Article

Leveraging Information and Communication Technologies in Forest Ecotourism: A Case Study from Poland

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Abstract: Ecotourism encompasses various forms of tourism which are implemented in accordance with the principles of sustainable development of the EU. They maintain a balance between the three pillars of sustainable development: economic development, sustainable use of natural resources, and respect for social and cultural values. Ecotourism in forests holds particular significance due to its ability to sustain the ecological, social, and economic integrity of these areas. Activities promoting access to forests focus on ensuring a safe and enriching experience for forest users while simultaneously conserving nature. In response to the needs of forest tourism and recreation enthusiasts, innovative developments and new information and communications technologies (ICTs) such as websites, web platforms, mobile apps, QR codes, and others are being introduced with increasing frequency. These technologies already have a wide range of applications in providing access to tourism information and services in other sectors of tourism management and are now supplanting conventional sightseeing information systems. This paper aims to present the activities currently underway in connection with the development of a new tourism and recreation offering in the forests owned by the State Treasury and managed by the State Forests National Forest Holding in Poland. The research involved conducting an environmental survey among representatives of all forest districts in Poland (*n* = 425). A questionnaire survey was created using the Microsoft Forms web-based programme and made available online to representatives of all State Forests' forest districts in Poland participating in the *Stay Overnight in the Forest* programme. The scope of this paper covers the present day, with a primary focus on desk research and analysis of statistics and source materials pertaining to the period from 2007 to 2022, retrieved from internal documents and reports prepared by the General Directorate of the State Forests. The research demonstrated that technological innovations such as mobile apps, social media, websites, web portals, and YouTube TV, when employed for developing forest tourism and forest recreation in Poland, can contribute to the advancement of the forest's non-productive role, namely, a social role and in particular, the tourism, leisure, and recreational function of the State Forests.

Keywords: ecotourism development; forest tourism and forest recreation; information and communications technologies; tourism; Poland

1. Introduction

Ecotourism is considered as the cornerstone of sustainable tourism due to its heightened emphasis on environmental protection. As defined by the Quebec Declaration on Ecotourism (2002), ecotourism not only strives to minimise negative impacts on nature but also actively promotes nature conservation and adopts an educational character, as some participants may undertake or join in specific conservation activities. Ecotourism is most commonly practised in areas of exceptional natural value, such as forests. When organising ecotourism activities, particular attention is paid to minimising the negative impact on the environment and meeting the expectations of tourists, who are primarily interested in interacting with natural values [1–4]. According to [5], ecotourism is understood as a

purposeful journey to areas of natural value for cognitive, inspirational, and self-realisation purposes, without compromising the integrity of the environment. Ecotourism encompasses all forms of tourism (adventure and mass tourism) and some forms of recreation (hunting, fishing, and gathering). Rural areas, often associated with agriculture, hold a special place for ecotourism [6,7]. However, beyond their typically agrarian function, rural areas also contribute to the ecological, social, and economic integrity of regions [8]. Tourism in rural areas is undergoing a constant transformation in both demand and supply [7]. The reference literature [9–11] mentions various classifications of tourism in rural areas, increasingly highlighting the significance of tourism forms based on specific destinations. One of them is forest tourism practised in forested areas. According to [12], "it is a peculiar (...) unique type of tourism activity with a characteristic destination, that is, forested areas. Considering other components of travel, forest tourism comprises residential tourism and touring, as well as other types of tourism where forested areas are the destination". Therefore, the literature also mentions forest recreation [13], "which is a term generic to forest tourism, similar to how recreation is to tourism and all its forms can be classified as tourism activities consistent with the principles of sustainable development in rural areas and urban forests and forest parks" [14]. "Therefore, activities taking place in the forest include active leisure (such as cycling, running, and walking) and new outdoor activities such as bushcraft and geocaching. The above-mentioned elements, combined with an improvement in the living standard and ecological awareness, make the social function of the forest more significant to people than its productive function" [15,16].

