categories. The most represented category of respondents is 18–25 years of age (48.51 %), second group is formed by respondents aged 46–55 years of age (20.65 %).
- Women are represented in the sample of 427 respondents (58.02%) while men by 309 respondents (41.98 %).

For measuring of perceptual carrying capacity it was used visual method with digitally processed photographs of Nature trail around Zelená hora in Žďár nad Sázavou, where UNESCO monument – The church of St. John of Nepomuk is situated. In the year 2011 the church of St. John of Nepomuk in Žďár nad Sázavou was visited by 23 646 of tourists (NIPOS, 2011). This means that the monument was visited on average by 158 visitors per day in tourist season (tourist season is from April to October; from May to September 6 days per week; in April and October only in weekends – thus tourist season has usually 149 days).

Visual method is a usual method used for measuring perceptual or social carrying capacity. For example this method was used by Sterl, Wagner and Arnberger (2004) for measuring social carrying capacity in Austria's Danube Floodplains

1: *Visual representation of different levels of visitor density*

2: *Visual representation of spa type destination*

National Park. Manning (1999) in connection with this method states that images are more realistic representation of an area or a situation than a verbal description. Essence of visual method consists in using set of images (usually photographs) with different levels of visitor density (crowding) of selected tourist area. For this research photographs digitally processed via graphic software GIMP (distributed under open source license) were used (Fig. 1).

The pictures used in this research were adjusted so that they show different levels of population visitors. The scenery, in which the images were planted, represented the starting point for the nature trail around the Zelená hora. The starting position was selected due to the high exposure of the tourist, and also thanks to good visibility of the trail. The images were created with the help of volunteers, who represented the tourists. They were moving along precisely marked signs so that it was possible to create different distances to simulate the tourist population. From a total of 300 photographs were taken in the final 6 images, which depicted as an empty path, as well as a situation where the characters are from each other at a distance of 3 meters.

Images were also used for describing preferences of destinations types. In this case the photographic database of Czech Tourist Authority – CzechTourism was the source of photographs showing types of Czech destinations. The CzechTourism photo database allows using subject searching by many categories and also displays amount of view and amount of download for each photograph, so it was possible to create sets of photograph for each type of destination by using the most searched photographs in each category. According to Pásková (2008), next destination types of Czech Republic were used: *spa type; type of tourism in natural valuable areas; near the water type; type of cognitive tourism in rural complexes;* *urban type; historical type; mountain type; pilgrimage type; type of centers of individual recreation; type of complexes of attractions.* Each type of destination was represented with set of at least three photographs (Fig. 2).

For evaluation overcrowding as a negative impact of tourism the ordering question was used. Factors used for ordering were derived from factors of destination quality used in QUALITEST (2011) *Tourist Satisfaction Questionnaire* together with added factor of overcrowding.

RESULTS AND DISCUSSION

The conducted survey revealed following findings. Tab. I represents results of evaluation of negative factors of tourism in destination. Variables are upwardly ordered by mean value (lower mean value indicates more important factor). Respondents are most afraid of "Poor accommodation" (mean 3.67). The second most problematic negative factor of tourism is "Sense of danger" (mean 3.8). This variable has also the lowest value of mode (1) and median (2). Second place of this variable could be explained by a high proportion of young respondents (18–25 years), who exhibit lower sensitivity to danger than older respondents. Otherwise it could be expected that this value should stand at the first place. Variable "The high concentration of other visitors – overcrowding" stands on the eight place, in the middle of the second half of the array (mean 6.46). Interesting result brings the modal value (11) of this variable. Together with median value (6) it indicates, that by this variable there is the largest scatter in preferences of respondents among the others variables. This result should be subjected to the more detailed research.

Table (Tab. II) shows the evaluation of preferred types of destination. Variables in this table are ordered upwardly by mean value (higher mean value indicates more preferred type of destination).

