PILGRIM CITY DEVELOPMENT INDEX IN COMMUNITY MANAGEMENT

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Abstract: The aim of the study was to create a method of assessing the development of pilgrim cities PCDI. During building PCDI method, a number of indicators that determine important areas of the city were subject to verification and divided into two main groups. The first group characterizes pilgrims coming to the shrine, while the other relates to infrastructure affecting the comfort of pilgrims. Using available tools such as the presented method PCDI will allow making the right management decisions and may contribute to the development of tourism and tourism-related infrastructure.

Key words: Pilgrim City Development Index, PCDI, community management, tourism management, development of tourist infrastructure

Introduction

Local government units face high requirements in terms of economic policy-making and social development. For this purpose it is necessary to use all the opportunities and resources that the given region has, including those that arise from conditions and external factors. Managing a city in which the sanctuary is present has its own specific conditions related to the possibility of organizations of handling facilities for pilgrims. The expansion of this feature may lead to an increase of pilgrim traffic and enable the residents to reap the benefits from servicing pilgrims - tourists.

Pilgrim City Development Index (PCDI) - Description of the Method

In the process of community management adaptation of the existing infrastructure to the needs of locations visited by pilgrims may affect their decisions concerning the choice of site, to which they intend to come, and for how long they will finally decide to stay (Ferencová et al., 2014). This decision will be of key importance in terms of the amount of leftover funds in the local market (Celuch, 2009). And through it for further dynamic development of tourism and tourism-related infrastructure. Expansion of tourism-related infrastructure will also increase the comfort of the residents, as well as support other branches of the local economy (Ślusarczyk and Modrak, 2010). Effective method of comparing the different areas of the pilgrim city can be a valuable tool used by local authorities and representatives of sanctuaries in community management.
PCDI measurement methodology refers to the widely recognized methodology LHDI and HDI (Sen and Anand, 1994; UNDP, 2011; UNDP, 2012). Some

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modifications were applied, such as defining thresholds that determine the minimum values and strategic goals that allow comparing individual centres.

Building a method of measuring the degree of pilgrim city development, verification was applied to a number of indicators which determine the areas that affect the quality of life in the city, the comfort of visiting pilgrims and economic aspects associated with the possibility of benefiting by residents of the city from the presence of pilgrims.

Verified areas evaluated and affecting the result of the index are divided into two main groups. The first group characterized pilgrims coming to the shrine P_i, while the other relate to infrastructure affecting the comfort of pilgrims M_i.

In an area characterizing pilgrims, it was assumed that the important issues are the number of pilgrims coming to the shrine, the distance indicator, which they must overcome, length of stay of pilgrims, which is closely connected with the terms of beds and availability of other infrastructure and has a decisive impact on the amount of leave-funds on the local market and the uniformity of intensity of pilgrims arrivals.

In the second group specifying the adaptation of individual centres to receive pilgrims M_i issues assumed to be important included indicator characterizing the availability and transparency of information in the city covering such areas as having a website by the local government and the sanctuary, mutual links to other sites, information on joint initiatives, information on additional attractions and proposals to spend free time, information about accommodation, restaurants, possession of accounts in social websites, clarity and readability of data. An indicator of the availability of medical security includes information on the number of pharmacy outlets in the zone occupied by pilgrims, and the amount of medical points in the zone occupied by pilgrims (Vortmann et al., 2015). An indicator of the potential for development of infrastructure facilities reconnected with transport of the sanctuary was defined as T'i. This index covers such areas as: the use of local public transport network of intercity bus transportation, rail, air transport (Alshalalfah et al., 2015; Nowak and Ulfik, 2014, Jelušić et al., 2010), as well as the possibility of using own transport, and analysis of the number of parking spaces for cars and for buses (Nowak and Štefko, 2014; Holm et al, 2012). The potential of accommodation of respondent pilgrimage centres takes into account accommodation in hotels and other objects such as camping-type houses, pilgrim hostels and so on (Nowak and Štefko, 2014). The potential of restaurants includes the number of seats in restaurants, fast food outlets, cafeterias and the number of grocery stores, which supply the pilgrims. The last subject area of the analysis is to evaluate the possibility of purchasing souvenirs from the pilgrimages, expressed by the number of points of sale (Štefko et al., 2013; Štefko et al., 2015).