The development of the tourism function of rural areas is influenced by several different factors, with the most important ones being natural values and resources, as well as man-made objects that have a real impact on the development of tourism and the travel patterns chosen by potential tourists. Consequently, this affects the volume of tourism [9,17,18]. According to [19], in order to reduce disparities in their development and contribute to the general socioeconomic progress of the country, rural areas should aim for faster growth, among other things, by increasing their potential through restructuring and revitalisation processes and by creating improved policies while implementing local development strategies [20]. The above-mentioned authors underline that the experience of other countries demonstrates the contemporary key role of innovation, both social and technological, which focuses on increasing the potential for sustainable and permanent development of rural areas [19]. At present, studies concerning the development of tourism mention the application of information and communications technology as a trend shaping this branch of the economy in the medium- and long-term perspective [21]. Thus, technological innovation supporting the development of forest tourism and forest recreation can contribute to the development of a non-productive function, that is, the social function of a forest, and in particular, its tourism, leisure, and recreational function [22]. Simultaneously, it can become an element of the tourism product's 'smart specialisation' and of the 'smart village' concept, which the reference literature interprets as, among other things, "villages (local communities, regions) using digital technology and innovation in their everyday lives, thus enhancing their living standards, upgrading standard public services, and improving the utilisation of local resources (...)" [23]. Therefore, the development of the smart villages concept is seen as offering villagers an opportunity to have easier and more comfortable lives. "(...) in fact, this denotes a set of integrated services for rural communities and business groups to address the demographic deficit and achieve inclusive growth goals in a more effective and efficient manner" [24,25]. Regarding the development of forest tourism and forest recreation in Poland, social activity can be stimulated, among other elements, by the current tourism and recreation offer of the State Forests National Forest Holding (SF), which allows the use of information and communications technology in the form of mobile apps and social media, as well as websites and web portals or YouTube TV.

This paper aims to present activities currently undertaken in connection with the development of a new offer of tourism and recreation in the forests that are the property of the State Treasury and administered by the State Forests National Forest Holding (SF) in

Poland. This paper poses the following research hypothesis: a comprehensive package of traditional and innovative forms and tools for building and promoting the contemporary tourist and recreational offer of State Forests enables forest tourism and forest recreation to thrive and contributes to the development of the non-productive role of forests in Poland, particularly in ecotourism.

The most recent example of such an innovative offering for all forest enthusiasts interested in active leisure is the SF's programme *Stay Overnight in the Forest* (Polish: *Zanocuj w lesie*), which promotes access to forestland for dispersed camping [26]. This programme is currently associated with the Forest Tourism Guide website and the mobile Forest Data Bank app (mBDL ver 1.19.0) [27,28]. Regarding the *Stay Overnight in the Forest* initiative, as a relatively new tourist offering (launched on 15 February 2021, initially in selected forest districts in Poland, and since 1 May 2021, it has been available throughout Poland), the reference literature lacks a detailed analysis of the project. Existing studies primarily consist of review papers [26] and statistical research [27,29] or are derived from the State Forests' internal records and reports [30–41]. However, there are no scientific papers that explore the application of modern information and communications technologies in the programme. Given the information mentioned above, the primary objective of this paper is to conduct a survey among representatives of all forest districts of the State Forests in Poland participating in the Stay Overnight in the Forest programme. The aim is to examine their opinions and present the activities currently being carried out in connection with the development of a new tourism and recreation offering in the forests owned by the State Treasury and managed by the State Forests National Forest Holding (SF). At the same time, it demonstrates that innovative enhancements and modern information and communications technology, such as mobile apps, social media, websites, etc., introduced by the SF contribute to the development of forest tourism and forest recreation in Poland and the creation of new tourism products in rural areas that align with the concept of ecotourism. This innovative research approach underscores the vital role of modern information and communications technology. This article has an applied character and can be beneficial for developing a tourist offering in other forest areas. This study was undertaken to bridge the existing knowledge gap. This study's results and the recommendations formulated can also be utilised by the State Forests in Poland, as well as by private and local entities and decision-makers at various administrative levels around the world.

This article is structured as follows. The second chapter focuses on the presentation of the diverse functions of the forest, in particular, its non-productive role, which is nowadays greatly influenced by various forms of tourism and recreational activities in the forest. The third chapter contains information on the research area—forest areas which are owned by the State Treasury. It discusses the process of research proceedings and the source materials used in this study. The fourth (empirical) chapter focuses mainly on examples and the analysis of the structure of modern tools for creating and promoting the current tourist and recreational offers in forest areas in Poland. Among them, the internet and related state-of-the-art information and communication technologies (e.g., mobile applications) play a special role in the creation of forest offers in Poland which support the development of forest tourism, recreation, and ecotourism. A good example of these is the implementation of a social program of the State Forests entitled "Stay overnight in the forest". The fifth chapter takes a closer look at the discussion of the role of ecotourism in forests, which has been the subject of numerous studies conducted by researchers in various countries around the world.

