MOBILE SIGHTSEEING APPLICATIONS: THE EXAMPLE OF *MAZOWIECKIE REZERWATY PRZYRODY*

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Purpose: The aim of this article is to assess the functionalities offered by the selected mobile sightseeing guide application. The subject of the consideration is the Mazowieckie Rezerwaty Przyrody application.

Design/methodology/approach: The article uses the case study method. The evaluation of the functionalities of the *Mazowieckie Rezerwaty Przyrody (Mazovian Nature Reserves)* application was made on the basis of the point method. This method has been modified for the needs of this research.

Findings: (mandatory) Based on the results of the analysis it was found that the functionalities of the *Mazowieckie Rezerwaty Przyrody* application are mainly information tools useful for people interested in learning about protected areas located in the Mazowieckie Voivodeship. The researched mobile application can also meet various expectations of tourism participants, and it has been designed with the realization of educational tasks through entertainment in mind.

Research limitations/implications: (if applicable) The article contains a preliminary study. In the future it is planned to conduct additional quantitative and qualitative research. The study will help to perform a comprehensive analysis of the application being discussed.

Practical implications: (if applicable) Conclusions from the discussion can be an inspiration for creating a strategy of promotion of the analyzed mobile application, as well as activities related to improving its functionalities.

Social implications: The research conclusions may encourage institutions managing touristic areas to create more complex mobile solutions supporting sightseeing tourism. This solution should offer visitors access to additional information that will enable them to improve their knowledge of tourism and sightseeing.

Originality/value: The article uses the example from business practice. This is one of the earliest studies investigating the *Mazowieckie Rezerwaty Przyrody* application.

Keywords: mobile technology, mobile applications in tourism, innovation in tourism, *Mazowieckie Rezerwaty Przyrody.*

Category of the paper: The article uses the case study method.

Introduction

Mobile applications are eagerly used around the world by institutions and companies operating in various sectors of the economy (Lee, Rangu, 2014). First of all, they provide an example of a key tool of mobile marketing (Broeckelmann, 2010; Holl, Elberzhager, 2019). Recently, they have also been used in sightseeing tourism. Implementation of mobile applications for this form of tourism can contribute to the increase of the attractiveness of the area and its competitiveness, and consequently to the development of tourist traffic (Panasiuk, 2015). However, the activation of these socio-economic phenomena requires coordinated actions to support tourism and sightseeing, including the implementation of innovative solutions (Divisekera, Nguyen, 2018). It is worth noting that at the same time it is necessary to create a coherent offer that will distinguish a given region from other competitive areas (Manczak, 2014). Creating and sharing mobile sightseeing applications is an example of the assumptions indicated. Such mobile products are often designed and implemented on behalf of public entities (Ganatapi, 2015). They recognize the need to create websites and mobile programs in order to share free multimedia with a wide audience (Papińska-Kacperek, 2016). At the same time the dynamic realities of today's market make it seem necessary to indicate the need for the creation of personalized communication solutions for the consumer (Manczak et al., 2019). One should also expect to see increasing customer expectations in terms of sophistication and complexity of the mobile tools offered by enterprises (Sanak et al., 2018; Fard, Marvi, 2019).

The aim of this article is to assess the functionalities offered by the selected mobile sightseeing application. The subject of the consideration is the *Mazowieckie Rezerwaty Przyrody* (*Mazovian Nature Reserves)* application. This program is part of a project of the same name, which since 2018 has been implemented by the Regional Directorate for Environmental Protection in Warsaw with the support of the Regional Fund for Environmental Protection and Water Management in Warsaw. During the research, case study method was used. The evaluation of the functionalities of the *Mazowieckie Rezerwaty Przyrody* application was made on the basis of the point method.

