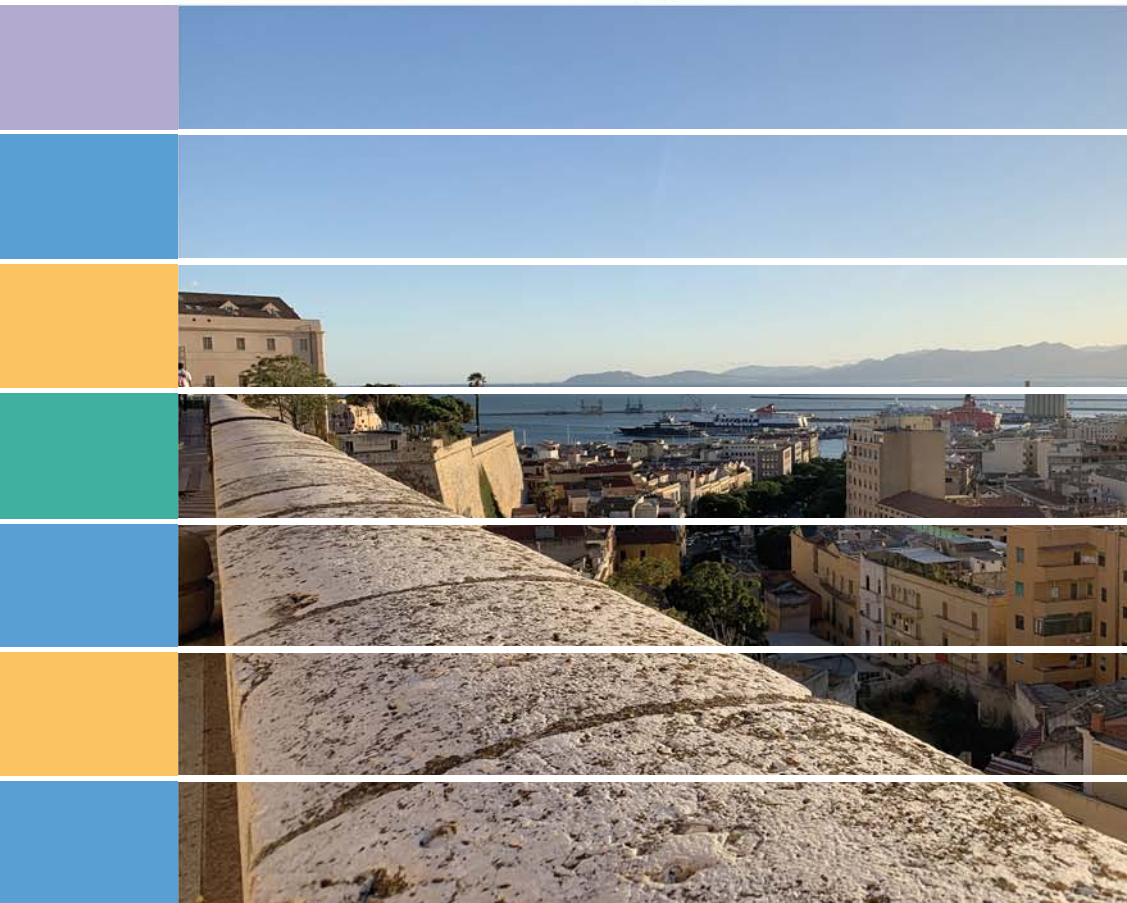


Carmela Gargiulo Corrado Zoppi  
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## SMART MAPPING TOOLS FOR THE BALANCED PLANNING OF OPEN PUBLIC SPACES IN THE TOURIST TOWN OF GOLUBAC, SERBIA

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### ABSTRACT

*Cultural tourism is becoming an important factor for local socio-economic perspective today. This is especially visible in smaller remote locations with rich cultural and natural heritage, where the other economic drivers are usually limited due to this remoteness. The proper example for this is the Iron Gates, where local heritage has been isolated by this longest gorge of the Danube. Nevertheless, the boom of cultural tourism has been noticed last years. The problem is that it is very concentrated in the main heritage sites, leaving the other parts without observable socio-economic benefits. Golubac Town at the western entrance of the gorge is such example. This is the only town in the Iron Gates with a historic urban core and the variety of open public space. Although magnificent Golubac Fortress is close and the Danube is the widest in its flow in the front of Golubac, local tourism is still underperforming.*