I: *Negative factors of tourism in destination*

Variable	Mean	Median	Mod	Mod frequency
Poor accommodation	3.67	3	2	162
Sense of danger	3.80	2	1	292
High prices	4.63	4	3	102
Poor level of communication with staff	5.10	5	4	127
Polluted environment	5.36	5	2	128
Lack of quality catering facilities	6.22	6	6	98
Lack of good opportunities for leisure activities	6.30	7	8	126
The high concentration of other visitors – overcrowding	6.46	6	11	125
Poor transport infrastructure	6.83	7	7	105
Insufficient information about the possibilities of spending free time	8.55	9	10	167
Lack of friendliness of local population	9.09	10	11	256

II: *Preferred type of destination*

Variable	Mean	Median	Mod	Mod frequency
Type of tourism in natural valuable areas	6.71	7	9	211
Mountain type	6.44	7	9	227
Historical type	6.22	7	7	131
Spa type	5.82	6	9	132
Near the water type	5.47	6	7	109
Urban type	5.25	5	5	124
Type of cognitive tourism in rural complexes	5.08	5	7	114
Type of centres of individual recreation	4.93	5	7	108
Type of complexes of artificial attractions	4.51	4	1	132
Pilgrimage type	4.38	4	2	113

The most preferred types of destinations are: "Type of tourism in natural valuable areas" (mean 6.71) as well as "Mountain type" (Mean 6.44). On the other side stands the least preferred type of destination – "Pilgrimage type" (Mean 4.38).

Results of cluster analysis of preferred type of destination are shown in dendrogram on figure 3. Cluster analysis enables to identify four clusters (distance connectivity 90). The first cluster groups "Spa type", "Urban type" and "Historical type" of destination. The common sign of this cluster could be named as *presence of human labor in the countryside*. "Pilgrimage type" of destination together with the "type of cognitive tourism in rural complexes" are the members of the second cluster, which could be marked as *the rural heritage*. The third cluster consists of "near the water type", "type of centers of individual recreation" and the "type of complexes of artificial attraction". Common sign in this cluster could be *the individual recreation*. Fourth cluster consist of the "type of tourism in natural valuable areas" and the "mountain type". This cluster could be marked *natural heritage*.
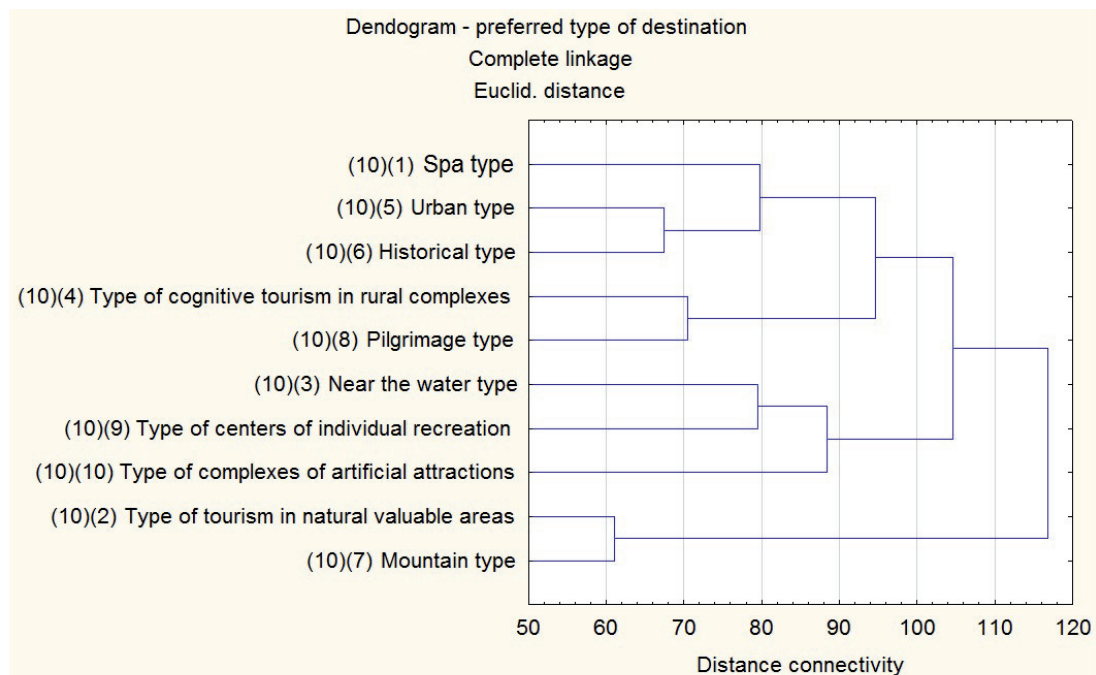
Results of visual method used for measuring of perceptual carrying capacity are shown in table (Tab. III). Mean value of ideal number of visitors (mean 2) indicates that our respondents prefer image showing only one person. This fact is confirmed by values of median (2) and mode (2).