Similarly as in the method LHDI (Sen and Anand, 1994; UNDP, 2011; UNDP, 2012) referred partial indices are in the range of 1-100 points and the index PCDI is the geometric mean of selected area indicators divided into two groups; indexes

characterizing the pilgrims coming to the shrine P_i and indexes describing the adaptation of individual centres to receive pilgrims M_i.

Table 1. Characteristics of the components of author's method Pilgrim City Development Index

PCDI - Pilgrim City Development Index	
Characteristic of the pilgrims coming to the shrine **(P_i)** – amount of pilgrims coming to the shrine **(W_i)** – distance from which pilgrims come and their length of stay **(T_i)** – amount of pilgrims coming to the shrine from abroad **(Pz_i)** – amount of pilgrims residing within the distance of 100km from the shrine **(Pm_i)** – length of pilgrims' stay in the city **(Pp_i)** – uniformity of pilgrim arrivals to the shrine throughout the year **(R_i)**	The adaptation of pilgrim cities to receive pilgrims **(M_i)** – Accessibility and transparency of information about the sanctuary and the city **(I_i)** – Accessibility to medical services **(Me_i)** – Number of pharmacy outlets in the zone occupied by pilgrims **(A_i)** – The amount of medical points in the zone occupied by pilgrims **(Pm_i)** – Transport infrastructure **(T'_i)** – Logistic service of the shrine **(L_i)** – Number of parking spaces zoned to leave comfortably means of transport for pilgrims **(P'_i)** – Number of parking spaces for cars **(So_i)** – Number of parking spaces for buses **(Au_i)** – Infrastructure related to the stay of pilgrims in the shrine **(B_i)** – Accommodation facilities of the surveyed pilgrim centres **(N_i)** – Accommodation available in hotels **(H_i)** – Number of sleeping places in dormitories, campsites, pilgrim houses etc. **(K_i)** – Gastronomic base of the surveyed pilgrim centres **(G_i)** – Number of seats in restaurants and bars within the area of pilgrims' stay **(R'_i)** – Number of groceries within the area of pilgrims' stay**(Sp_i)** – Number of souvenir shops for pilgrims **(S_i)**

$$PCDI = \sqrt{P_i \times M_i} \quad (1)$$

Where:

$PCDI$ – Pilgrim City Development Index
P_i – index characterising pilgrims coming to the shrine
M_i –index describing the adaptation of individual centres to receive pilgrims

In determining quantities characterizing the pilgrims coming to the centres P_i, the areas were determined that contribute significantly to the popularity of the resort and the possibility of potential benefits for the centre - both the sanctuary and the city. The proposed index P_i is a geometric mean of selected area ratios.

$$P_i = \sqrt[3]{W_i \times T_i \times R_i} \tag{2}$$

Where:
P_i – index characterising pilgrims coming to the shrine
W_i – index of quantity of pilgrims coming to the shrine
T_i – index determining the distance made by the pilgrims and the length of their stay
R_i – index determining the uniformity of pilgrims arrivals to the shrine

Proposed index measuring the size of the given centre W_i hall include in the range of 1-100 and should take into consideration the ratios of pilgrims' arrivals to the specific locations. Determining this indicator requires calculating strategic aims of the biggest centres $W_{s,max}$.

$$W_i = 100 \times \frac{W_{ei}}{W_{s,max}} \tag{3}$$

Where:
W_i – index of quantity of pilgrims coming to the shrine
W_{ei} – number of pilgrims coming to the shrine
$W_{s,max}$ – supposed values of pilgrim arrivals