*This paper aspires to examine the prospects of Golubac Town to become a proper destination of cultural tourism by the comparison of two methods, both based on spatial networking through mapping. The first one is customised space syntax, oriented to the use of open public space by different users as a prerequisite to support the deconcentrated use of wider urban environment. The second method is newer and "smart" – it the mapping of the use of open public space extracted from social media (Tweeter, Instagram, and Flick) and it is more attached to visitors. Using these two methods on the case of Golubac the paper results in the recommendations how to improve traditional urban planning and design for the potential tourist destinations that face the high spatial imbalance of tourist visitors between their parts.*

### KEYWORDS

*Smart city; tourism mapping; cultural tourism; space syntax; social networks*

\* The other author is: Nikola Dinkić.

## 1 CULTURAL TOURISM, PLANNING, AND SMART DEVELOPMENT

Tourism is one of the most promising sectors in global economy. By the recent estimations, tourism and travel account more than 10% of global GDP (WWTC, 2018). However, more significant is that tourism is developing fast – it is predicted that tourism will grow by 3.8% annually in the next decade, far more than general economy. Therefore, it will play more important role in the socioeconomic prospects in the world (Lyon & Wells, 2012).

Some subsets of tourism are anticipated to have even faster development, becoming megatrends (OECD, 2018). A right example is a cultural tourism, which refers to traveller's aspiration to meet with and experience of the culture of a certain tourist destination, including many local cultural factors, such as heritage, lifestyle, manifestations, tradition or customs (ICOMOS, 1997). It is regarded to be a key element of a "quality tourism" (Richards, 2007, p. 1) The rise of the cultural tourism has been evident in the last decades. It has a constant increase in tourism share, making almost 40% of tourism arrivals globally (UNWTO, n.d.). Therefore, this tourism subset is becoming the important generator of the local economy (Frey, 2019). Finally, the cultural tourism also generates new trends in tourism sector, such as its geographical expansion and interest on indigenous cultures and traditions (Richards, 2018) or the engagement of the visitors in the local cultural practice, to experience direct cultural contacts (Chen & Rahman, 2018).

With its rise, the planning of the cultural tourism emerges as a paramount element of its sustainable development. Knowing that all socioeconomic practices inevitably reflect in a space (Lefebvre, 1974), the territorial planning imposes its importance in the formation of the competitive tourist destinations (Risteski et al., 2012). This is noticeable at different spatial levels. In a regional planning, the concept of the cultural landscapes and their viable use especially refers to the proper planning of cultural tourism (Şimşek, 2017). Then, it is also related to all levels of the urban planning and all segments of settlement areas (Barrera et al., 2016).

Nevertheless, the proper planning of the cultural tourism and, even more, the implementation of these planning actions are an immense task. This is particularly true in the case of small and underdeveloped towns and communities, which, as it was aforementioned, arising as new-trend destinations in this sector. The economic, organisational, and human resources of these communities are usually limited (Jamieson, 1993). Taking into account possible pressure from mass-tourism, these towns and communities face many spatial problems in their destination-tourism development. A common consequence is a poor spatial balance in this development that further implies social and economic polarisation in the destination and its overall underperformance (Paskaleva et al., 2006).

A good example is the small town of Golubac in the Iron Gates Region along the Danube, Eastern Serbia. The Iron Gates are unique by the fact that this is the longest gorge of the Danube, the second longest European river and its first-tier inland waterway. The recent boom of the mainly cultural tourists, driven by promoting heritage destinations along the Danube, has had a limited impact on local communities in the gorge due its traditional remoteness and inherited socioeconomic obstacles. This is also visible in Golubac Town, where the new tourist flow has not been appropriately utilised for the local prospects, at least partly due to imbalance in the spatial development of the tourist destination.

The explained gap between tourist potential and limited local resources conditions an adequate research and assessment of their current state as a prerequisite for a qualitative planning (Paskaleva et al., 2006). In this situation, the innovative and out-of-the-box approaches can be especially useful for the efficient planning of the small-format tourist destinations, such as Golubac. The aim of this research is to present them by the comparison of two network-based methods: customised space syntax and the mapping of the sentimental paths from social media. Using these two methods on the case of Golubac the paper results in the recommendations how to improve traditional urban planning and design for the prospective destinations of cultural tourism that face the high spatial imbalance of tourist visitors between their parts.

