

# **Methodological and theoretical aspects of using passive mobile positioning data for tourism marketing**

# 1. Introduction

People tend to associate tourism marketing with advertisements from glossy magazines and international channels “calling to enjoy countries”. These advertisements of attracting countries and introducing vocation possibilities are the most widespread method of destination marketing (Esu & Ebitu, 2010). Campaigns introducing countries and regions are mainly based on the analysis of international visits. Such campaigns apply both for developing current markets and invading new markets (Buhalis, 2000).

Currently, however, in the era of digital media and open borders, destination marketing faces new challenges. The selection of potential markets and destinations has become more diverse, the decision making process of tourists more complicated, while marketing has become also more diverse and personal. New marketing has also created a need for new data and analyses. In the era of BIG data, there are many possibilities and activities for this. In relation to this, researchers have thought about the advantages and disadvantages of current approaches and developed theoretical and methodological concepts that would enable to market destinations with new type of data in the newly functioning world (Buttle, 2004; Green, 2003).

The aim of this presentation is to introduce possibilities for using mobile positioning based statistics in tourism destination marketing. For this purpose, I introduce destination marketing concepts and possibilities for the use of statistics in realising them, generated on the basis of mobile data.

In the era of BIG data, significant changes also occur in marketing due to the new possibilities of “new” and digital data. I would highlight three aspects here. First, the data are digital, which makes the collection and processing of them faster as well as the data analysis more diverse. Second, there are a lot of data, and therefore the vertical and horizontal bearing plane of analyses changes. Third, the data collection of digital and large-scale BIG data is automatic and fast and thus enables developing new type of marketing analyses and products. The real advantages of BIG data in marketing are exposed with applications in social media and communication networks. New data entail, of course, several methodological problems as well.

## 2. Mobile data

Very different statistics that reflect different behaviours can be generated from mobile phones. The data of active mobile positioning are collected with special inquiries on telephone use or location (Ahas et al 2008). Passive positioning data are automatically collected on the phone use or location in different log files. To use these logs, an agreement has to be reached with the telephone user or Mobile Network Operator (MNO). In this presentation, we look at passive positioning data and the possibilities deduced from their use. The most common source of data in case of passive positioning is Call Detail Record (CDR) and Data Detail Record (DDR), which are automatically saved by using the telephone.

DDR and CDR automatically save in the memory of Mobile Network Operator (MNO):

Phone ID; usually, privacy ensuring ID has been made anonymous.

The country of registration of the phone, with which the country of origin of the foreign visitor is determined.

The time of telephone use, usually of the precision of a second.

Location coordinates, usually of the precision of a mobile antenna.

The type of telephone use, usually call, sms, etc data are distinguished.

In case of a phone call or sms, the receiver of the call; social networks data is generated from this.

Often, the data include social-demo traits, characterising the user.

In case of passive position data, it is further important that a data use contract has been concluded with an operator and that the data are collected in a long-term perspective and in large extent. The large number of respondents and long time period enable developing several marketing analyses further.

### 3. Methodological perspectives

Mobile data collected digitally, automatically and on a micro level open possibilities for developing the analysis methods used in destination marketing. In what follows, I present some examples on which innovations have been adopted or are possible in tourism geographical analysis.

	<b>Spatio-temporal statistics</b>
<b>Research task</b>	The precise measurements in time and space of tourist visits.
<b>Traditional data and their disadvantages.</b>	Accommodation data, transportation data, border statistics and questionnaire surveys. Accommodation data are usually fixed and aggregated with administrative units and monthly time periods. Questionnaire surveys are geographically and temporally related to some region and a particular questionnaire period.
<b>Advantages of mobile data.</b>	The longer time period saved with mobile data, bigger sample and the temporal and spatial resolution of digital database enable measuring the market and consumption more precisely. Possible to distinguish suitable periods and time periods. Causal relations possible to be modelled with micro data.
<b>Disadvantages of mobile data</b>	Less is known about visitors' motivation, transportation method and costs.

