

The Instagram Image of the City. Insights from Lodz, Poland

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Abstract. The age of big data opens new opportunities for urban research. As millions of users have been creating and transmitting visual representations of cityscapes (e.g., photos taken with smartphones), it is crucial to understand features of the online crowd-sourced images of cities and their relations with their offline archetypes. However, it seems that photos posted by users of social networking sites remain understudied and their informative potential has not been fully exploited yet. The aim of the conducted research was to examine and comprehend the nature of the Instagram image of the city. The paper presents the results of investigating 1867 Instagram photos featuring outdoor city views taken in Lodz, Poland in September 2015. The posted photos were classified by their components and attributes. The study revealed that Instagram content does not reflect the urban space in general. It rather selects geographies and subjects presenting aestheticized and picturesque places and objects. Nevertheless, the new components of cityscapes seem to be noteworthy for Instagram users. Finally, the paper argues that mapping Instagram content without prior and careful examination of the local context may lead to biased conclusions.

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1. Introduction

In tandem with the emergence of mobile devices and Internet ubiquity, people started to generate online geotagged content through social networking sites. Although few terms have been employed to describe this recent phenomenon (e.g., crowd sourcing, citizens as sensors, user-generated content, volunteered geographic information), most of them relate to systems where users contribute to data collection processes without prior training or supervision (Richter, Winter, 2011). Content generated by users is rated nowadays as “the fastest-growing source of spatially referenced data” (Cope, 2015) and grabs particular attention among scholars doing research on cities (Feltynowski, 2016). Additionally, it seems that user-generated content may cover aspects of urban life that have not been supplied by traditional ways of data collecting or it may allow for a much larger scale of analysis. Furthermore, observations made on the results of traditional urban research techniques may be widened by a flow of people’s mundane experiences internalised in social networking sites’ metadata that is accidental in nature and often georeferenced. However, Kitchin (2013) points that progress in devising new data analytics is indispensable for scholars to “make sense of massive data sets”. Hence, moving beyond visualisations of geotagged big data remains one of the ongoing challenges (Shelton, 2016). Since the prevailing discourse tends to “obscure, more than reveal” the complex socio-spatial processes (Graham, Shelton, 2013) and in some fields the computing side dominates over the urban one (Arribas-Bel, 2014), the explanatory power of metadata stored in social networking platforms in general—and geotags in particular—seems to be limited (Crampton et al., 2013). Thus, moving beyond geotags might support more complex understandings of cities.

The present paper is focused on Instagram—the common social Internet-based photo-sharing service established in 2010 that gathers more than 700 million users (Instagram, 2017) around visual representations of everyday lives. The popularity of Instagram manifests the emerging significance of visual communication on the web, where photos and videos are “the key social currencies online” (Rainie et al., 2012). According to the typology of big data

sources by Arribas-Bel (2014), the Instagram data is collected in a bottom-up approach, i.e. “from mobile sensors carried by humans”. Instagram mobile application functionalities include taking, editing, tagging, sharing, exploring and commenting photos or short videos. Furthermore, research into the motives of Instagram use reveals that it is exploited mainly for the purpose of documenting everyday lives. However, some users take advantage of Instagram to learn about other users, to express one’s creativity or to self-promote (Sheldon, Bryant, 2016). Although we do not have exact knowledge on Instagram demography, several studies have shown that its users are mostly young people (Rainie et al., 2012; Duggan, 2015; UM Polska, 2015).

In contrast to the growing popularity of Instagram, this social media site remains understudied from the urban research and planning perspective. More precisely, for the purpose of conducting studies in social networking sites and cities, scholars definitely prefer to employ Twitter geotagged posts. The ease of collecting and processing textual data might be a predominant factor of visual content analysis negligence in big data research practice (Highfield, Leaver, 2015). However, Instagram content has been featured recently by newspapers as a material for portraying particular cities (e.g., the Guardian). Indeed, Instagram reflects mostly urban areas because it is used first and foremost by urbanites (Duggan, 2015). In other words, Instagram captures mainly the largest and global cities (Manikonda et al., 2014). Due to its urban nature, Instagram content is appraised as a source of information on city dynamics or sights (Silva et al., 2013) and as a source of data for studies of particular events taking place in cities (Hochman, Manovich, 2013; Manovich et al., 2014). Moreover, it has already been exploited for the study of cultural ecosystem services (Guerrero et al., 2016), social segregation in cities (Boy, Uitermark, 2016), and tourists’ activities in urban areas (Kotus et al., 2015).