Mobile sightseeing applications

Mobile technologies have become an inseparable part of life, both for individual users and various businesses (Martin, Ertzberger, 2013). The popularity of this type of solutions is evidenced by the fact that at the end of 2018 it was noted that the number of mobile device (smartphone, tablet etc.) users was higher than that of those using desktop computers

(Dąbrowski, 2019). More and more institutions are deciding to use solutions addressed to mobile recipients (Sanak et al., 2018). The reason for it is that mobile technologies allow carrying out basic market communication tasks (Sznajder, 2014). One of the tools addressed to the consumer are mobile applications, which can be considered as a consequence of implementing ICT in business practice (Czajkowski, Nowakowski, 2015). They perform social, informational, educational and entertainment functions (Kubiak, 2015). The functionalities of mobile applications are also widely used in tourism and sightseeing (Da Silva, Da Rocha, 2012; Liang et al., 2017, Pawłowska-Legwand, 2019).

Mobile applications are examples of software that are used on mobile devices with embedded operating systems, such as smart phones, mobile phones, tablets or PDAs (Jasiulewicz, Wiaderny, 2015). They can have a variety of purposes. For example, we can distinguish between social networking applications, information applications, business software, educational applications, banking and financial applications, travel applications, health applications, games, entertainment software, music and film software, sport applications, commercial applications and others. The general trend shows that very often mobile software has a layered formula, while offering functionalities from many areas (Gadziński, 2018). They can also have hybrid purposes.

There is no doubt that mobile applications have successfully supported tourism for many years (Buhalis, Law, 2008). In addition, it should be noted that tourism has a significant role in the development of mobile technology (Kim, Kim, 2017). In this industry, the analyzed applications have been widely used, and at the same time new solutions from this area are being implemented (Nunes, Mayer, 2014; Law et. al., 2018). Research conducted by Pawłowska-Legwand (2019) shows that tourists are keen to use information and communication technologies before and during a trip. Smartphone users access information and advice related to travel via mobile programs and websites. This applies to, among others, recommended routes, reviews of various attractions, information on beauty spots, transport, accommodation, events or other activities (Chang et al., 2016; Hew et al., 2016). At the same time, the implementation of mobile applications may contribute to a better adaptation of the tourist product to the needs of the recipients, following their greater interaction with a given tourist destination (Piechota, 2014).

In parallel with the development of ICT in tourism, the idea of a SMART tourist emerged (Koo et al., 2016). Such a tourist uses a variety of digital tools that support the planning and implementation of the trip both prior and after it. User support technologies in this area include already mentioned applications, as well as Wi-Fi, Big Data, various sensors and others (Gretzel et al., 2015). The SMART tourist is characterized by a range of behaviors such as (Molz, 2012):

- keeping online connectivity through applications with access to the device location,
- enrichment of sightseeing experiences from the use of new technologies (e.g. virtual reality),
- creating and sharing content related to the visited areas independently,

- digital interaction with local communities and other stakeholders of tourism,
- commitment to sustainable development of the community and environment.

The SMART tourist willingly combines conventional and technological experience, which they treat as a factor increasing the attractiveness of visited places (Buonincontri, Micera, 2016; Brennan, 2020). In this area several levels of digital support for the participant of tourism can be distinguished. These are, respectively, the following experiences (Neuhofer et al., 2014):

- conventional experience,
- experience aided by technology,
- experience enriched by technology,
- experience stimulated by technology.

Mobile touristic applications, especially those using new technologies, such as the Internet of Things, virtual reality or artificial intelligence, are part of the SMART tourism trend. Such solutions gain supporters as a result of various phenomena taking place on the modern tourism market. Recipients are looking for more and more flexible, dynamic and intelligent solutions that will actively be useful from the point of their needs and expectations (Perez Pulido, 2016). At the same time, participants in tourism expect personalized offers, characterized by a close fit to their individual preferences (Manchak, Sanak-Kosmowska, 2018).

It is worth noting that consumers show attachment to the digital tools used so far. However, they are constantly looking for new solutions that will work better when optimizing the planning of the sightseeing experience (Xiang et al., 2015). Importantly, there is often a disproportion between the number of application users expected by the publisher and those who actually use them. As a result, even the most useful mobile application must be supported by suitable promotional activities (Ziernicka-Wojtaszek et al., 2020).