	<b>Movement in destination</b>
<b>Research task</b>	Analysis of tourists' movements within the point of destination, distinguishing visit-related regions, determining routes.
<b>Traditional data and their disadvantages.</b>	Special questionnaire surveys or travel advisers' databases are needed for moving at the point of destination. Accommodation data do not enable describing movements.
<b>Advantages of mobile data.</b>	The data of digital tracking enable to tie the visit temporally and geographically as well as analysing movements statistically; possibility for modelling with micro data. Possible to analyse routes and related places.
<b>Disadvantages of</b>	Less is known about visitors' motivation, transportation methods and

<b>mobile data</b>	costs. CDR is imprecise for relating movement with particular buildings or places.
--------------------	--

	<b>Segmentation of visitors</b>
<b>Research task</b>	Distinguishing visitor segments on the basis of different traits.
<b>Traditional data and their disadvantages.</b>	Questionnaires and interviews provide a good overview of the behaviour of some segments, but are relatively expensive and temporally and spatially complicated (Vassiliadis, 2008).
<b>Advantages of mobile data.</b>	Possible to segment the visitors of destination and a larger region in time and space, on the basis of quantitative visit indicators (Kuusik et al 2011).
<b>Disadvantages of mobile data</b>	Segmentation is limited with temporal-spatial data; little known about visitors' motivation and attitudes.

	<b>Monitoring of events</b>
<b>Research task</b>	Surveys of the visitors on tourism events.
<b>Traditional data and their disadvantages.</b>	Questionnaire surveys, analysis of tickets. Rather high labour cost.
<b>Advantages of mobile data.</b>	Possible to find events from databases based on the "accumulation" of visits or the previously provided traits of visitors at events. Possibility to analyse catchment areas and relating the visit of an event with the traits of the entire trip (Getz, 2008).
<b>Disadvantages of mobile data</b>	Several visits are short-term or the phone is switched off, and thus CDR does not record any information. The low level of spatial prevision of CDR data does not enable distinguishing events from other tourists at sparsely populated areas (Nilbe et al 2014).

	<b>Destination loyalty</b>
<b>Research task</b>	Analysis of repeated visits by tourists.
<b>Traditional data and their disadvantages.</b>	Questionnaire surveys, difficult to find the same visitors to the sample. The question asked from tourists – "would you like to return here?" – could reflect the tourist's attitude, but not the actual return (Dick & Basu 1994).
<b>Advantages of mobile data.</b>	The time period and geography of the repeated visit can be precisely analysed from the digital database (Morais & Lin, 2010).
<b>Disadvantages of mobile data</b>	The purpose of the trip and costs not known, a mistake possible due to the change of mobile phone number.

## 4. Discussion and conclusions

The main tourism statistics of mobile positioning enable to develop tourism destination marketing also theoretically. I indicate three aspects hereby. First, using such data and analysis methods, tourists can be segmented in a much more detailed way. Traditionally, tourists have been segmented through visit motives, social traits and means of transport. Now, however, a possibility opens to “sieve” similar visits on the basis of behavioural data. Trajectories, timely planning, geography, and repeated visitations will be analysed. Deducing from this, there are also more possibilities for providing new marketing solutions to new customer segments.

Second, with such data and analysis possibilities, destinations can be determined differently. Traditional “geographical” destination approach determines that destination is one country or region. Newer approaches, however, see destination as a product of social practice, while its dimensions vary by visitors and time units (Esu & Ebitu, 2010). Destination may also be an event or activity, if this is the main aim of the trip (Framke, 2002; Kuusik et al 2011). Also, regions of similar visiting trajectories may be “attracted” as a destination based on tracking data (Oppermann, 2000). All this opens a possibility for destination marketing to compile new products and marketing packets. They can be seasonally different or directed at different consumer segments.

Third, such the significant novelty of such data is – timeliness. Fast data collection and the digital temporal resolution enable to develop very dynamic analysis environments and monitoring systems. Several “marketing barometers” become necessary for hotel owners or tourism organisers when they can be the visitors of a region, their number and geographical changes in real time or after a few days (Tiru et al 2010). Usually, accommodation data are available of the precision of a quarter or a month, in the worst case. Accommodation data are usually presented as aggregated and in the extent of administrative units. Mobile data can be also used for everyday statistics of the precision of a city quarter or highway track. This makes statistical products more necessary and useful for the consumers and directs them to their use. Furthermore, financially very interesting are the estimates on the impact of marketing campaigns or the conducted investments (Crompton & Mackay, 1994; Breen et al 2001; Brida et al 2013). Due to their precise resolution, mobile data enable evaluating such impact of campaigns.