The indicator showing the distance from which pilgrims come and length of stay T_i is the geometric mean of the amount of pilgrims coming to the shrine from abroad Pz_i, the amount of pilgrims who live at a distance of 100km from the sanctuary Pm_i, and the number of pilgrims who remain in the sanctuary for a specified period Pp_i.

$$T_i = \sqrt[3]{Pz_i \times Pm_i \times Pp_i} \tag{4}$$

Where:
T_i –index of the distance from which pilgrims come and length of their stay
Pz_i - index of the amount of pilgrims coming to the shrine from abroad
Pm_i –index of the amount of pilgrims residing within 100km from the shrine
Pp_i –index determining the number of pilgrims who remain in the sanctuary for a specified period of time.

Pilgrims who live closest to the sanctuary Pm_i, due to methodological considerations the distance of 100 km from the sanctuary was assumed, they usually represent the largest share of visitors to the holy place. People from this group visit shrines even a few times a year, but since their visits lasts for a short period of time, this is also the fact that they leave the smallest amounts of money per one visitor. The index takes into account the pilgrims living within a 100 km Pm_i is calculated based on the revised distance formula due to the nature of the expected value. The proposed ratio is in the range 1-100. In determining this ratio, strategic objectives of the largest centres $Pm_{s,max}$ should be defined).

$$Pm_i = 100 - \frac{100 \times Pm_{ei}}{\mathbf{Pm}_{s,max}} \tag{5}$$

Where:
Pm_i – index of the amount of pilgrims residing within 100km from the shrine
Pm_{ei} – the amount of pilgrims residing within 100km from the shrine
$Pm_{s,max}$ – supposed values of arrivals of pilgrims residing within the distance of 100 km from the shrine

Pilgrims reaching from beyond the borders of the country Pz_i, in which the sanctuary is located, represent the smallest percentage of pilgrims in shrines analysed, but given the tangible benefits that occur because of their visits to the sanctuary, they constitute an important segment providing a degree of development of a given sanctuary.
The proposed ratio regarding the impact of pilgrims arriving from abroad Pz_i is in the range of 1-100 and determines the proportion of arrivals of pilgrims to specific cities from abroad. In determining this ratio strategic objectives largest centres ($Pz_{s,max}$) should be defined on the arrival of pilgrims from abroad in relation to all visitors. The indicator is calculated by a distance formula.

$$Pz_i = 100 \times \frac{Pz_{ei}}{\mathbf{Pz}_{s,max}} \tag{6}$$

Where:
P_{zi} – index of the amount of pilgrims to the shrine from abroad
Pz_{ei} - the number of pilgrims to the shrine from abroad
$Pz_{s,max}$ - the expected value of the number of visits of pilgrims from abroad

The proposed method of assessing the development of pilgrimage (PCDI) contains partial indexes specifying in a scale of 0-100 points number of foreign pilgrims Pz_i, and local pilgrims Pm_i. The deliberate omission in the calculation of pilgrims living in the distance above 100km from the sanctuaries stems from the fact of dimension of the index W_i indirectly taking into account that part of the pilgrims.
The basis for index calculation determining the number of pilgrims who remain in the sanctuary for a specified time Pp_i is data characterizing the average length of stay of pilgrims at shrines in percentage terms with three compartments: the

pilgrims remaining to 8 hours Pp_{8ei}, up to 30 hours Pp_{30ei}, and to 55 hours in the city Pp_{55ei}. The index is calculated by a distance formula. Due to the expected maximum long stay, the weighting system was used to promote length of stay in that location. The proposed ratio is in the range 1-100. In determining the index, the strategic objectives of the largest centres $Pp_{s,max}$ should be adopted.

$$Pp_i = 100 \times \frac{[(1 \times Pp]_{8ei} + 2 \times Pp_{30ei} + 3 \times Pp_{55ei})}{\mathbf{Pp}_{s,max}} \quad (7)$$