The national offer of sightseeing mobile applications is constantly being expanded and enriched with other interesting proposals. Users are provided with practical tools that are able to meet their expectations, including making their travels more attractive. The available sightseeing applications help one navigate tourist trails as well as offer access to a rich database of information about places and attractions in their vicinity. For example, the application *Szwajcaria Kaszubska* provides information about the highest rising part of the Kashubian Lake Area. The *Szlaki Małopolski* application, in turn, presents the routes of tourist trails in the Małopolska province, including the related tourist attractions. The *Bieszczady* and *MRB Karpaty Wschodnie* application can be a mobile guide to the International East Carpathian Biosphere Reserve.

Aim of research and applied research method

The key objective of the discussion is to assess the functionalities available within the mobile application *Mazowieckie Rezerwaty Przyrody*. It was decided to analyze the possibilities, including the usefulness of the software. The following specific questions were prepared:

- what tasks the software performs,
- who the target audience of the application are,
- how the application contributes to the development of tourism in the Mazowieckie Voivodeship,
- what new technologies support the software,
- how the application promotes the Mazovian nature reserves.

As part of the considerations the case study method was used (Yin, 1981; Eisenhardt, 1989). The applied research method is discussed in the works of representatives of various scientific fields (Dąbrowski, 2017). This qualitative method assumes a comprehensive description of the studied phenomenon, concerning the selected scientific discipline (Grzegorczyk, 2015), as well as identification of appropriate concepts in economic practice (Manchak, Sanak-Kosmowska, 2018). For the purpose of the considerations, it was assumed that the discussion presented is based on considerations that meet the assumptions of case study. The article attempts to approximate an example of the use of a mobile application in a selected tourist region. This objective was achieved on the basis of a literature analysis and the materials available on the project, including the research approach used. It was decided to make a point evaluation of the functionalities available in the application from the point of view of different target groups. In the literature it is accepted that the point method allows the evaluation of any object according to a set of adopted criteria (Szyran-Resiak, 2016; Gierszewska, Romanowska, 2017). The gist of the method is to create a list of criteria (factors) that will allow one to describe and differentiate the analyzed object (Thompson, Strickland, 1997). The subsequent criteria are assigned appropriate weights (because not all of them have the same meaning) and a number of points (marks) from the selected numerical range (Szyran-Resiak, 2016).

For the purposes of the research, it was decided to make a slight modification of the above-mentioned point method. First of all, it was recognized that the needs of each user are equally important and therefore different weights were not given to them. Scales of 1 to 5 points were adopted, assuming that:

- 5 points implies a very useful functionality,
- 4 points implies a useful functionality,
- 3 points implies a functionality that can be useful,
- 2 points implies a hardly useful functionality,
- 1 point implies a useless functionality.

The points received by each one of the functionalities of the application were awarded by the authors of the article and then they were summed up to rate their usefulness.

Mazowieckie Rezerwaty Przyrody mobile application – project assumptions

The *Mazowieckie Rezerwaty Przyrody* application was made available in 2020 as part of the project of the same name carried out by the Regional Directorate of Environmental Protection in Warsaw. It was co-financed by the Regional Fund for Environmental Protection and Water Management in Warsaw. The main objectives of the project included bringing closer the knowledge of the value of nature reserves in the Mazowieckie Voivodeship, emphasizing the necessity of their protection and encouraging users to take care of the natural environment (Mazowieckie Rezerwaty Przyrody, 2020). The project was divided into several stages, two of which have already been completed – presented in Table 1.

The *Mazowieckie Rezerwaty Przyrody* mobile application can be classified as a sightseeing application, performing mainly informative and navigation tasks. This software is addressed both to the residents of the Mazovia region, and to domestic and foreign tourists. In its current form, the application is available only in Polish. It is intended to find access routes to the individual reserves located in the area of the Mazowieckie Voivodeship. What is more, during the visit to the protected areas, the tourists will be shown the trails and the most interesting places (Mazowieckie Rezerwaty Przyrody, 2020).

