Heritage tourism is a fashionable phenomenon today (Richards, 2011), the importance of which is well illustrated by the ever-expanding literature on the topic (see du Cros & McKercher, 2015; Comers & Willems, 2019). Although in many ways cultural heritage and tourism can be considered as natural allies (Mihelić, 2019), recognizing and acknowledging the touristic potential of archaeological heritage was the result of a long process (Lowenthal, 1998; Howard, 2003; Erdős & Sonkoly, 2004; Harrison, 2013; Sonkoly, 2016). International conventions, such as the World Heritage Convention (1972), the UNESCO Convention on the Conservation of Intellectual Cultural Heritage (2003), the European Landscape Convention (2000) and the European Framework Convention on the Social Value of Cultural Heritage (2005), played a major role in this process, and so the concept of cultural heritage has been extended onto (historic) landscapes, as manifestations of the interaction between man and his environment. Awareness of the landscape as a historical and archaeological resource has been supported by landscape archeological research projects that have transformed the former site-centric view of archeology. Landscape archeology has brought many important results and new approaches since the 1980s (Aston, 1997; David & Thomas, 2016, especially 27–91), and in the last two decades, Hungarian archeological research has increasingly been applying this methodology, too (Laszlovszky, 2008; Zatykó, 2011; 2015). (Fig. 1)

Traces of past human actions that transformed the natural environment are usually easily recognizable in the landscape, but the early Iron Age monumental landscape features of the Central Danube Basin are often difficult to identify. Realizing this, an international cooperation was launched, which connected 20 institutions from five countries and gained the generous support of the European Union Danube Transnational Programme (Early Iron Age monumental landscapes of the Danube basin, shortly: Iron-Age-Danube project). The project aimed to apply a unified research strategy for the preservation and presentation of the characteristic Iron Age cultural heritage of the area.1 Since the beginning of the international program, reports on its results have been regularly published in the journal Hungarian Archeology.

IRON AGE ARCHAEOLOGICAL REMAINS OF THE DANUBE REGION

Large territories of present-day Austria, Slovenia, Croatia, Hungary, and Slovakia belonged to the so-called Eastern Hallstatt culture in the 9th–5th centuries BC. These regions were characterized by fortified hilltop settlements and burial mounds. Hilltop settlements surrounded by large fortifications

1 http://www.interreg-danube.eu/approved-projects/iron-age-danube (Accessed on July 31, 2019).
were in many cases established in the Late Bronze Age and remained in use until the Early Iron Age. It is suggested that hilltop settlements dominating the settlement network had multiple functions: in addition to being visual signs of power and residential places of the elite, they also functioned as ritual centers (Potrebica, 2012; Mlekuž & Črešnar, 2014; Mele, 2015; Tiefengraber & Tiefengraber, 2015; Mason & Mlekuž, 2016; Potrebica & Mavrović-Mokos, 2016). The size of the burial mounds erected for the deceased members of the Hallstatt elite suggest at least as much wealth as weapons, jewelry, utensils and luxury items buried with the dead (Egg, 1996). The so-called princely seats of the Hallstatt culture, characterized by a large area with a well-structured interior organization, densely built-up, surrounded by flat settlements and tumuli, have already been urban (proto-urban) settlements. This process of population concentration stopped in the middle of the 6th century BC and then collapsed (Collis, 2014; Smith, 2014; Krausse, et al., 2016).

RESEARCH STRATEGIES AND THE TOURISTIC EXPLOITATION OF ARCHAEOLOGICAL RESULTS

Evaluation of data from past research projects, integrating them into an online database; and non-invasive remote sensing methods had a major role within the interdisciplinary research strategies applied for the Iron-Age-Danube project. In the nine microregions of the project (Strettweg, Großklein, Poštela, Dolenjske Toplice, Jalžabet, Kaptol, Sopron, Sütő, Százhalombatta), traditional archaeological excavations were only undertaken following the evaluation of collected information. The excavations aimed to address and solve specific issues, through international research camps (Črešnar & Vinaza, 2019; Czajlik, et al., 2017; 2018; 2019). (Fig. 2.)

In addition to scientific research, the program aimed to present these Iron Age landscapes and related results not only to professionals, but also to a wider audience interested in visiting the sites as tourists.

To achieve the above goals, processes of 21st-century museology and tourism were kept in mind. Especially, the concept of Creative Tourism, formulated in 2000, which aims to connect locals and visiting tourists through cultural programs, thus making the experience much more personal to both parties and creating a real transfer of knowledge between the hosts and the guests during the program (Raymond & Richards, 2000), had a special emphasis during our work.