Individual frequency responses are shown in Fig. 4. From this graph (Fig. 4) it is clear that the vast majority of respondents chose the ideal number of visitors ranging from the empty to the three persons displayed. This number of depicted persons could be used for visualization in promotional materials of the Nature trail around Zelená hora in Žďár nad Sázavou.

On the other side what is the maximum number of depicted persons? Results of maximal acceptable number of visitors (mean 3.64; median 4; mod 4) in table (Tab. III) indicate that our respondents accept images showing five persons. Therefor the maximal number of depicted persons in the promotional materials should not exceed this number.
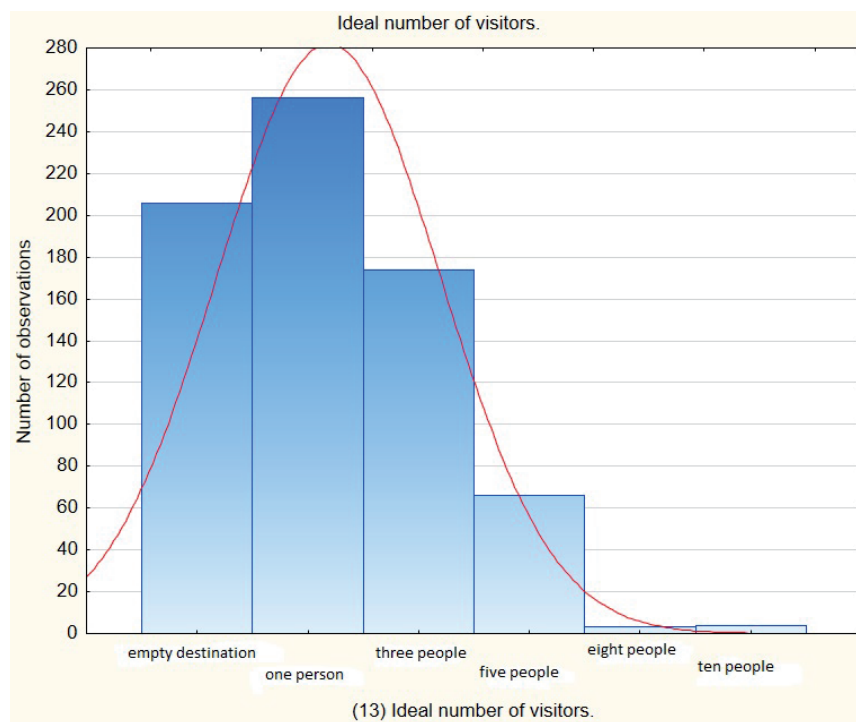
In the context of sustainable marketing that is primarily engaged in marketing of protected areas, and one of whose principles is the pursuit of realistic images and information, it could be possible to select appropriate photograph reflecting the real situation based on information from the traffic of selected monument (WEARING, S., ARCHER, D., BEETON, S., 2007).

3: *Dendrogram – preferred type of destination*

III: *Results of visual method*

Variable	Mean	Median	Mod	Mod frequency
Ideal number of visitors.	2.18	2	2	256
Maximal acceptable number of visitors.	3.64	4	4	287

4: *Results of ideal number of visitors*

SUMMARY

The aim of this article is to introduce results of research of perceptual carrying capacity. The visual method was used for assessment of perceptual carrying capacity as well as for assessment of preferences of respondents in the typology of tourist destination. First, an evaluation of the high concentration of visitors as a negative factor in tourism was conducted. This factor is considered by respondents to be less important in comparison with a sense of danger or bad accommodation. Among other negative factors was this negative factor ranked in eight place out of eleven. The most preferred types of destinations were type of tourism in natural valuable areas and mountain type. The ideal number of visitors ranging from the empty to the three persons displayed. This number of depicted persons could be used for visualization in promotional materials of the Nature trail around Zelená hora in Žďár nad Sázavou.

These partial results are part of an extensive research of perceptual carrying capacity and impacts of overcrowding in tourism. The data from this first data collection will be supplemented with data from data collection from the other regions of the Czech Republic, conducted in April 2013 thought July 2013, put through detail statistical analyses and compared with similar researches conducted abroad.

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