Table 1.
Stages of the project Mazowieckie Rezerwaty Przyrody

Specification	Completed tasks
1st stage of the project (2018-2019)	- printing 10,000 brochures and maps presenting fifteen of the nature reserves located in Warsaw and its surroundings - issue of 2000 memory games educating about flora and fauna in Mazovian nature reserves - creation of two educational videos about the natural values of the reserves and selected threats to them - placement of 40 information boards in twelve nature reserves - sharing the hashtag #MazowieckieRezerwatyPrzyrody on Facebook - organization of two educational meetings and three nature walks in the reserves - organization of the Explore the Mazovian Nature Reserves competitions - organization of conference on the Mazovian nature reserves
2nd stage of the project (2020)	- making the mobile application available presenting twenty of the protected areas in the Mazowieckie Voivodeship; the software is intended to provide information on all reserves in the region (189) - installation of 120 plates with QR codes to enable downloading of the application and providing information about the natural, cultural and historical values of the sites; by the end of the year, about 30 more are to be installed - placing 10 information boards in five nature reserves - organization of the Explore the Mazovian Nature Reserves competitions

Source: Generalna Dyrekcja Ochrony Środowiska, 2019; Generalna Dyrekcja Ochrony Środowiska 2020; Mazowieckie Rezerwaty Przyrody, 2020.

An important element of the mobile software are its educational functionalities, including informational elements with descriptions of the natural values of the reserves, on top of entertainment in the form of quizzes and games (Generalna Dyrekcja Ochrony Środowiska, 2020). The software works with the functionalities of the device on which it is installed and uses external information carriers, using new technology solutions such as augmented reality and QR codes. The first of these technologies is a kind of visual system, which, through the IT environment, applies information and images to the external environment. As a result, it allows connecting the virtual world and reality through content, simulations, illustrations and projects (Peddie, 2017). In the analyzed application, the user can access graphic overlays on the camera of their mobile device, showing characteristic species of animals and plants from the area of the visited protected areas (Generalna Dyrekcja Ochrony Środowiska, 2020). QR codes, on the other hand, enable the graphical presentation of information using a two-dimensional symbol (Soon, 2008). After scanning the code, the user is shown text or graphic information stored in the code or is redirected to an indicated URL. The *Mazowieckie Rezerwaty Przyrody* application allows the user to scan the QR codes that have been placed on the information boards in selected nature reserves. Users are given access to additional information about the natural, historical and cultural values of a given place. In the case of people who do not have this application on their mobile device, scanning the code with a smartphone camera will direct them to the application download page (Mazowieckie Rezerwaty Przyrody, 2020).
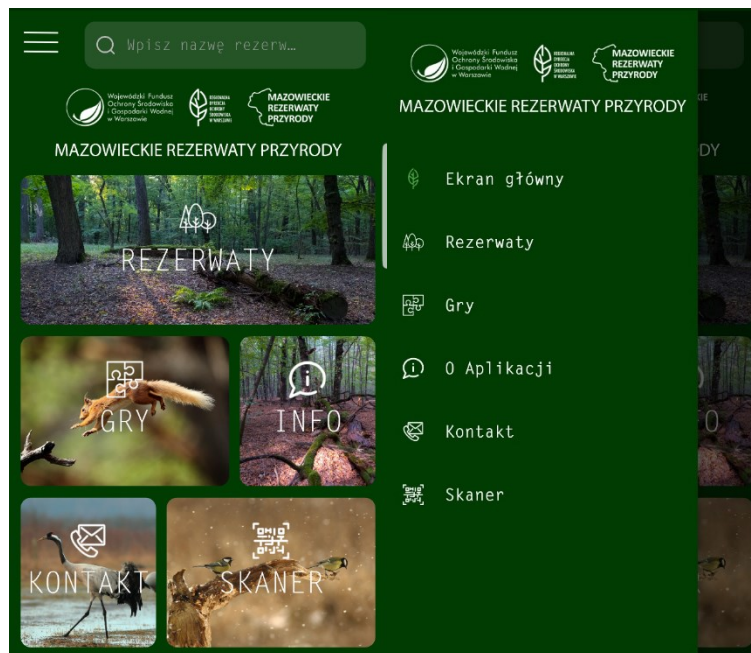
Evaluation of the functionalities available in the *Mazowieckie Rezerwaty Przyrody* mobile application

Various criteria are used in the research on the quality of mobile applications. One of them might be functionality. For the purposes of the considerations, it was assumed that functionality means the accessibility of certain functions of the mobile application. It can be measured by the features from the area of functional requirements defined by the organization (Zborowski, Łuczak, 2016).