## 2 METHODOLOGY

This paper is shaped as a case-study research. Before the presentation of the case study, relevant theoretical fundamentals are scrutinised. The case study – Golubac Town – is analysed by two quantitative methods:

- Customised space syntax method, oriented to the use of open public space by different users during a day; and
- Creating the sentimental path of users - mapping of the use of open public space extracted from social media (Tweeter, Instagram, and Flick), more related to visitors' experience.

The both methods are innovative for the urban planning because they are based on the networks through the concepts of sentimental paths and place attachment. The network planning has long been neglected instead of the zoning spatial planning; however, the network-led spatial planning is more adaptive, effective and dynamic (Dupuy, 2008). The correlation between the methods refers to the postulates of the concept of the place attachment that explore emotional interaction between a person and an environment (his or her place). The both methods indirectly identify the complexity of this interaction. Rapoport

(1990) concludes that environment acquires its meaning through the way people react on it. In the case of the mapping of the social media, the new sentimental paths are formed by the experience of the tourists transferred through their use of the social media; in the space syntax, the trajectories of users in a certain place refer about their habits and the ways of life, i.e. their feelings, memories and interpretations evoked by space.

Their comparison in the final part of the paper is a guideline to create the recommendations for a sustainable and innovative urban planning of the small-format tourist destinations.

### 3 CASE STUDY: GOLUBAC TOWN, THE IRON GATES GORGE

#### 3.1 GOLUBAC TOWN – CURRENT ASSESSMENT

The location of Golubac in the Iron Gates Gorge gives this town uniqueness as itself (Fig. 1). The Iron Gates (Serb. *Đerdap*) reach many records at European and broader regional level. With the length of more than 130 km, it is not only the longest gorge of the Danube River, but also at the entire continent. The narrowest part of the gorge is also the narrowest point of the Danube in 2/3 of its lower length, downstream from Germany. This 180 m-wide part is Veliki Kazan (Eng. *Great Cauldron*) inner narrow (Fig. 2), but it is also the deepest point (82 m) of any European river (Stanković, 2006).

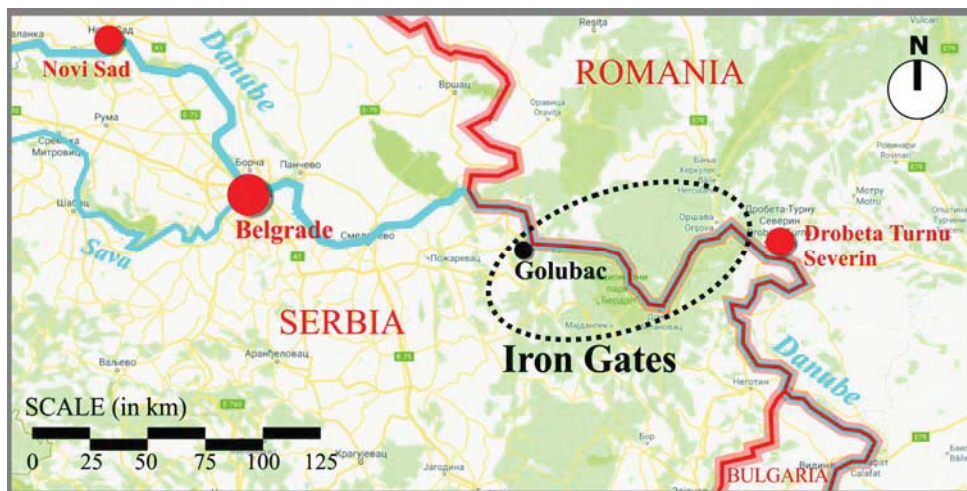


Fig.1 The location of The Iron Gates/Đerdap Region and Golubac Town (Author: B. Antonić; Supplementary maps: Google Maps).

These remarkable dimensions of the Iron Gates have influences on the other specific aspects of their nature. First, the geomorphologic features of the gorge are extraordinary, with the



variety of the tectonic structures. The gorge isolation further causes microclimate conditions, which eventually enable unique flora and fauna, rich biodiversity and many endemic species (Maran Stevanović, 2017). The natural protection of the gorge was also a crucial to one of first permanent human settlements in Europe is situated here. The famous Lepenski Vir Archaeological site from Mesolithic was nicknamed as “the first city in Europe” (Pavlović, 2017). Human activities have been noticeable since that, but by far the major intervention by man, was the construction of the “Iron Gates (Đerdap) Dam 1” with hydroelectric power station and the formation of 130-km long artificial lake in the gorge. Iron Gate I power station is the largest in Europe without Russia by electric power generation capacity.



