

MAREK NOWACKI*, AGNIESZKA NIEZGODA**

Comparison of Poznań, Wrocław and Bratislava Image Attributes in the Reviews Published on TripAdvisor

Abstract. The aim of the article is to identify unique image attributes of Poznań, Wrocław and Bratislava. It was made using the analysis of opinions posted on the English-language TripAdvisor website ('Things to do...' category for three cities). 76 most-emerging words-attributes were extracted from 29,383 reviews with the text mining procedure. These words differentiate the examined cities among themselves. Analysis of the correspondence revealed unique image attributes for each city. In addition, sentiment analysis was carried out, which showed differences in the affective dimension of the images between the cities.

Keywords: image, cities, attributes, sentiment analysis, correspondence analysis

1. Introduction

Understanding the image creation process is essential for managers of tourism destination, as the image can influence the decision to stay in a destination as well as decide on the competitive advantage of a tourist destination. The authors who deal with the issue of the place image point to the need for conceptualization and operationalization of this concept [Cardoso et al. 2019; Echtner, Ritchie 2003]. This may influence the understanding of how tourists gather information and translate it into a comprehensive picture (and evaluation) of the place. The desired image is achieved in the long term, as a result of a strategy aimed at

* WSB University in Poznań (Poland), Department of Finances and Banking, Social-Economic Institute, e-mail: marek.nowacki@wsb.poznan.pl, orcid.org/0000-0002-6981-7698.

** Poznań University of Economics and Business (Poland), Department of International Economics, e-mail: Agnieszka.Niezgoda@ue.poznan.pl, orcid.org/0000-0002-2456-1633.

strengthening or changing the attitudes and beliefs and decisions of different target groups [Glińska, Florek, Kowalewska 2009: 29].

The authors involved in image research propose various models and components that take part in image creation, the so-called “imagery processing” [Gunn 1972; Gartner 1993; Echtner, Ritchie 2003, Glińska, Florek, Kowalewska 2009; Szromnik 2007; Cardoso et al. 2019]. The starting point in the discussion is the importance of the unique features (attributes) of cities, which determine their competitive advantage on the markets of internal customers (residents, institutions), as well as the customers of external markets (investors, tourists). A distinction is made between features of comparable attributes and features related to the general atmosphere of the place [Echtner, Ritchie 2003; Florek 2014]. The image is also divided into organic and induced [Gunn 1972; Echtner, Ritchie 2003; Florek 2014]. The organic image is based on non-commercial sources of information such as the media, the opinions of friends and family. The induced image is in turn the effect of commercial sources of information. The image of the place and the attributes that build it also result from interpretation of each researcher. The division into organic and induced image, proposed by Clare Gunn [1972], was defined by Bill Bramwell and Liz Rawding [1996] and Aslie Tassci and William Gartner [2007]. In addition, Steven Pike [2007] compiled a list of attributes identified in several hundred works and ordered them according to the popularity of their occurrence. The issue of the distinguishing features of a given city in the reception of tourists is complex, as this reception is influenced by messages controlled by the sender (city), as well as by messages sent by the participants of the tourist movement. In the era of the Internet, the opinions of tourists on social networking sites gain particular importance, which may influence the manner in which image of places is shaped.

The aim of this paper is to identify unique features of the image of Poznań, Wrocław and Bratislava, based on the analysis of opinions published on the TripAdvisor website. The article is part of the stream of attempts to analyse and measure the image of various places and to compare them [Echtner, Ritchie 2003].

2. Image of the city and its components

According to Philip Kotler, the image of a place is “the sum of beliefs, ideas and impressions that people have about a given place” [Kotler et al. 1999: 161]. According to this concept, images are a simplification of a huge number of connections and fragments of information connected with a given place. An image is created on the basis of essential information about a place among many people who come across it [Florek 2014: 126]. Andrzej Szromnik describes the image

(in relation to the city) as “all subjective images on reality that have been created in human minds as a result of perception, the influence of the media and informal information messages” [2007: 134].