This study of Instagram photos is an attempt to examine the notion of the image of the city in the age of social media. However, studies on cities’ images have a long tradition and show two main strands of research perspectives. The first one focuses on the cities’ images created and curated in the process of branding strategies. Thus, researchers who study them deal with promotional materi-

als delivered by municipalities to understand how images of cities are being communicated (e.g., Vanolo, 2008; Young, Kaczmarek, 2008). The second perspective is concentrated on cityscapes' features or components and their perception of humans. This strand of research was highly influenced by Lynch and his pioneer studies of a city image that employed mental maps (Lynch, 1960, 1984). Nevertheless, subsequent studies of sociologists and geographers started to apply photos as a valuable source of information about the human environment in general (Rose, 2008), and human perception of cityscapes in particular (e.g., Tobiasz-Lis, Wójcik, 2013a). As a result, the contemporary ubiquity of visual user-generated content produced through social networking platforms seems to be an intriguing field for urban scholars, offering new research perspectives on the "perception and cognition of the crowd itself" (Dunkel, 2015).

Since millions of users have been creating and transmitting visual representations of cityscapes

(e.g., photos captured with smartphones, Fig. 1), it is crucial to understand features of the online crowd-sourced images of cities. Thus, the aim of the present study is to understand the nature of the image of the city shared on Instagram and its relations with the offline archetype. The study was conducted through an investigation of photos featuring outdoor city views (namely architecture and public spaces) that had been taken in Lodz (Łódź), Poland. Although Instagram remains less popular among Polish users in comparison to their counterparts in other countries (UM Polska, 2015), Lodz with its 700,000 inhabitants seems to be large enough to reflect the subject heterogeneity of Instagram photos. What is more, Lodz is an accurate example of a post-industrial and post-socialist city in deep transition where economic and social changes are reflected in the continuously transforming cityscape. In other words, the spatial structure of Lodz presents plenty of contrasts, where neglected/deprived and regenerated/gentrified neighbourhoods are located



Fig. 1. A person taking a photo of an outdoor city view using Instagram

Source: Own work

next to each other (Sokołowicz et al., 2010; Tobiasz-Lis, Wójcik, 2013b; Jakóbczyk-Gryszkiewicz et al., 2014). Thus, the various and highly differentiated qualities of Lodz urban tissue are an intriguing case for studying Instagram photos.

The paper is organized as follows: the next section describes the employed methods of obtaining Instagram photos featuring outdoor city views and disassembling their subjects. The study results are presented in section 3 and followed by a discussion of the findings referring to the nature of the Instagram image of the city and to the limitations of Instagram content use for urban research purposes. The last section provides conclusions.

2. Material and research methods

This section investigates how the Instagram dataset was queried, how particular photos were selected to be a sample, and how the subjects of photos were disassembled afterwards. Each post on Instagram has its visual representation. To be specific, the functionality of Instagram interface allows its users to upload a photo or short video, leaving textual data optional. Thus, researchers may draw upon the technical homogeneity of Instagram content. It is particularly interesting from the urban research perspective that Instagram content can be assigned to a geographical location by choosing one of plenty predefined and labelled “locations” (e.g., geographic names or points of interests, such as landmarks or businesses) with specified geographical coordinates. Although the application suggests to its users a list of nearby “locations”, checking the current location of the mobile device, they may set any “location” established in the Instagram searchable database. All things considered, Instagram might be studied threefold. Firstly, researchers may pay attention to textual data (e.g., hashtags) enclosed in captions or comments to shared photos and videos (Highfield, Leaver, 2015). Another opportunity is the spatial exploration of Instagram content through geotag analysis. However, the third approach takes advantage of Instagram’s visual specificity and tries to disassemble its photo content. This may be conducted through automated computer vision techniques, through manual categorisation or by combining

both methods (Hu et al., 2014; Bruno et al., 2015; Manovich, 2016).