Fig. 2 The narrowest part of the Iron Gates Gorge (Author: B. AntoniĆ)

Fig. 3 Golubac Fortress at the upper entrance of the gorge (Author: B. AntoniĆ)

The name of the gorge – Iron Gates – comes from two Ottoman fortresses that controlled its upper and lower entrances by iron chains across the river for toll. One of them is Golubac Fortress at the upper entrance (Fig. 3). The fortress is monumental, with a strategic position at the entrance of the Iron Gates (Cunjak & Jordović, 2002). It was built in the medieval centuries, but was more important in the later centuries, when the Danube divided Hapsburg and Ottoman empires and, even more, the two civilisations and cultures (Tracy, 2015). The borderland character of the Iron Gates has continued until today. Since the World War I, the Danube in the gorge is also an international border between Serbia and Romania. This political division has just emphasised the natural isolation of the Iron Gates and its communities. The right example is Golubac Town, the seat of one of three municipalities in Serbian side of the gorge. The town is the only settlement in the Iron Gates that was not resettled by the formation of the Iron Gates Lake, preserving a historic urban core and the variety of open public space. Its current position on the Danube where it is the widest in its entire flow is also a great advantage.

The economic, social, and demographic profile of Golubac in the last 50 years pretty much demonstrates the challenging situation of all settlements in the gorge. The town is one of the smallest in Serbia, with less than 2,000 inhabitants. Golubac has been losing population since the start of post-socialist transition of the country in 1991. The demographic situation at municipal level is even more severe; Golubac Municipality, as well as the other two gorge municipalities, has rapidly shrinking (Tab.1).

COMMUNITY	Census 1948	Census 1991	Census 2002	Census 2011	Difference 2011/1948	Difference 2011/1991
Golubac Town	1,373	1,995	1,896	1,653	145.3%	-17.1%
Golubac Municipality	14,844	12,513	9,913	8,331	-43.9%	-33.4%
Majdanpek Municipality	19,610	27,378	23,703	18,686	-4.7%	-31.7%
Kladovo Municipality	26,161	31,881	23,613	20,635	-21.2%	-35.3%

Tab. 1 Demographic indicators of Golubac Town and the gorge municipalities in last national population censuses (Source: SORS, 2014)

This is the clear reflection of the economic downturn and the overall isolation of Serbia in the last decades; three Gorge municipalities are among the last ones by the economic performance in Serbia (MRDRS, 2009-15).

However, the recent rise of the cultural tourism in the gorge has positively shaken somnolent settlements in the Iron Gates. National level has invested in heritage protection and presentation, such as the revitalisation of Golubac Fortress, to present local cultural and natural treasure to visitors. The problem is that this, new vigour has been oriented to a few main heritage sites, where the state is in charge, leaving the local level stretched between them. Consequently, the impact of the tourism has limitedly reached declining local population, which supposedly should be the main target of such projects. Golubac is a showcase for this gap; although the local community has invested a lot in the reconstruction of the open public spaces (the Danube quay in the town, the main square, town park) in the town in last years, local tourism is still underperforming.

The on-site research and discussion with local experts in Golubac confirmed that the main problem is the weak and unprepared municipal governance, which is not able to back and guide the development of supplementary tourist services and infrastructure. Moreover, the local strategic plans are controversial; some important planning actions are internally in collision and many of the proposed key projects are located without a real connection to the local community. Their spatial location in a narrow strip along the Danube is also doubtful, leaving to connections with the mountainous hinterland of the gorge with preserved intangible heritage and the vernacular villages (Antonić & Djukić, 2018). The local strategies and plans



are also very conservative in essence; they do not support the innovative and alternative ways of a tourism development such as creativity and creative industries (Djukić, & Antonić, 2018). For example, the huge inflow of the tourists in Golubac Fortress in the last couple of years has not properly reflected in the general development of nearby Golubac Town, which has played more a “transit zone” towards the fortress than a real attraction.