2. Theoretical Background

2.1. Ecotourist Trips in Forests

Ecotourism is associated with sustainable tourism because it blends nature with the culture and traditions of the region. Ecotourism encompasses various types of tourism, including sightseeing and leisure, as well as qualified and specialised tourism. It plays a role in conserving ecosystems and enriching the heritage values of the regions [42].

Ecotourism in forests has a special place because of the following four aspects [43,44]:

- It is a form of active sightseeing and contributes to the deepening of tourists' knowledge of the region's nature and cultural heritage;
- It stimulates efforts to balance forest landscapes as a basic ecotourism product;
- It can generate funds for the protection of forest complexes;
- It integrates forest management into local economies while bringing tangible economic benefits [45].

Forest ecotourism and recreation serve as a crucial connection between the practice of sports, tourism, recreation, and the economic activities of forest management and forest protection. There has been a noticeable surge in interest in the development of forest ecotourism for a significant period in the continents of Africa, southeast Asia, and South America, and for several years in Europe as well. According to [46], only 4% of the world's total forest area serves purely social functions, primarily catering to the needs of recreation and tourism. This indicates a growing interest in ecotourism in forests in the near future. Hence, this form of forest ecotourism should be regarded as an integral component of forest management, especially considering the numerous vital functions that forest areas perform, both ecologically and economically [47]. The functions of forests are illustrated in Figure 1.
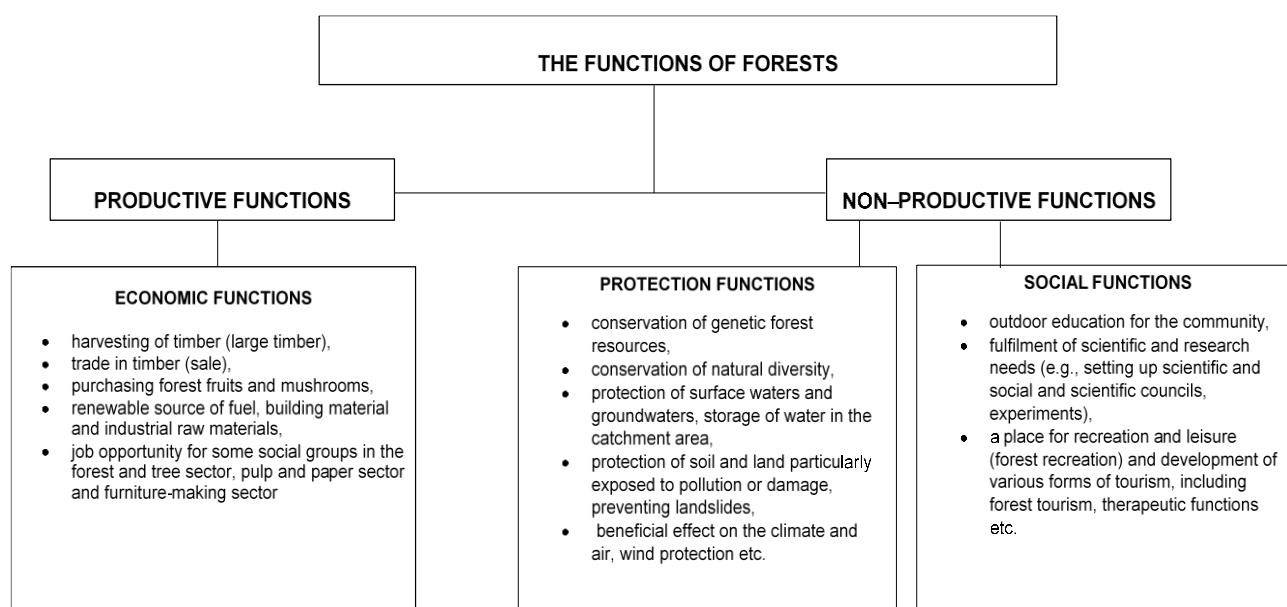
Figure 1. Functions of forests (source: own elaboration based on [45–48]).