Social networking platforms often provide application programming interfaces (APIs) that allow third-party developers and researchers to access the metadata of user-generated content (e.g., IDs, date stamps, geotags) in an automated way (Arribas-Bel, 2014). However, the access to Instagram API is limited to the content shared by users as “public”. It was queried in December 2015 for all posts published in September 2015 and georeferenced to a circular area defined by a midpoint centre (51.7592, 19.4560; commonly perceived as the centre of Lodz) and a radius of 5 km. Due to the relatively compact spatial structure of Lodz, this area covered its historical core, commercial and industrial districts, post-war housing estates, low-density residential neighbourhoods and urban green spaces. In consequence, suburbs and satellite towns were left behind. Furthermore, the choice of September was intentional, as academic year starts at Polish universities in October and cities in Poland generally host tourists between June and August. Thus, the choice of September excluded the hypothetical predomination of students and tourists in the creation of Instagram content, while weather conditions were still encouraging for enjoying outdoor activities and for capturing cityscapes through a smartphone lens. Thus, the defined query to Instagram API resulted in a sample of 11,071 geotagged photos which might represent 19% of all photos shared on Instagram in this area (according to the calculations of Manikonda et al., 2014). From a technical point of view, the employed method of querying Instagram API was successfully used by other researchers (Manovich et al., 2014; Boy, Uitermark, 2015, 2016).

The purpose of the study was to understand the nature of the Instagram image of the city through an investigation of Instagram photos featuring outdoor city views (namely architecture and public spaces), thus it was necessary to move beyond the metadata provided by Instagram API. Thereby, a manual inspection of 11,071 entries (photos and videos) obtained from Instagram API yielded 1867 photos presenting outdoor city views (16.86%) that were selected for a further analysis (videos were excluded). This result seems to be comparable to the number of Instagram photos (15%) associated with “both outdoor & indoor activities, places

where activities happen” by Hu et al. (2014). The manual inspection of photos was conducted by a group of 24 volunteers from Lodz who worked in pairs (both online and offline) and discussed their outcomes with each other to make corrections, ensuring consistency of the results. Volunteers were using a purposely-designed online application to browse and select photos to the sample and to assign them to pre-established categories. Scholars point that there is a wide range of subjects of photos uploaded on Instagram (Hu et al., 2014; Manovich, 2016). Thus, the question asked towards each photo before selecting it into the sample for further analysis was “Does the photo present first and foremost the city?” In other words, photos presenting portraits of people, or pets, food, clothing, gadgets, etc. were not included in the research, even if urban space was visible in the background. In essence, irrelevant Instagram content was excluded and only photos presenting outdoor city views were accepted for further investigation. Figure 2 summarises the described process.

To shed light on the Instagram image of the city, photos presenting outdoor city views were manually classified by their subjects and qualities of the featured architecture and public spaces:

1. Photos featuring architecture constitute the first category. More specifically, these photos were examined to specify the time of the building’s construction (“historic” or “modern/contemporary”), the building’s original function (“residential”, “industrial”, “commercial” or “civic”), which usually relates to its architectural form, and the building’s visual appearance (“well-kept” or “neglected”).
2. The second category consists of photos presenting public spaces. In this case, photos were distinguished by the type of public space (“street”, “square”, “park” or “semi-public space”) and the type of public art featured (“mural/graffiti”, “sculpture/monument”).
3. The last category, “recent”, covers photos featuring objects or places that were established or were in construction in September 2015.

However, these categories did not reflect the entire complexity of outdoor city views on Instagram. Thus, to deal with unclear subjects of photos (e.g., a photo featuring both historical and contemporary

architecture) additional sub categories - “unclassified” - were created. Lastly, it should be noted that one photo might have been included in several categories. For instance, in the majority of photos classified as presenting public spaces architecture was also featured. On the other hand, photos presenting parks were included exclusively in the category “public space” as they did not feature architecture. Finally, the manual examination of Instagram photos employed for this study created an opportunity for verifying geotagging accuracy. It was performed in the case of the five most popular Instagram “locations” in Lodz through a comparison between “locations” assigned to photos by Instagram users and the actual location in physical space of architecture and public spaces featured.

3. Results

This section presents detailed results of the conducted analysis. 1867 photos (16.85%) out of 11,071 entries (photos and videos) geotagged in Lodz and posted on Instagram in September 2015 were recognized as presenting outdoor views of the city featuring architecture (72.04%, n=1345) and public spaces (69.47%, n=1297).