The image consists of knowledge about the place, ideas on it, prejudice and emotional attitude [Griszel 2015: 37]. Therefore, it may differ from person to person. Information about a tourist city can be transmitted by different broadcasters and its reception is uncontrolled because it exists in the minds of the receivers. Adam Figiel [2015: 12] based on the concept of G.R. Dowling indicates that there is no need to indicate whether a “homogeneous collective” or a “heterogeneous community” is involved in image shaping. The image is created in the consciousness of people who come into contact with a given object not only directly but also indirectly [Nawrocka 2013: 21]. Analysing the image of tourist destinations, Lucilia Cardoso, Francisco Dias, Arthur Filipe de Araujo, Maria Isabel Marques [2019] present a model in which they distinguish between dream destinations and favourite destinations. The first group is based on the image of places where the tourists have not yet been and which they would like to visit. The second group of destinations is made up of those regions where the tourists have already been and which, in their opinion, are the most suitable to meet the needs of the desired form of tourism. The category of dream destinations is part of the concept that the image concerns the images of people who are not present in the place. For the researchers taking this position, the image is “a mental reflection of the environment in the consciousness of people who have never visited a given place” [Kangas 1998; Griszel 2015].

In the era of speed of information transfer and technology development, such an approach is possible, but it would be a limitation for analysis. From the point of view of the purpose of the research presented in this paper, the opinions of the people who visited the analysed cities and thus have an impact on their image formation should be taken into account. All the more so as the image components are related to the individual impressions, experiences and dreams of the tourist [Cardoso et al. 2019: 81]. The experience of a tourist may modify the image existing in the minds of tourists [Echtner, Ritchie 2003: 38], and thus influence their later choices of destinations. This is in line with the territorial brand function (loyalty and attachment to the city), which means that people who have visited a city and are satisfied will return faster and will probably be good ambassadors for the city [Griszel 2015: 34]. Stepchenkova and Shichova [2017] note that in the image structure of a destination, the ease of remembering the place and the richness and variety of associations associated with it are very important. The image is therefore a whole resulting from a holistic interpretation of reality [Cardoso et al. 2019: 84].

In the literature on tourism economics, the image is studied mainly in the context of a tourist reception place attributes, which include elements of the

natural and cultural environment, the material background of tourism, the aesthetics of the place, entertainment, attitudes of residents and the atmosphere of the place, infrastructural facilities and tourist services [Nawrocka 2013; Glińska, Florek, Kowalewska 2009]. These attributes affect the quality and standard of services provided, however shaping of the image is more complex because it is influenced by emotional elements, impressions and experiences [Niezgodna 2017]. Adam Figiel [2015], exploring various approaches to the place image, came to the conclusion that for an organisation the image may be intentional (what does the organisation want the outside people to think about it), presumed (what does the organisation seem to think about it, how does the outside people think about it) and actual (what are the stakeholders' actual ideas about the organisation).

William Gartner [1993: 193], when analysing the complex nature of the image of a tourist destination, mentions the following components of the image:

- cognitive element connected with the knowledge about a given place;
- emotional (affective) element related to the level of liking for the place;
- behavioural (conative) element connected with readiness to take specific actions in order to visit a place.

According to Lucilia Cardoso, Francisco Dias, Arthur Filipe de Araujo, Maria Isabel Marques [2019: 82], each of these elements plays an important role in the tourist's choice of destination. The attributes of the city's image (brand) can be divided into unique and universal ones [Glińska, Florek, Kowalewska 2009: 80; Echtner, Ritchie 1993, quoted from: Grizel 2015: 38]. Common attributes are repeated in many cities and allow their comparison, while unique attributes are unique and do not occur in a territory other than a given city. The unique attributes of cities are also called their icons [Proszowska-Sala, Florek 2010: 49]. These are very clear symbols that identify a city and, in addition, evoke specific associations and locate the city in the consciousness of the addressees.

Charlotte Echtner and J.R. Brent Ritchie [2003] analysing the components of the image and its structure suggested that the image of a place consists of three types of continuum. Apart from the above mentioned continuum of dividing the image into unique and universal features, the authors propose a continuum in which the image is based, on the one hand, on attributes that can be compared and/or measured, and, on the other hand, the image is based on holistic impressions that are a kind of complex and an image of the sum of associations about a given place. The third continuum creates a dimension between the functional and psychological features of a place. Functional attributes include material, objective and measurable features and objects, as well as comparisons with other destinations. Psychological attributes include non-material, abstract values, impossible to measure directly, connected with the subjective evaluation of the visitor and even his or her emotional colouring. According to the authors, in the

complex system of image components, two-sided dependencies occur: holistic impressions result from the combination and interaction of specific attributes, and at the same time there is an inverse dependence, i.e. the perception of individual attributes is influenced by general feelings and impressions, i.e. the holistic component [Echtner, Ritchie 2003: 41].