2.2. The Rights or Restrictions on Practising Forest Tourism and Forest Recreation

Tourists venturing into the forest for tourism are well aware of its climatic, health, and aesthetic qualities. Staying in the forest positively impacts their physical and mental well-being and provides recreation. However, it is equally important for tourists to be conscious of the principles of protecting forest resources. Excessive exploitation of forest areas due to a high volume of tourist traffic can lead to a decline in the aesthetic value of the forest landscape and the loss of natural phenomena and values [49]. Activities such as hiking, biking, skiing, and horseback tourism are permissible in the forests. However, entry is permanently prohibited in forests with trees measuring up to 4 m in height, experimental areas, and seed stands, as well as animal sanctuaries and the headwaters of rivers and streams [50,51]. Periodic restrictions on forest access may be imposed due to excessive drought and fire risk, as well as forest management activities. These management operations, which include logging, harvesting, silviculture, and forest protection, can temporarily limit access to the forest and forest hiking trails [52–54].

Dangers associated with access to the forest, forest tourism, and forest recreation stem from a failure to adhere to the rules and regulations for forest usage. The most frequent

violations involve damaging forest trails with quad bikes, cross motorcycles, or all-terrain vehicles [55].

Despite certain constraints or restrictions, the forest areas in Poland, owned by the State Treasury and managed by the State Forests National Forest Holding (SF), have become a significant focal point for the development of forest tourism, including ecotourism, and recreation, in the country, as stipulated by Polish law [56]. Thanks to the availability of modern information and communications technology, particularly through forest apps, in the current tourism and recreation offerings of the State Forests, all forest users can safely make the most of the potential of Polish forestland. An excellent illustration of this is *the Stay Overnight in the Forest* programme, launched on 1 May 2021 throughout Poland, which represents a new and genuine tourism and recreation initiative by the State Forests aimed at various groups of forestland users.

2.3. Information and Communication Technologies

The globalisation processes of the 21st century have contributed to the intensive leveraging of information and communication technologies in various areas of life. The use of new technologies influences the dynamic development of the information society. At the same time, modern society faces new challenges, such as the knowledge economy and the need for knowledge management. Thus, information and communication technologies are the basic facilities supporting the socioeconomic development of the country. The intensive development of the Internet has led to the use of this means of transmitting information as an important factor in interpersonal communication in various areas of life. One of the first was D. Stevenson, who was the first to use the term ICT5 (information and communications technology) in the context of the application of information and telecommunications technology (ICT) in the development of education in the UK [29]. The use of ICT can be observed in various scientific works, for example, the promotion of tourism and recreation, the development of underground space in urban built-up areas [31], and preferences revealed by Airbnb users [57].

3. Materials and Methods

3.1. Source Data

The timeframe of this paper encompasses the present period and primarily focuses on desk research and the analysis of statistics and source materials related to the years from 2007 to 2023. These materials were retrieved from internal documents and reports prepared by the General Directorate of the State Forests. The input data for the analyses included the results of surveys conducted in 2022 by the State Forests' Evaluation Centre among participants of the *Stay Overnight in the Forest* programme (providing access to forestland for dispersed camping) and various forest-related online sources. These sources include the State Forests' homepage [58], the Forest Tourism Guide website [30], 13 forest-related mobile applications, and the primary social media profiles of the State Forests. However, the key element of this work was primary data derived from the following:

- The self-designed environmental survey conducted from 25 April 2023 to 27 May 2023 among representatives of all of the forest districts of Poland participating in the *Stay Overnight in the Forest* programme since 1 May 2021 ($n = 425$).
- Phone calls to interview selected forest districts in Poland both in 2022 (i.e., during the pilot survey) and in 2023, immediately after the closing of the main survey.

3.2. Study Area

The spatial scope of this study encompasses the forested areas of Poland which are divided into 17 Regional Directorates of State Forests and further subdivided into 429 forest districts (as of 2023). However, it is worth noting that four forest districts were excluded from the *Stay Overnight in the Forest* programme [26,30] due to their significant natural and valuable characteristics (Białowieża, Browsk, Hajnówka, and Drawsko). Additionally, the Cisna Forest District suspended the programme in its area as of 1 March 2022, in agreement