### 3.2 ANALYSIS 1: SPACE SYNTAX

The space syntax is a relatively new method in spatial research, developed in the early 1980s, with the rise of computer modelling (Hillier, 2002). Nevertheless, it is among the rare methods in urban practice that have gained an international attention from early beginnings (Jiang & Claramunt, 1999). The method concerns pedestrian flow in the urban nodes (crossroads in streets and squares) per an hour during the characteristic daytimes and days in a week. The difference in obtained results during a day or week and their spatial configuration can be good indicator of the broader spatial and socioeconomic circumstances of the investigated urban area (Sayed et al., 2013). In the case of the development of cultural tourism, this is related to the aforementioned newest trends that the cultural tourists want a new experience of the cultural space, including a “real” interaction with local population. Thus, streets and squares, as the main urban places for socialisation, are a good showcase to explore the local pattern that can facilitate and/or enhance the cultural tourism.

The customised space syntax investigation that included the measurement of the pedestrians flows, cyclists, cars, and heavy vehicles (buses and lorries), was conducted in Golubac in the Thursday, March 2, 2017 (Fig. 4). This day is intentionally chosen because Thursdays are market days in Golubac and the weather was sunny and between 15-20°C. In contrast, March is a month outside of tourism season. Hence, this day was perfect to measure the maximal exploitation of the open urban space by the local users and ordinary passers-by, e.g. without disruption by tourists. This stance was important for the research – Richards (2007) points that local lifestyle is becoming increasingly important for the contemporary consumers of the cultural tourism. Tourists will follow local people in their lifestyle and “consume” the same places in the urban structure.

The obtained results in Golubac are very indicative for this matter. Generally, cars and pedestrians dominate in the open public spaces in central Golubac; on the other side, the cyclists are quite scarce. If this issue is analysed from node to node, it is obvious that there is a huge gap between the pedestrians and the other users. The cyclists and all types of the vehicles tended to use the main west-east transport corridor through the town (Đerdap/Iron Gates State Road), which is also the widest street in the town. At contrary, pedestrian movement has a less dispersed network. The numbers of pedestrians and other observed

users are both similar and highest along the main street and around the main square, with the highest concentration of the central facilities. However, this is a sharp contrast with the main tourist attractions, such as the Danube Quay and the nearby city park with the view on the fortress. These spaces are not appropriately used by local pedestrians to eventually become magnets for the external visitors.