The oldest buildings in Lodz date back to the 1820s, as the city grew rapidly due to the 19th-century industrialisation. Instagram photos featured mostly “historic” architecture built before the year 1945 (77.70%, n=1045). Although a significant share of building stock in Lodz was constructed in the post-war era due to the urban renewal initiatives, “modern/contemporary” architecture was featured only in one-fifth of the entire photo set (21.26%, n=286). The analysis of building types sheds more light on the patterns of presenting architecture in Instagram photos. Even though the most popular type of architecture was “residential” (50.48%, n=679), it mostly included 19th and early-20th century tenements (42.16%, n=567) nowadays hosting a variety of businesses on ground floors. Since their facades are rich in ornament, they may draw the attention of Instagram users. On the contrary, numerous and commonly inhabited post-war modernist blocks of flats were seldom presented (5.72%, n=77). Doubtless, the Instagram image of Lodz is

built upon former factories (22.53%, n=303), mostly red brick buildings housing textile production. This sort of architecture in Lodz has recently been refurbished to host cultural and commercial venues and thus brought back to the minds of locals and tourists. The meagre attention paid to “civic” architecture (13.09%, n=176; such as public institutions, universities, temples, etc.), may be a consequence of the political context of Lodz’s rapid growth in the 19th century when a very limited number of buildings of this sort were erected (Lodz’s remarkable increase in population was not complemented by its promotion in the administrative hierarchy of the Russian Empire). Finally, there is a strong domination of “well-kept” architecture (75.24%, n=1012) over the “neglected” one (18.96%, n=255).

The most popular type of public spaces featured in Instagram photos was “streets” (37.5%, n=336). However, the results of the analysis confirm the spe-

cific character of Lodz urban tissue where traditional public spaces are limited due to a relatively sparse street network and large urban blocks that are the legacy of former industrial sites. In this respect, privately owned “semi-public spaces” (31.81%, n=285) created within urban blocks and imitating their public archetypes play an important role in attracting the attention of Instagram users. Lodz’s “parks” were featured on every fifth photo presenting public space (20.31%, n=182). Moreover, 19.44% (n=363) of photos classified in the category “public space” featured “public art”. Most of them focused on “murals” (68.04%, n=247) that became popular due to the street art festivals organised in the city. As a matter of fact, in the queried month a festival of murals was held in Lodz and it could be the source of the described bias. Traditional types of public art—“sculptures and monuments”—gained less attention (27.55%, n=100). Finally, 7.34% of all pho-

Table 1. Distribution of photographs assigned to pre-established categories

Category	Sub category	Feature	Number of photos (n)	Share of photos in subcategory (%)*	Share of photos in the entire set (%)**	
Architecture	Age	Historic	1045	77.70	55.97	
		Modern/contemporary	286	21.26	15.32	
		Unclassified	14	1.04	0.75	
	Type	Residential	679	50.48	36.36	
		Industrial	303	22.53	16.23	
		Civic	176	13.09	9.43	
		Commercial	109	8.10	5.84	
		Unclassified	78	5.80	4.18	
		Visual appearance	Well-kept	1012	75.24	54.2
			Neglected	255	18.96	13.66
Unclassified	78		5.80	4.18		
Public space	Type	Street	336	37.5	18.00	
		Semi-public	285	31.81	15.27	
		Park	182	20.31	9.75	
		Square	42	4.69	2.25	
		Unclassified	51	5.69	2.73	
		Public art featured	Mural/graffiti	247	68.04	13.23
			Sculpture/monument	100	27.55	5.36
	Other		16	4.41	0.86	
	Recent	-	-	137	-	7.34

* 1345 = 100% of photos featuring architecture; 1297 = 100% of photos featuring public spaces. ** 1867 = 100%

Source: Author’s calculations

tos (n=137) featured components of Lodz cityscape that were established or were in construction in the queried month.

4. Discussion

4.1. Nature of the Instagram Image of the City

One of the vivid directions in the debate on social media research is the extent to which user-generated content presents social reality distortedly. This problem is an especially interesting field of study from the perspective of representations of cityscapes in social media—and Instagram in particular. Hochman and Manovich (2013) noticed that Instagram allows its users to manipulate the perceived time and atmosphere of the photos taken through the use of built-in filters. This seems grounded in light of the present study, as the majority of examined photos (51.58%, n=963) had filters applied.