For the purposes of the article, research was conducted into associations reflected in the opinions of TripAdvisor portal users on selected cities of Central and Eastern Europe. The authors focused on the analysis of associations related to destination attributes, i.e. attributes comparable in relation to the continuum: functional characteristics versus psychological characteristics. In this paper, the evaluation of holistic impressions was abandoned, accepting the conclusions of other researchers that holistic impressions should be studied on the basis of qualitative analyses and in-depth interviews conducted among specific visitors to the city [Echtner, Ritchie 2003: 44]. Big Data surveys on the basis of opinions placed in TripAdvisor cannot meet the criterion of in-depth researches. At the same time, it can be assumed that in most studies the image analysis is based on a list of comparable attributes and not on the evaluation of complex holistic impressions [Echtner, Ritchie 2003: 41]. The problem results from the complexity of the tourist product. The impressions reflected in opinions of the tourists may concern both a specific element of the place (e.g. hotel, service, attractions, museum, etc.), as well as the whole city.

3. Method

The research was carried out using the desk research method. The analysis used reviews published by users in the English language portal TripAdvisor (www.tripadvisor.co.uk). It is an American aggregator of opinions about tourist enterprises and at the same time the largest tourist website in the world, containing over 760 million reviews of 8.3 million accommodations, airlines, experiences, restaurants and cruisers. It also enables the purchase of selected services collected from over 200 booking sites [PL Media Center, About TripAdvisor 2019]. The portal is available in 28 languages. The English language portal was used in the research due to the possibility of comparing comments on cities located in different countries: Poznań, Wrocław and Bratislava. The choice of cities was dictated by the results of previous analyses, which indicated significant similarity between brands and images of these cities [Nowacki 2019; Nowacki, Niezgodna 2019]. The categories of entries concerning tourist attractions of the examined cities were selected (Things to in ...). The reviews were downloaded from 9-16 March

2019 using the Web Scraper application (www.webscraper.io/). All reviews of attractions (places and objects) with at least 10 reviews were downloaded: 3270 concerning the attractions of Poznań, 7956 – for Wrocław and 18,157 – for Bratislava – a total of 29,383 reviews from three cities (Table 1). Among the surveyed attractions, the largest number of attractions were museums – 26 objects (1,662 reviews), historical buildings – 19 (5,782 reviews), churches and synagogues – 16 (3,088 reviews) and monuments – 15 (4,458 reviews). The largest number of reviews concerned places, streets or squares – 8,876.

The opinion analysis was performed using Text Mining procedure in Statistica 13.0 software and tag maps in QSR NVivo Pro 11.0 packet. Differences in the occurrence of words in the opinions were checked by means of one-factor ANOVA variance analysis. Then the analysis of correspondence was performed, which is a descriptive and exploratory technique, informing about the structure of connections between columns and rows in a table [Hill 1974].

Table 1. Characteristics of the examined sample

Attraction	Poznań	Wrocław	Bratislava	Total	No. of reviews
Place / street / square	1	5	6	12	8,876
Tourist attraction	5	5	2	12	1,982
Park, garden	4	3	4	11	953
Church / Synagogue	3	6	7	16	3,088
Secular historical building	3	7	9	19	5,782
Museum	7	9	10	26	1,662
Cultural institution	1	1	2	4	244
Zoo	2	1	1	4	692
Sports facility	2	2	1	5	111
Monument	4	2	9	15	4,458
Shopping centre	2	2	0	4	122
Educational institution	1	1	0	2	146
Transport facility	2	1	0	3	213
IT Point	1	0	1	2	200
Fountain	1	1	4	6	452
Cemetery	0	1	0	1	31
Contemporary object	0	0	3	3	371
Number of facilities	39	47	59	145	–
Number of reviews	3,270	7,956	18,157	–	29,383

Source: own study.