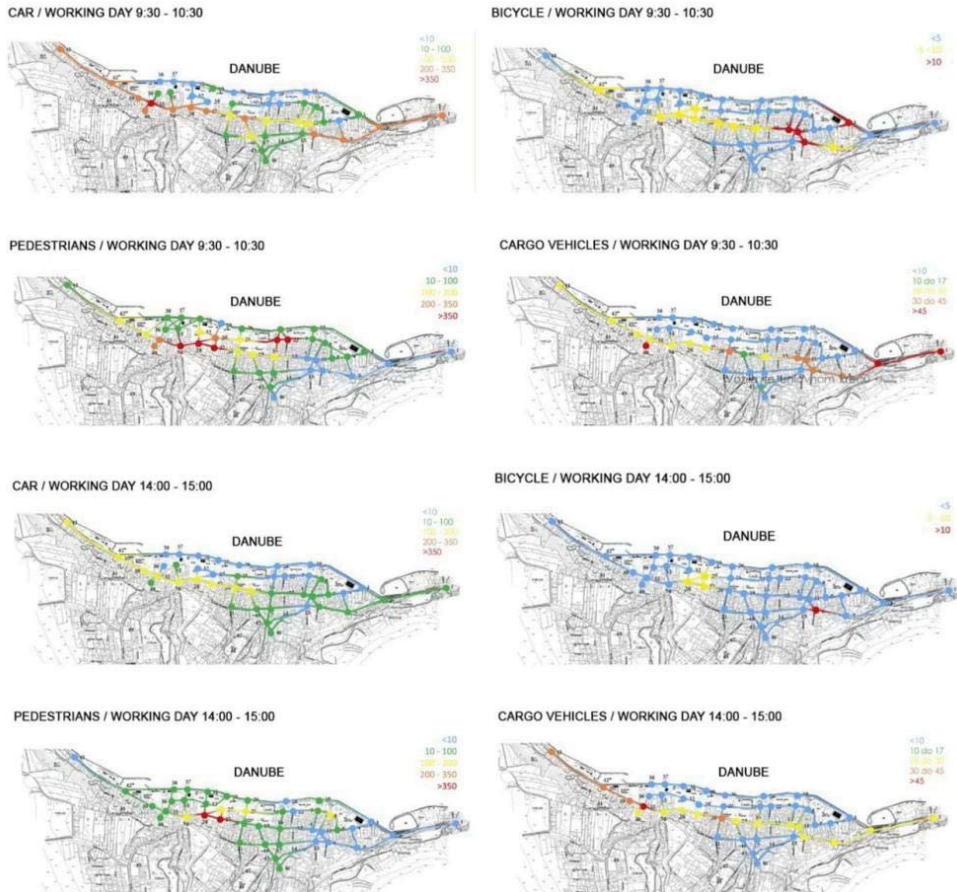


Fig. 4 The flows of the different users of open public space in central Golubac in two characteristic daytime period (Authors: M. Zukanović, J. Milovanović & T. Radić).

### 3.3 ANALYSIS 2: SOCIAL MEDIA MAPPING

The global development of social media (Facebook, Twitter, Instagram, Pinterest, ect) in two recent decades concurs with the acceleration of the cultural tourism. These two sectors have become dependent recently. Muscat Declaration (WTO, 2017) highlights the computer-based activities to post and share or, indirectly, to promote the cultural tourism by distributing related big data. The social media arises as important segment of this big-data exchange (Demunter, 2017).

The analysis of posted geocoded data in Golubac were conducted for two social media networks (Instagram and Twitter) in the period 2011-2017, done by Jugoslav Joković and Nikola Dinkić.

Instagram: The analysis of location tags (hashtags) by Instagram in Golubac area demonstrates the general interest on the fortress instead on the town; the tags that include the words fortress, castle and their Serbian match-words are the most frequent. The only other Golubac location mentioned in Instagram is the town quay (Fig. 5):

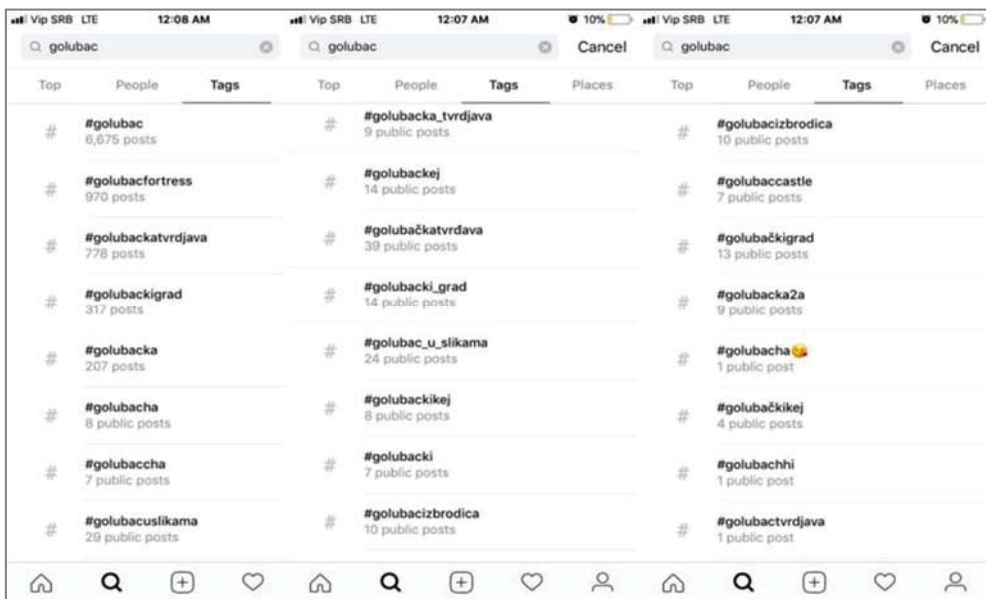


Fig. 5 Golubac hashtags by Instagram (Source: J. Joković & N. Dinkić).

The same analysis of Instagram data done by also showed several key hashtags related to Golubac, with the total number of 8,740 these tags. The non-denominational hashtag *#golubac* dominates with 76% share. The second ones are the hashtags related to the fortress

(*#golubacfortress* and *#golubackatvrđjava*) – 20%. The last ones are the hashtags that refer to the town (*#golubactown* and *#golubackigrad*) with just 3.7% share.