The creation of the application was prompted by various motivations to present the protected areas in the Mazowieckie Voivodeship. The most important objectives pursued by the creators of the software were (Mazowieckie Rezerwaty Przyrody, 2020):

- presenting the value of nature reserves in Mazovia province,
- the need to emphasize the importance of their protection,
- encouraging care for the environment.

Their implementation is supported by various mobile application functionalities. Figure 1 presents the basic functionality of the application available in the Start-up screen and the side menu in the applications.

Figure 1. Start-up screen and side menu in the applications *Mazowieckie Rezerwaty Przyrody* application. Source: own research.

Using the functionalities of the software requires that the GPS location is activated on the mobile device. In addition, the augmented reality function also uses a smartphone or tablet camera. As a result, the application user can benefit from the full spectrum of its functionalities. Evaluation of the functionalities available in the *Mazowieckie Rezerwaty Przyrody* mobile application was presented in the Table 2. It should be stressed, however, that in accordance with the project assumptions, the software will be further developed in the coming years. Therefore, it can be assumed that the content available within the application will be expanded, as will the offer of new functionalities (Mazowieckie Rezerwaty Przyrody, 2020).

The functionalities available within the application can be grouped into four categories (according to their purpose). They are the following: informative, navigational, entertainment and application-related.

In the information category there is a functionality called "Nature Reserves", which allows the user to select a reserve by pointing on it on the map, selecting from a list, or searching by name. This selection displays pictures of the protected area, data on the date of its creation, its area, protection goals, characteristic plants and animals, forms of accessing the area and who manages it. In addition, one can enable the "Flora" and "Fauna" tabs for each of the reserves. The available content is complemented by pictures with descriptions, which are often followed by additional information about the species.

Table 2.

Evaluation of the functionalities available in the Mazowieckie Rezerwaty Przyrody mobile application

Feature	Specification
Nature Reserves	information on individual protected areas in the Mazowieckie Voivodeship
Navigate to Natural Reserve	a tool for mapping the route to the reserve from the current location
Map	map of the nature reserve with sightseeing trails
Games	educational quiz and memory game to systematize the knowledge of protected areas
AR Items	virtual overlays on the camera of a mobile device showing the local protected species
QR Scanner	tool for scanning QR codes placed in the nature reserves presenting additional information about the area.
About the App	basic information about the application and access to its settings
Contact	contact information of the Regional Directorate of Environmental Protection in Warsaw

Source: own research.

Another functionality in the category of information is called "QR Scanner". This functionality can scan the respective boards with QR codes, which are arranged in selected protected areas. As a result, the user gains access to additional information about the natural, historical and cultural values of their current location.

In the navigation category there is a "Navigate to Nature Reserve" functionality. This option gives a possibility to set a route to the selected protected are from the current location. Its use requires running the GPS location on the recipient's smartphone, as well as granting the application access to use this functionality. In this category there is also a functionality called "Map", which contains hiking, biking, walking and cycling trails in selected protected areas, as well as in their vicinity. The map is equipped with a compass for easy orientation in the area and it displays information about the nature reserve.

In the "Entertainment" category, there are "Games" which allow users to check knowledge gained during a trip or from the content of the application. The user can choose from educational games, such as:

- a quiz with questions about the nature reserves and flora and fauna occurring in their area; after indicating the answer, the user receives a response message not only regarding its correctness, but also containing supplemental information on issues raised in the question,
- memory game where the task is to find pairs of the same photos; they depict the species of plants and animals living in the protected areas described in the application (the game has three difficulty levels).

In the entertainment category also "AR Items" are found. These are camera overlays showing protected species of plants and animals, which the user can also superimpose on photos they take.