In order to assess the affective dimension of the image of the examined cities, a sentiment analysis was performed using the SentiStrength application [<http://sentistrength.wlv.ac.uk/>]. It evaluates the strength of positive and negative opinions. The application uses a dictionary of 2,846 words about human feelings, evaluating two dimensions of sentiment: (1) negative: from -1 (not negative) to -5 (very negative) and (2) positive: from 1 (not positive) to 5 (extremely positive). This is due to the observation that people process positive and negative moods in parallel – hence reviews contain mixed emotions. The final result of the evaluation of the text sentiment is obtained by adding a negative dimension (from -1 to -5) to a positive dimension (from 1 to 5), resulting in the strength and direction of the sentiment on a scale from -4 to 4 [Thelwall 2018]. The analysis of differences in the sentiment of opinions between cities was performed with the use of one-way analysis of variance (ANOVA), while detailed differences were checked with Scheffé post-hoc Test [Scheffé 1959].

4. Results

In the first stage of the analysis, the most common words in reviews were identified. This was done using the TextMining procedure in Statistica 13.0 statistical software. This resulted in a set of $N = 367$ words that appeared in at least 1% of all reviews. From this set of words, using NVivo 11.0 software, tag clouds were created for each city separately (Fig. 1 and 2), containing the most common words in reviews of these cities.



Figure 1. Tag cloud for Poznań and Wrocław

Source: own study.



Figure 2. Tag cloud for Bratislava

Source: own study.

Then, from the set of 367 words, proper names and words that did not describe experiences, activities, contexts and places related to them were manually removed, leaving 167 words in the sample. Next, a one-way analysis of variance ANOVA was performed, aimed at showing which words, due to the average number of occurrences in the comments, significantly differ between the three examined cities. As an effect of the analysis 76 words were left in the sample. In order to determine which of the remaining words differ between two specific cities, a post hoc Scheffé test [Kenneth, Borden, Abbott 2008: 432] was performed.

Words that significantly differed in the comments concerning one or two cities in relation to the other are presented in Table 2. The number of unique words for particular cities was quite similar and amounted to 35 for Poznań, 29 for Wrocław and 31 for Bratislava. Their sum – 93 – is higher than the total number of words (76), because a few words are repeated, due to they clearly distinguished two cities from the third one, and therefore they were included in the case of both cities.

Then, an attempt was made to indicate words-attributes belonging to the psychological and functional component of the image. They were defined as follows [Martineau 1958; Echtner and Ritchie 2003; Cardoso et al. 2019]:

- *functional attributes (features) of individual products (places, objects, attractions)* are features and material objects, which are objective and directly observable and measurable, such as prices, appearance, weather or local food, thanks to which one destination is comparable to another, e.g. forms of activity associated with them;

- *psychological attributes (features) of individual products (places, objects, attractions)* are intangible, abstract values, impossible to measure directly and highly subjective, as well as emotional (affective), such as the kindness of the staff or the hospitality of the local population, e.g. delicious.

The authors, as competent judges, have independently assigned the tested word-attributes to one of two dimensions (functional or psychological). After the first round of coding, they achieved a score of 76% (r -Pearson = 0.53). In the next phase, as a result of consultations, they reached a consensus and the remaining words were clearly assigned to two categories (Table 2). For Poznań and Bratislava, most of them were functional features (54% and 58%), while for Wrocław, psychological features (52%).

Table 2. The most common words in opinions concerning Poznań, Wrocław and Bratislava