Twitter: At the first glance, Tweets analysis showed that the interest of users existed just for Golubac Fortress. Thus, the Tweets analysis is narrowed to the fortress, where an explored location is defined by the fortress coordinates (44.660241 N, 21.679019 E), with 300-metres radius. The results of Tweets analysis (Tab. 2 and 3) profoundly show that Golubac Fortress is becoming an international tourist attraction; eight used languages and the variety of the applications used for Tweets distribution confirm this statement.

Analysis type	Number	Application	Share (%)
Total number of Tweets	61	Instagram	56.3
Number of users	44	Foursquare	20.8
Number of applications	5	Twitter for Android	18.3
Number of languages	8	Twitter for iPhone	3.2
Number of likes	36	WorldPress	1.1
Number of re-Tweets	2	ekskursja.pl	0.4
Number of followers	85,253		
Number of friends	50,872		

Tab. 2 and 3 Tweeting on Golubac Fortress 2011-2017: general figures (left) and the distribution of Tweets by applications (right) (Authors: J. Joković & N. Dinkić)

## 4 CONCLUSIONS

The main findings from two analyses in Golubac Town are given in the following highlights: The sharp division between western and eastern half of Golubac centre due to their different character; the western part is more related to retail and transport and the eastern part is more with public institutions (school, kindergarten, etc.).

The results of space syntax clearly show that the “ordinary” actions of the modern planning in tourism cannot be predicted in a traditional way. For example, the local government has invested a lot in the open public space along the Danube Riverfront (town quay or town park), these space is underused most of the year. Space syntax results reveal that these places are not on daily routine for the majority of local population. At contrary, the main street, the part of the Iron Gates Main Road, is not adequately recognised as an important public space even though its transitive character, also identified by space syntax, means that it is the “gate” of Golubac Town to the-first time passers-by. Therefore, it can be crucial for the first-time individual cultural tourists to notice the potential of the town and the nearby Danube riverside and spend some time in Golubac.

Interestingly, some places important for local communities are totally unnoticed by local government and local plans.

For example, the town open market ("bazaar") is very important for local community by space syntax research, but cultural tourists do not know about it. However, it can be easily promoted as an integral part of Serbian life and culture, which is in line with the recent trends in cultural tourism (traditional culture). Similarly, the tourists are not informed about the upper part of central Golubac with excellent viewpoints to the lower historic part, Golubac Fortress, Romania and the 6-kilometre wide Danube. The market, located in this part of town can be included in this town tour.

The previous findings are further support by the results from social-media analysis. There is a noticeable gap between the attractiveness of Golubac Fortress, which has already known internationally, and Golubac Town, which is far behind. This indirectly points out that the broad surrounding of the fortress, including the town and its open space, cannot currently enable the same tourist interest as the fortress, which size is negligible comparing with the town.

For the future planning and design, the following recommendations are crucial:

- Physical improvements of the main street and the open public space around bus station are the most desirable, with preserving its vibrant life;
- The "softening" of its image of a 'mental boundary' between the lower and upper parts of the town;
- Open public spaces in the eastern part of Golubac deserve a profound regeneration, which should be based on multi-aspect approach – to include physical, functional improvements, as well as social and cultural interventions; and
- The better visual and symbolical link with the fortress as an already established major attraction should be embedded in the future interventions in the town. The new planning and design projects had to include the view on Golubac fortress and the Danube. Furthermore, it is necessary to explore the meaning and importance of the fortress by promoting the design that symbolically resembled the fortress and related matters (middle ages, knights, etc.). However, it is important to use ICT-driven tools to link tourism and culture through public space(digitised heritage, augmented reality, etc.).

The future research regarding cultural tourism should be more focused on how to use the social media and geo-located data derived from user movement in urban planning. Finding the sentimental paths of the users and missing links between the nodes within open public spaces is crucial for the successful functioning of the city regarding the cultural tourism. It is also important to recognise all key tourist spots, to strengthen the links between them and eventually to form the network based on them. This is the only way to be in touch with the

already mentioned new trend; to wide tourist offer from the main tourist sites to their surroundings, including local tradition and customs and involving tourists to participate in them.

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