As part of the research, an attempt was made to evaluate individual functionalities available in the *Mazowieckie Rezerwaty Przyrody* application. The results are being shown in Table 3. The following separated categories have been assigned points:

- **information** – transmission of knowledge about the values of landscape parks,
- **tourism** – supporting people during trips to Mazovian protected areas,
- **entertainment** – level of solutions' focus on learning through play.

Each functionality could obtain from 1 (not useful at all) to 5 (very useful) points in this category.

Table 3.
Evaluation of the functionalities available in the Mazowieckie Rezerwaty Przyrody mobile application

Feature	Information	Tourism	Entertainment	TOTAL
Nature Reserves	5	4	2	**11**
QR Scanner	5	4	5	**14**
Navigate to the Reserve	3	5	1	**9**
Map	3	5	1	**9**
Games	4	1	5	**10**
AR Items	2	3	5	**10**
About the App	2	1	1	**4**
Contact	2	2	1	**5**
TOTAL	**26**	**24**	**21**	**71**

Source: own research.

On the basis of the conducted considerations, it was found that the functionalities of the application *Mazowieckie Rezerwaty Przyrody* will be useful, first and foremost, as information tools for people interested in protected areas in the Mazowieckie Voivodeship (26 points). They will be almost equally useful for tourists visiting protected areas (24 points). The designers of the analyzed application also took into account trends in education through entertainment, which complements the basic tasks of the program (21 points). The function that best meets the assumptions of each of these criteria is the "QR Scanner" (14 points). Other functionalities integrate up to two of the identified areas. For example, the "Reserves" functionality combines the categories of information and tourism, while the "Games" category fits into and tourism and information.

On the basis of the assessment, it was noticed that the *Mazowieckie Rezerwaty Przyrody* application can aid a sightseeing tourist during visits to nature reserves. The program presents individual protected areas in an attractive way. It gives the opportunity to learn interesting facts about the flora, fauna and history of visited places and supports the tourist in planning the trip. Based on the evaluation performed, it was found that the *Mazowieckie Rezerwaty Przyrody* application can be considered in three ways:

- as a guide to the protected areas in the Mazowieckie Voivodeship,
- as a support tool for planning travel,
- as an educational platform.

It is worth emphasizing that the application in question is part of a project that will be further developed in the future, which may transfer into further expansion of the program's functionality and an increase in its complexity.

Conclusions

The increase in the number of mobile device users is conducive to creating and sharing mobile touristic applications. The wireless communication provided by smartphones allows users to stay connected at almost any time and anywhere. Therefore, mobile programming offers tool that continuously support the user during sightseeing trips. For this reason, more and more regions offer dedicated platforms for different segments of tourist traffic. One such region is the Mazowieckie Voivodeship.

In the discussion, an attempt was made to evaluate the functionalities of the *Mazowieckie Rezerwaty Przyrody* mobile application. Based on the results of the analysis it was found that the functionalities of the *Mazowieckie Rezerwaty Przyrody* application are mainly information tools useful for people interested in learning about protected areas located in the Mazowieckie Voivodeship. Importantly, they can also meet the various expectations of the participants of tourism. The *Mazowieckie Rezerwaty Przyrody* application was also been designed to carry out the tasks of education through entertainment. Based on the results of the evaluation, it was found that the functionality that meets the assumptions of each of the adopted criteria for the purpose of the research is the "QR Scanner". The functionality may be considered the most useful by potential users of the application. This solution is capable of getting to know the needs of people who are interested in improving their knowledge of tourism and sightseeing. The *Mazowieckie Rezerwaty Przyrody* application is an example of programs which presents the ways of organizing tourist travel in the protected areas in an attractive way.

Finally, it should be emphasized that the point method has a number of limitations, the greatest of which is the subjectivity of the assessment. However, it should be stressed that the deliberations undertaken in the article are preliminary in nature. The study will help to perform a extensive analysis of the application being discussed. In the future it is planned to conduct additional quantitative and qualitative studies. This research will allow to make a comprehensive examination of the application of *Mazowieckie Rezerwaty Przyrody*, as well as to indicate new thematic areas related to the topic of the discussion. It is also planned to combine the discussed mobile program with other similar technological solutions.

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