Dimension	Poznań		Wrocław		Bratislava		
	Word	\bar{x}	Word	\bar{x}	Word	\bar{x}	
Functional >	bar	0.084	architecture	0.079	café	0.052	
	beer	0.043	buy	0.024	church	0.158	
	church	0.143	Christmas	0.037	coffee	0.023	
	color	0.032	colour	0.026	crowd	0.027	
	colour	0.028	display	0.017	expense	0.018	
	display	0.014	fountain	0.040	fountain	0.030	
	eat	0.035	garden	0.060	history	0.061	
	food	0.046	hall	0.072	historical	0.080	
	hall	0.071	historical	0.080	palace	0.031	
	house	0.508	night	0.049	park	0.020	
	inform	0.054	paint	0.062	picture	0.046	
	market	0.153	park	0.017	sculpture	0.028	
	monument	0.044	weekend	0.014	shop	0.095	
	museum	0.176	zoo	0.092	souvenir	0.018	
	pub	0.024	amazing	0.998	tour	0.070	
	restaurant	0.178	atmosphere	0.047	tourist	0.067	
	sit	0.033	beauty	0.294	view	0.367	
	souvenir	0.018	children	0.030	walk	0.286	
	Psychological <	weekend	0.015	cute	0.035	charm	0.045
		atmosphere	0.043	family	0.022	cool	0.023
beauty		0.301	fantastic	0.038	famous	0.012	
culture		0.016	fun	0.111	friend	0.032	
family		0.030	hidden	0.035	local	0.037	
famous		0.017	impress	0.060	memories	0.020	
friend		0.040	kid	0.041	music	0.023	
fun		0.068	love	0.187	nice	0.320	
huge		0.038	peace	0.021	pretty	0.048	
kid		0.035	unique	0.031	quiet	0.018	
local		0.039	wonder	0.058	spectacular	0.015	
music		0.024			unusual	0.015	
people		0.083			worth	0.185	
perfect		0.029					
relax		0.039					
stun		0.038					
wonder	0.054						

Note: \bar{x} – average number of words in one opinion for the city.

Source: own study.

In the next step, for a table of 76 words for 3 cities ($76 \times 3 = 228$ cells), an analysis of correspondence was made. It is a descriptive and exploratory technique, informing about the structure of relations between columns (variables) and rows (cases) of a multidimensional table [Hill 1974; Stanisz 2007]. Pearson's χ^2 test (95% confidence level) was performed prior to the correspondence analysis:

Total inertia = 0.11284; $\text{Chi}^2=12646.0$; $df = 150$; $p < 0.0001$

The test showed the existence of a statistical relation between cases and variables in the table at the level of $p < 0.0001$. The analysis of the correspondence gave two dimensions, which in total reproduce 100% of the total inertia (Table 3).

Table 3. Results of correspondence analysis

Dimension	Eigen value	Singular value	Percentage of inertia	Cumulated percentage of inertia	Chi-squared
1	0.301	0.090	80.497	80.497	10 179.31
2	0.148	0.022	19.502	100.000	24 66.24

Source: own study.

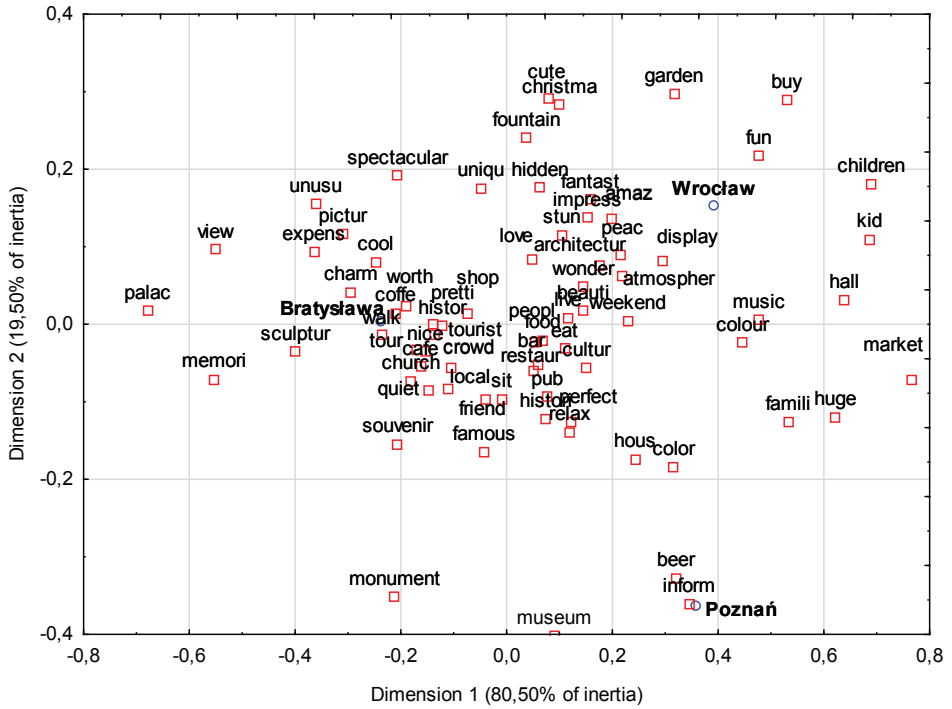
The results of the correspondence analysis are presented on a two-dimensional chart of rows and columns (Chart 1), where circles represent cities and squares represent words. Experiences accompanying a visit to Poznań include museums, beer, historical building/monuments, colourful, families, relaxing, historical monuments. Wrocław means fun, children, gardens, shopping, exhibitions, fantastic, amazing, charming, especially during the Christmas season. Bratislava means historical tours, palaces, memories, shops, cafés, expensive and crowded.