Where:
Pp_i – index of the number of pilgrims who remain in the sanctuary for a limited time
Pp_{8ei} - pilgrims remaining to 8 hours in the sanctuary (the city)
Pp_{30ei} - pilgrims remaining to 30 hours in the sanctuary (the city)
Pp_{55ei} - pilgrims remaining to 55 hours in the sanctuary (the city)
$Pp_{s,max}$ - the expected length of stay of pilgrims in the sanctuary

Uniform intensity of the frequency pilgrim visits R_i is essential for quality of life in the city. The indicator, as in other cases, is in the range 0-100, but with insufficient amounts of statistical data it can be determined by experts based on their expertise and knowledge of the specificities of different places of worship.
In determining the size of infrastructure characterized by adapting the site to the reception of pilgrims' geometric mean of selected area ratios was used.

$$M_i = \sqrt[4]{I_i \times Me_i \times T_i \times B_i} \quad (8)$$

Where:
M_i- index describing the adaptation of individual centres to receive pilgrims
I_i – index of the availability and transparency of information
Me_i – index of the availability of medical services
T_i – index of the infrastructure in terms of transport
B_i – index of the infrastructure related to the stay of pilgrims in the sanctuary

Indicating the essential aspects of cooperation between the cities of shrines indicator of the availability and presentation of information must be analysed. The literature of the subject emphasizes and focuses on the joint promotion of the sanctuaries and the region and cooperation between ecclesiastical and secular authorities. The analysed index I_i shall be determined in an objective manner, taking into account the mutual cooperation of local self-government of the sanctuary and the availability and transparency of information presented.
An index of the level of medical coverage Me_i is in the range of 1-100. As in the previous cases, it is calculated using a formula which ranged assuming a specific value $Zm_{s,max}$ specifying the number of dispensaries and medical securing points which are located in the occupied by pilgrims zone.

$$Me_i = 100 \times \frac{A_i + \mathbf{Pm}_i}{\mathbf{Zm}_{s,max}} \quad (9)$$

Where:
Me_i – index of the availability of medical services
A_i - the number of pharmacy outlets in the zone occupied by pilgrims
Pm_i - the number of medical points in the zone occupied by pilgrims
$Z_{ms,max}$ - expected amount of medical protection points in the zone occupied by pilgrims

Indicator of the transport infrastructure T'_i is the geometric mean of the indicators of the area connected with the capabilities to handle the logistics of the sanctuary, L_i and the number of parking spaces in the nearby of the shrine where pilgrims may leave their means of transport P'_i.

$$T'_i = \sqrt{L_i \times P'_i} \tag{10}$$

Where:
T'_i – index of the infrastructure in terms of transport
L_i - possibilities for logistics service of the sanctuary
P'_i - the number of parking spaces zoned to leave comfortably the means of transport for pilgrims

Opportunities for logistics service of the sanctuary L_i can be determined based on the assessment made by experts of the possibility and extent of use of transport infrastructure by the various shrines (Marek and Liszewski, 2015) and to prevent traffic congestion during periods of increased traffic of pilgrims.
In community management, providing right amount of parking spaces is one of the determinants of comfort for both arriving pilgrims and locals. The index taking into account the number of parking spaces zoned to leave comfortably means of transport for pilgrims P'_i take into account parking spaces for cars and coaches and is in the range 0-100. It is calculated based on a distance formula taking the value of $P'_{s,max}$ setting out the strategic objectives of the largest centres.

$$P'_i = 100 \times \frac{4xSo_i + 40xAu_i}{P'_{s,max}} \tag{11}$$

Where:
P'_i – the number of parking spaces zoned to leave comfortably means of transport for pilgrims
So_i – the number of parking spaces for cars
Au_i – the number of parking spaces for buses
$P'_{s,max}$ – the number of pilgrims likely to leave the means of transport in the parking lots within the reach of a walking distance of the shrine

The indicator defining the infrastructure related to the stay of pilgrims in the sanctuary is the geometric mean of indicators of quantity and quality of beds N_i,

the availability of restaurants and grocery stores G_i and the number of souvenir stores S_i.