The application of new data into use entails, of course, the necessity to evaluate the respective methodology and the feasibility of the data. Eurostat „Feasibility study“, concluded in 2014, forms one step in developing new solutions (Positium, 2014). New digital data also entail the necessity to address questions of privacy and data protection, as they become more clearly foregrounded here.

## 5. References

Ahas, R., Aasa, A., Roose A., Mark, Ü., & Silm, S. (2008). Evaluating passive mobile positioning data for tourism surveys: An Estonian case study, *Tourism Management*, 29(3), 469-486.

Breen, H. Bull, A., & Walo, M. (2001). A Comparison of survey methods to estimate visitor expenditure at a local event. *Tourism Management*, 22, 473-479.

Brida, J.G., Disegna, M. & Osti, L. (2013). Visitors' expenditure behaviour at cultural events: the case of Christmas markets. *Tourism Economics*, 19(5), 1173-1196.

Buhalis, D. (2000). Marketing the competitive destination of the future. *Tourism Management*, 21, 97-116.

Buttle, F. (2004). *Customer relationship management: concepts and tools*. Amsterdam:

Elsevier/Butterworth-Heinemann.

Crompton, J.L., & Mackay, S.L. (1994). Measuring the economic impact of festivals and events: some myths, misapplications and ethical dilemmas. *Festival Management and Event Tourism*, 2(1), 33-44.

Dick, A., & Basu, K. (1994). Customer loyalty: toward an integrated conceptual framework. *Journal of Marketing Science*, 22(2), 99-113.

Esu, B.B., & Ebitu, E. (2010). Promoting and Emerging Tourism Destination. *Global Journal of Management and Business Research*, 10(1), 21-28.

Framke, W. (2002). The Destination as a Concept: A Discussion of the Business-related Perspective versus the Sociocultural Approach in Tourism Theory. *Scandinavian Journal of Hospitality and Tourism*, 2(2), 92-108.

Getz, D. (2008). Event tourism: Definition, evolution, and research. *Tourism Management*, 29, 402-427

Green, B.C. (2003). Marketing the Host City: Analysing Exposure Generated By a Sport Event. *International Journal of Sports Marketing and Sponsorship*, pp. 335-353.

Kuusik, A., Tiru, M., Varblane, U., Ahas, R. 2011. Process innovation in destination marketing: use of passive mobile positioning (PMP) for segmentation of repeat visitors in case of Estonia, *Baltic Journal of Management* 6(3): 378 – 399.

Morais, D.B., & Lin, S.-H. (2010). Why do First-Time and Repeat Visitors Patronize a Destination? *Journal on Travel & Tourism Marketing*, 27, 193-210.

Nilbe, K., Ahas, R., Silm, S. 2014. Evaluating the Travel Distances of Events and Regular Visitors using Mobile Positioning Data: The case of Estonia, *Journal of Urban Technology* 21(2).

Oppermann, M. (2000). Tourism Destination Loyalty. *Journal of Travel Research*, 39, 78-84.

Positium LBS. (2014a). Feasibility Study on the Use of Mobile Positioning Data for Tourism Statistics, Eurostat Contract No. 30501.2012.001-2012.452.

Saraniemi, S., & Kylanen, M. (2011). Problematizing the Concept of Tourism Destination: An Analysis of Different Theoretical Approaches. *Journal of Travel Research*, 50(2), 133-143.

Tiru, M., Saluveer E., Ahas, R., Aasa, A. 2010. Web-based monitoring tool for assessing space-time mobility of tourists using mobile positioning data: Positium Barometer. *Journal of Urban Technology*, 17(1): 71-89.

Vassiliadis, C.A. (2008). Destination product characteristics as useful predictors for repeat visiting and recommendation segmentation variables in tourism: a CHAID exhaustive analysis. *International Journal of Tourism Research*, 10(5), 439-452.