The comparison of positive sentiments showed that the most positive opinions were expressed in reviews of Wrocław (86.83%), then Poznań (85.04%) and the least for Bratislava (83.64%) (Chart 2).

The analysis of negative sentiment showed that Bratislava (27.34%) had the highest number of negative opinions, while Poznań (25.91%) and Wrocław (25.69) had the lowest number of negative opinions (Chart 3).

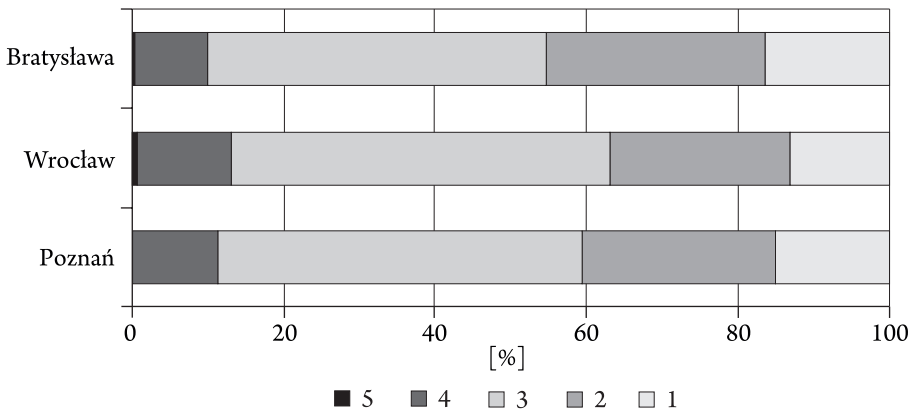
In order to obtain the final result of the sentiment assessment, the negative and positive dimensions were summed up. Analysis of ANOVA variance showed significant differences between the examined cities due to their total sentiment ($F = 55.26$; $p < 0.001$) (Table 4). The detailed analysis with Scheffe Test showed significant differences between each of the pairs of the cities. The most positive

Chart 1. The chart 2W coordinates of rows (cities) and columns (words)



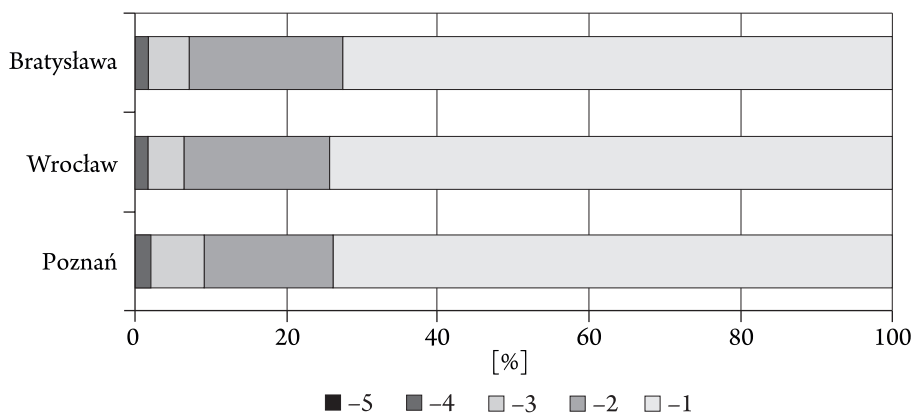
Source: own study.

Chart 2. Distribution of positive sentiment in opinions for the surveyed cities



Source: own study.

Chart 3. Distribution of negative sentiment in opinions for the surveyed cities



Source: own study.