$$B_i = \sqrt[3]{N_i \times G_i \times S_i} \tag{12}$$

Where:

B_i – index defining the infrastructure related to the stay of pilgrims in the shrine

N_i – potential of accommodation facilities in the surveyed pilgrimage centres

G_i – potential of gastronomic base in the surveyed pilgrimage centres

S_i –indicator of the amount of souvenir shops

In determining the potential of accommodation base N_i, it should be divided into two segments: no stars hotels able to accommodate a lot of people at the expense of comfort - dormitories, sleeping hostels, camping sites, pilgrim houses etc. and available accommodation base in the hotels. The proposed ratio is in the range of 0-100.

$$N_i = 100 \times \frac{K_i + 2\mathbf{x}\mathbf{H}_i}{\mathbf{N}_{s,max}} \tag{13}$$

Where:

N_i – potential of accommodation base of surveyed centres

K_i – number of sleeping places in dormitories, campsites, pilgrim houses etc.

$\mathbf{H}_i$ – accommodation available in hotels

$\mathbf{N}_{s,max}$ – expected strategic aims of accommodation facilities

An indicator of the availability of restaurants and grocery stores is drawn up having regard to the distance formula taking into account the number of seats in restaurants and bars remaining in the area where there are pilgrims and the number of shops where they can buy food.

$$G_i = 100 \times \frac{R'_i + 20\mathbf{x}\mathbf{Sp}_i}{\mathbf{G}_{s,max}} \tag{14}$$

Where:

G_i – the potential of gastronomic base of surveyed pilgrimage centres

R'_i – the number of seats in restaurants and bars remaining in the area where there are pilgrims

$\mathbf{Sp}_i$ – number of grocery stores in the area where there are pilgrims

$\mathbf{G}_{s,max}$ – expected strategic objectives of gastronomic facilities

By studying the supply for basic needs of pilgrims, taking into account their willingness to purchase souvenirs, the index was proposed which determines the number of points which sell souvenirs. The proposed ratio is in the range of 0-100.

$$S_i = 100 \times \frac{S_{ei}}{\mathbf{S}_{s,max}} \tag{15}$$

Where:

S_i – index of the amount of souvenir shops
S_{ei} – amount of souvenir shops
$\mathbf{S}_{s,max}$ – expected strategic objectives

Developed for the assessment of individual areas of pilgrim cities PCDI method can also be used in community management. Proper selection of the analysed areas and determination of the assumed strategic goals are obvious necessity.

Summary

Tourism is one of intensively developing areas of the modern economy. Its rapid development is closely linked with changing customer expectations, looking on the market for newer and more attractive products.
Community management of pilgrim cities due to its specific character shall take into account the needs of the pilgrims. An ability to compare the various areas of the surveyed centres, and thus the possibility of defining the barriers to development, is a valuable source of information while creating strategic plans out vining further development of pilgrim cities.
Developed author's method Pilgrim City Development Index (PCDI), includes an assessment of selected, the most important from the point of view of managing a pilgrim city, areas of its operation. Using available tools such as the presented method PCDI will allow making the right management decisions and may contribute to the development of tourism and tourism-related infrastructure.

References

Alshalalfah B.W., Shalaby A.S., Dale S., Othman F.M., 2015, *Feasibility study of aerial ropeway transit in the Holy City of Makkah, "*Transportation Planning and Technology", 38(4).

Celuch K., Davidson R., 2009, *Human resources in the business events industry*, Advances in business tourism research, International perspectives of festivals and events, Paradigms of Analysis, Elsevier.

Ferencová M., Misencíková V., Kot S., 2014, *An analytical view of using e-communication tools in promoting of selected pilgrim tourism sites in Slovak Republic*, "Journal of Environmental Management & Tourism", 5(2).

Holm C., Anžek M., Kaštela S., 2012, *Travel Time Information Service Utilising Mobile Phone Tracking*, "Promet-Traffic&Transportation", 16(4).