However, the dichotomy that is expressed by “reality” and “reality stored on Instagram” seems to be not only a matter of the application’s functionalities, but also users’ preferences. The results of the study show that Instagram users tend to focus on positive connotations of the cityscape components. It is best reflected in the fact that three in four photos of architecture featured well-kept buildings. Although other studies revealed that the perceived image of Lodz cityscape consists of contrasting neglected/deprived and regenerated/gentrified areas (Sokołowicz et al., 2010; Tobiasz-Lis, Wójcik, 2013b), this opposition is almost absent in the stream of Instagram content. For instance, some streets of Lodz are fouled with rudimentary wall writings reflecting quarrels between supporters of local football clubs. Nevertheless, among 130 photos classified as presenting writings in public spaces, only 3 featured such content. In other words, Instagram users seemed to avoid capturing neglected architecture or public spaces except those that relate to consumer culture, look funny or relate to alternative subcultures. These results support the findings of other researchers that “Instagram constitutes a distinctive way of seeing that composes an image of the

city that is sanitised and nearly devoid of negativity” (Boy, Uitermark, 2015).

Because Instagram users utilise this social media platform partly for self-promotion and to gain popularity (Sheldon, Bryant, 2016), they may not be eager to capture and share photos of architecture and public spaces that trigger negative connotations. Thus, posting photos of outdoor city views might be a part of the creation of users’ image of themselves. An optional explanation of this phenomenon may be drawn from the classical works of Lynch (1960, 1984). According to his findings, people do not perceive cityscapes in general, but rather select their components. Apparently, the same behaviour may be exemplified in the activities of Instagram users. The conducted research shows that two separate worlds exist at the same time: the “real” one, having all imperfections, and the “curated” one, shared among Instagram users. Hence, the Instagram image of the city seems selective and purified when compared to its offline archetype. This finding suggests to some extent that Instagram content may be employed in studies in geographies of entertainment, tourism and gentrification within cities.

Furthermore, this study shows that an appreciable share of Instagram photos presenting outdoor city views feature components that are recent in the cityscape. In particular, 7.34% (n=137) of photos featured buildings and places that were being established or that were under construction in the queried month. For instance, every September Lodz hosts a street-art festival that includes painting murals on buildings by globally-recognised artists. Murals painted in September 2015 were frequently featured in Instagram photos (n=74). Most of them are located in (often deprived) neighbourhoods that do not attract Instagram users for other purposes. It seems that the users might have visited the places purposely to take photos of the murals. Furthermore, the construction area of the new iconic central tram station gained a relatively significant share of attention, as it was featured in 27 photos. In other words, this infrastructural object became a landmark among Instagram users two months before opening. Finally, 26 photos featured a new shopping centre “Sukcesja” that was launched on September 25th. Due to the long-lasting and durable nature of cityscapes, where changes are only

marginal in the short term, it seems relevant that the new objects are noteworthy for Instagram users.

4.2. Beyond Instagram geotags

Most of the social media research in cities uses geotags stored in metadata to understand how contemporary cities function and where particular activities of people occur. In many cases, researchers draw conclusions from maps based exclusively on user-generated content geographical coordinates stored in APIs. Thus, to better understand the relations between Instagram image of Lodz and its offline archetype, an additional manual examination of photos content and geographic locations was conducted as the data analysis revealed that over a half of all photos (50.19%, $n=937$) were assigned by users in Lodz to just five Instagram “locations” (Table 2). It should be mentioned that several pre-defined Instagram “locations” may refer to one physical location: the examples are “Ulica Piotrkowska” and “Piotrkowska”, referring to Piotrkowska street in Lodz. The high popularity of these five “locations” is represented on a map depicting the spatial distribution of photographs in the queried area (Fig. 4).

The manual examination of photos and their geographic coordinates revealed that some geotags assigned to Instagram photos do not accurately reflect the actual location in which the photos were taken, making the data useless in a city-scale analysis. In detail, the accuracy of four of the five most popular “locations” seems questionable. The popularity of the most frequently used “location” labelled

as “Łódź, Poland” ($n=543$) was most likely a result of its name that reflects directly the name of the city. Thus, when Instagram users wanted to provide information that photos were taken in Lodz without providing locational details, the most obvious way was to apply this “location”. However, its geographical coordinates are set in Helenów park (2.80 km north-east from the city centre), making it unintentionally a Lodz Instagram hotspot, although only one of all 1867 photos was recognised as actually taken there. Thus, doubts on Instagram geotags’ accuracy in physical space reproduction may occur in the case of large areas assigned to “locations” that are spots in their nature. For instance, the “location” of the highly-popular commercial and cultural venue “Manufaktura” ($n=140$) is geographically assigned on Instagram to its western boundaries, where unwelcoming parking lots are located. In fact, the majority of photos assigned to this “location” were taken by Instagram users around the central square of “Manufaktura” (0.45 km east from the predefined “location”). Finally, Instagram allows users to assign photos to at least two “locations” related to the most popular Lodz public space—Piotrkowska street ($n=131$, $n=55$ respectively). Nevertheless, due to the significant length of the street, i.e. 4.20 km, these “locations” assigned to two points do not accurately reflect the linearity of the street. Figure 5 provides a corrected perspective on the spatial distribution of photos after the exclusion of those geotagged as the four debatable “locations”. These findings suggest that Instagram geotags may work well as reliable geographic references when assigned to small areas or particu-