Table 4. ANOVA analysis of sentiment differences in opinions on the surveyed cities

City	Negative	Positive	Total	Standard deviation	ANOVA
Poznań	-1.372	2.561	1.189	1.182	$F = 55.26$ $p < 0.001$
Wrocław	-1.339	2.633	1.293	1.153	
Bratislava	-1.361	2.491	1.130	1.149	

Source: own study.

sentiment was found for Wrocław ($\bar{x} = 1.293$) and it was stronger ($p < 0.001$) than for Poznań ($\bar{x} = 1.189$). On the other hand, Poznań had a significantly more positive sentiment ($p < 0.05$) than Bratislava ($\bar{x} = 1.130$).

5. Conclusions

The aim of this paper was to identify unique features of the image of Poznań, Wrocław and Bratislava. This was done by analysing the opinions posted on the TripAdvisor website by its users, who on the basis of their own experience described the places, objects and tourist attractions of these cities.

Using the Text Mining analysis, 76 words-attributes were distinguished from 29,383 reviews, which significantly differentiate the examined cities from each other. Most of the identified words are attributes of the functional dimension.

The correspondence analysis of the words-attributes and the cities revealed unique features of the image of each of the cities:

1. Poznań is a city associated with a good tourist information office, beer gardens, museums, colourful façades of houses, family tourism and a large number of restaurants and pubs.

2. Wrocław is a fantastic, amazing, peaceful city, rich in attractions for children, gardens and fountains, with a charming Christmas market, exhibitions, wonderful atmosphere, full of music and colours.

3. Bratislava is rich in monuments and sculptures, palaces, churches, souvenir shops and charming cafés, offering unusual views. However, it is expensive and crowded. It is worth planning a walk or a guided tour.

4. Poznań and Wrocław have the most positive affective dimension of the image reflected by sentiment, while Bratislava has the worst. This should also become a goal of interest for the city authorities and local tourist organizations. A detailed analysis of the opinions on TripAdvisor should explain which areas of the image and which elements of the tourist product of the examined cities should be changed.

The identification of the image and its influence on the shaping of the city's brand requires multilateral marketing research [Florek 2014: 127]. It should be remembered that image research is performed by specialists in the area of city management, territorial marketing and tourism development. Therefore, the indicated research results may be used in various aspects. For example, the fact that Poznań is associated as a centre with good information facilities may attract tourists who are not well prepared to visit the city and expect assistance in this respect. Wrocław may attract families with children as tourists, but also residents. The overcrowding of Bratislava is reflected in the survey results may discourage tourists a little, but it may attract entrepreneurs (e.g. traders).

One should also bear in mind the limitations resulting from the subjective nature of opinions submitted by tourists. The opinions can be published by any person and the sample is not always representative. Therefore, it may differ from person to person. Information about a tourist city can be transmitted by different broadcasters and its reception is uncontrolled because it exists in the minds of the receivers [Chan, Peters, Marafa 2016]. The image as defined in the introductory part of this article has a subjective character. It can therefore be assumed that the influence of the opinion of tourists is undeniable and the image is not a permanent category and has an individual character. The comparison of image attributes between individual cities may help in the process of analysing their competitiveness as tourist destinations.

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Porównanie atrybutów wizerunku Poznania, Wrocławia i Bratysławy na podstawie opinii zamieszczonych w TripAdvisorze

Streszczenie. Celem artykułu jest identyfikacja unikatowych atrybutów wizerunku Poznania, Wrocławia i Bratysławy. Cel ten zrealizowano za pomocą analizy opinii zamieszczonych na angielskojęzycznym portalu TripAdvisor.co.uk. Pozyskano 29 383 recenzji z kategorii atrakcji turystycznych (*Things to do...*) dla trzech miast. Za pomocą procedury Text Mining wyodrębniono 76 najczęściej powtarzających się atrybutów-słów. Słowa te w istotny sposób różnicują między sobą badane miasta. Analiza korespondencji ujawniła unikalne atrybuty wizerunku każdego z miast. Ponadto wykonano analizę sentymentu (wydźwięku), która wykazała istotne różnice w afektywnym wymiarze wizerunku pomiędzy miastami.

Słowa kluczowe: wizerunek, miasta, atrybuty, analiza sentymentu, analiza korespondencji