Jelušić N., Anžek M., Ivanković B., 2010, *Information source quality in intelligent transport systems*, "Promet-Traffic&Transportation", 22(2).

Marek M., Liszewski D., 2015, *Development of Polish regional airports in the context of tourism needs*, "Polish Journal of Management Studies", 11(1).

Nowak S., Štefko R., 2014, *Cooperation Shrines of Europe in regional management and development*, "Polish Journal of Management Studies", 10(2).

Nowak S., Štefko R., Ulfik A., 2014, *City logistics during the peak intensity of pilgrimage tourism*, "Advanced Logistic Systems, Theory and Practice", 8(1).

Nowak S., Ulfik A., 2014, *Konsekwencje ekonomiczne kongestii ruchu pielgrzymkowego dla samorządu terytorialnego,* „Logistyka", 6.
Sen A.K., 1993, *Inequality re-examined*, Cambridge: Harvard University Press.
Sen A.K., Anand S., 1994, *Human Development Index: Methodology and Measurement.* Occasional Papers, [Available in: http://hdr.undp.org/en/media/ Anand_and_Sen_ HDI.pdf.].
Štefko R., Jenčová S., Litavcová E., 2013, *Selected aspects of marketing pilgrimage sites,* "Polish Journal of Management Studies", 8.
Štefko R., Kiráľová A., Mudrík M., 2015, *Strategic Marketing Communication in Pilgrimage Tourism*, "Procedia-Social and Behavioral Sciences", 175.
Ślusarczyk B., Modrak V., 2010, *The Role of Business in Achieving Sustainability. Part 2: Implication for Industry*, Wyd. Techn. Univ. Kosice, Presov.
UNDP, *Krajowy Raport o Rozwoju Społecznym*, Polska, 2012, [Available in: http://www.ewaluacja.gov.pl/Dokumenty_ewaluacyjne/Documents/raport_undp_2012_lhdi_20420123.pdf].
UNDP, *Human Development Report 2011*. Sustainability and Equity: A Better Future for All, New York. Available in: http://www.undp.org/content/dam/undp/library/ corporate/HDR/2011 Global HDR/English/HDR_2011_EN_ Complete.pdf
Vortmann M., Balsari S., Holman S.R., Greenough P.G., 2015, *Water, Sanitation, and Hygiene at the World's Largest Mass Gathering*, "Current infectious disease reports", 17(2).

PILGRIM CITY DEVELOPMENT INDEX W ZARZĄDZANIU MIASTEM

Streszczenie: Celem pracy było stworzenie metody oceny rozwoju miast pielgrzymkowych PCDI. Budując metodę PCDI, weryfikacji poddano szereg wskaźników determinujących istotne obszary funkcjonowania miasta dzieląc je na dwie główne grupy. Pierwsza grupa charakteryzuje pielgrzymów przybywających do sanktuarium, natomiast druga odnosi się do infrastruktury wpływającej na komfort przybywających pielgrzymów. Wykorzystywanie dostępnych narzędzi jak na przykład zaprezentowanej metody PCDI, pozwali podejmować właściwe decyzje zarządcze i może przyczynić się do rozwoju infrastruktury turystycznej i okołoturystycznej.
Słowa kluczowe: Pilgrim City Development Index, PCDI, zarządzanie miastem, zarządzanie w turystyce, rozrój infrastruktury turystycznej

香客城市發展指標體系的社區管理

摘要：本研究的目的是建立評估朝聖城市PCDI發展的方法。在建設PCDI方法，一些決定城市的重要領域指標均接受核查，並分為兩大組，第一組特徵香客來參拜靖國神社，而其他涉及基礎設施影響朝聖者的舒適性。使用現有的工具，如該方法PCDI將允許做出正確的管理決策，並可能有助於旅遊和與旅遊相關的基礎設施的發展。
關鍵詞：朝聖者的城市發展指數，PCDI，社區管理，旅遊管理旅遊基礎設施的發展