The strategy for promoting the Iron-Age-Danube project can be divided into three groups of tasks. First of all, it involved introducing new programs in the public offers of the museums involved, introducing new museum pedagogical and andragogical activities, and organizing an international archaeology camp in all the four partner countries. Secondly, new digital devices were developed for tourists, e.g., e-learning and smartphone applications for visitors. The third group of tasks involved the creation and revitalization of archaeo logical parks and nature trails on these sites. (Fig. 3.)

Besides the progressive idea of creative tourism, the European cultural road network should be mentioned. The terms and conditions for international cooperation established with the support of the Council

\[\text{https://iad-dev.acdh.oeaw.ac.at/} \] (Accessed on July 31, 2019).
of Europe are defined by the center in Luxembourg. Nowadays it is impossible to promote and coordinate cultural routes without modern smart devices, and the thematic routes connecting the sites of the Iron-Age-Danube project were created according to these standards. The cultural route created within the framework of the project was launched first at Sopron – Várhegy, a popular touristic destination in the past 100 years.

On the 1.8 km long Sopron–Várhely archaeological trail, seven stops help the exploration of the Iron Age site, the fortification of the settlement, and the reconstructed entrance gate; the trail leads to the burial mounds, and offer a glimpse into the 2700 year-old burial ground. With the help of a Hungarian product developed in the framework of the project, an application for smart devices is available from the autumn of 2019, which guides visitors through eight micro-regions of the Iron-Age Danube basin.

THE GUIDE@HAND IRON-AGE-DANUBE APPLICATION

Digital solutions play a gradually increasing role in the preservation and presentation of our cultural heritage. This includes smart applications available to travelers to discover the values of archaeological and historical heritage. They can also improve the connections between fragile historical landscapes and tourism.

The Institute for Computer Science and Control started the development of the GUIDE@HAND family of smartphone applications in 2011. Several items of this product family offer contents closely related to the subject of our project, e.g. the guides of the Archaeological Park in Százhalombatta or that of Veliko Tarnovo in Bulgaria. The latest member of this line of the smartphone family is the GUIDE@HAND Iron-Age-Danube, introduced in 2019.

The main objective of this development was to make the information about the project available to a wide range of domestic and foreign guests visiting selected locations of the Iron-Age-Danube project, with the help of a frequently used device. The application and the related contents can be installed and downloaded to both iOS and Android devices.

The smartphone application comes with a versatile yet user-friendly main menu, based on the expectations of the project, and offers the following functions:

- **Map** – interactive map of the selected region with the thematic contents of the related locations;
- **Routes** – thematic packages of interconnected sights of the given region;
- **Regions** – detailed information about the selected locations;
- **Best of I-A-D** – information about the most important partners in the region;
- **Playground** – entertainment facilities with training materials, interactive exercises and games;
- **Project** – general information about the I-A-D project, main goals, introduction of the partners.

(Fig. 4. 1-3.)

3 The first cultural route was established in 1987, reviving the medieval pilgrimage route of St. James to Santiago de Compostela. Up to this point, 33 cultural routes have been acknowledged by the Council on a European level, including various thematic (religious, historical, culinary or artistic) routes. https://www.coe.int/en/web/cultural-routes (Accessed on 31st July 2019)
Further special functions are accessible with the help of the Settings submenu in the top right corner of the main menu page. The most important ones are:

- **Select Language** – the user can modify the language selected during installation;
- **Favorites** – list of items marked as “Favorites” during use;
- **Update** – user access to the contents modified or added by the service providers.

Thematic walks, 3D photos and videos, as well as 360° panorama pictures play a special role in the smartphone application. There are three types of walks available, each of them presenting the thematic items within or next to the walk area in a different way or form:

- **List** – items of the walk are ordered according to their distance from the current user position;
- **Map** – the items of the list are allocated on an interactive map;
- **Augmented Reality (AR)** – the items appear according to their direction by the camera of the mobile device.

Just as with other members of the smartphone family, all multimedia contents can be accessed directly through the GUIDE@HAND Iron-Age-Danube application. These data should be downloaded immediately prior to the departure to the selected location. This approach is very practical both considering the planned method of use and position of the sights, since internet access is often limited at the highlighted locations of these regions. There are, of course, further additional contents of the application only available for online use.

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