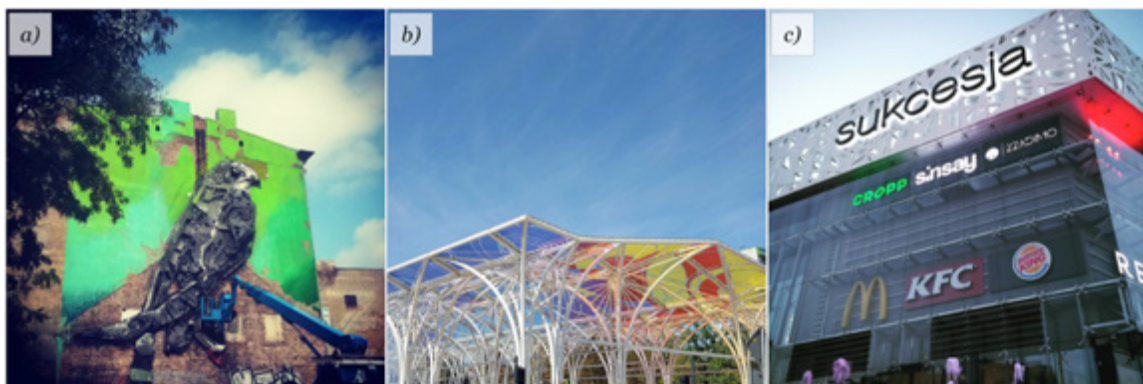


Fig. 3. Instagram photos presenting Lodz views taken in September 2015 featuring objects that were recent in the cityscape: a) Murals; b) Central tram station; c) “Sukcesja” shopping centre

Source: Instagram profiles: a) soul_sistaa, b) izkwiatkowska, c) gouda_works

Table 2. Distribution of the five most popular Instagram “locations”

Instagram “location” name	Number of photos assigned (n)	Share of photos in the entire set (%)*
Łódź, Poland	543	29.08
Manufaktura	140	7.50
Ulica Piotrkowska	131	7.02
OFF Piotrkowska Center	68	3.64
Piotrkowska	55	2.95
	937	50.19

Original names of “locations”. * 1867 = 100%

Source: Author’s calculations



Fig. 4. Heat map of all photos presenting outdoor city views with four “locations” of debatable geographic accuracy (n=1867)
Source: Own elaboration



Fig. 5. Heat map of all photos presenting outdoor city views after the exclusion of those associated with the four “locations” of debatable geographic accuracy (n=998)

Source: Own elaboration

lar objects (e.g., cafes, restaurants, monuments), but in cases of large areas their geographic accuracy becomes a problem. More precisely, mapping geo-referenced data stored in the Instagram API on the scale of a city or a neighbourhood may lead to biased conclusions, thus the metadata should be carefully examined before use.

5. Conclusions

This paper tackled the relationships between the Instagram image of the city and its offline archetype,

i.e. Lodz, Poland. The method utilised for the study moved beyond the prevalent focus on metadata in social media research through the employment of a manual inspection of strictly-selected Instagram content. Photos presenting Lodz’s outdoor city views on Instagram were carefully and collectively disassembled to allow the author to understand the nature of city images produced by Instagram users. The conducted research shows that Instagram content does not reflect the urban space in general, but rather selects geographies and subjects, capturing aestheticized and picturesque places and objects. Furthermore, Instagram content may capture some of the dynamics of the city, because a considera-

ble share of photos presenting outdoor city views in Lodz was focused on newly-established places and objects. However, the results presented here are limited as the Instagram content was analysed only for one city in a particular moment of time. Further research is needed to draw generalisations on the nature of the “Instagram Image of the City”. It should take into consideration more case studies in wider time spans and it should also apply alternative research methods (e.g., interviews among Instagrammers). Nevertheless, the study contributed to the social media research into cities by showing that simply mapping geotagged data stored on the Instagram API may lead to biased conclusions. The final advice is that the data obtained from Instagram should be carefully examined in the local context before use.

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