with the Polish Border Guard, due to its proximity to the state border. The forest area considered for analysis is owned by the State Treasury in Poland, managed by the State Forests, and overseen by the Regional Directorates of the State Forests. The division of Poland into forest districts is depicted in Figure 2, and the characteristics of the forest area considered for the study are detailed in Table 1.
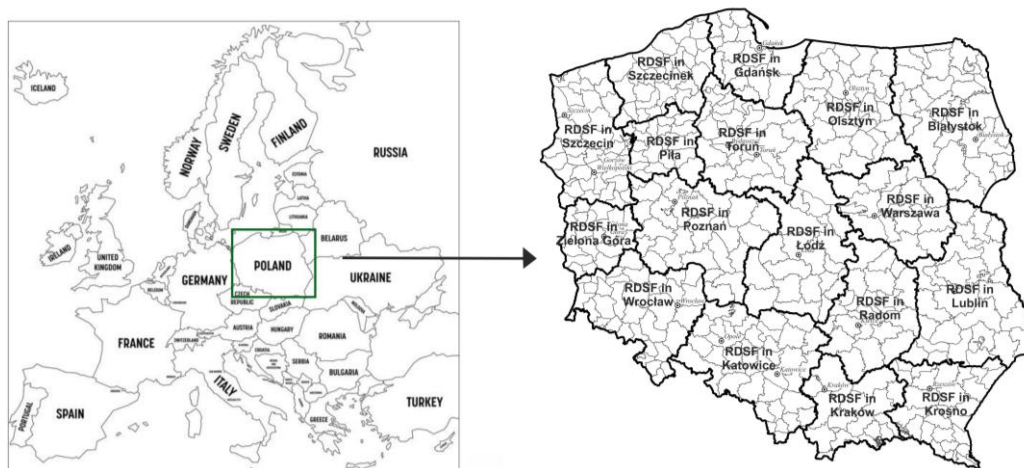
Figure 2. Administrative division of Poland's state-owned forests managed by the State Forest Holding—State Forests (source: own study).

Table 1. The area of forests under the management of the State Forests in Poland that have participated in the *Stay Overnight in the Forest* programme since 1 May 2021.

Regional Directorates of State Forests (RDSF)	Forest Area					Forest Districts Located within the Administrative Boundaries	Forest Districts Included in the Surveys that Participate in the "Overnight in the Forest" Programme
Location	Total ha	Forested ha	%	Non-forested ha	%	Number	
BIAŁYSTOK *	575,410	554,968	96.4	20,442	3.6	31	28
GDAŃSK	284,788	276,973	97.3	7815	2.7	15	15
KATOWICE	599,810	581,751	97.0	18,059	3.0	38	38
KRAKÓW	167,839	165,804	98.8	2035	1.2	16	16
KROSNO **	402,000	388,631	96.7	13,369	3.3	26	26
LUBLIN	398,118	394,213	99.0	3905	1.0	25	25
ŁÓDŹ	283,564	275,705	97.2	7859	2.8	19	19
OLSZTYN	580,986	564,017	97.1	16,969	2.9	32	32
PIŁA	339,568	334,686	98.6	4882	1.4	20	20
POZNAŃ	408,153	401,843	98.5	6310	1.5	25	25
RADOM	309,647	305,944	98.8	3703	1.2	23	23
SZCZECIN	641,197	627,345	97.8	13,852	2.2	35	35
SZCZECINEK ***	571,962	563,059	98.4	8903	1.6	30	29
TORUŃ	422,271	409,603	97.0	12,668	3.0	27	27
WARSZAWA	184,047	180,417	98.0	3630	2.0	14	14
WROCŁAW	526,810	509,521	96.7	17,289	3.3	33	33
ZIELONA GÓRA	425,261	414,589	97.5	10,672	2.5	20	20
Total	7,091,431	6,949,069	97.6	172,362	2.4	429	425

* The Białowieża, Browsk, and Hajnówka Forest Districts, due to public safety and their location near the border with Belarus, have been excluded from designation under the *Stay Overnight in the Forest* programme. ** The Cisna Forest District, for reasons of public safety in consultation with the Polish Border Guard as of 1 March 2022, has suspended participation in the *Stay Overnight in the Forest* programme until further notice. *** Drawsko Forest District, due to 90% of the forest district's area occupied by the Land Forces Training Centre (including the military training ground), has been excluded from the *Stay Overnight in the Forest* programme. Source: own study based on [56,59–62].

The forested area selected for analysis is owned by the State Treasury in Poland and continues to be managed by the State Forests, with oversight provided by the Regional Directorates of the State Forests.

3.3. Methodology

The primary research method employed was a diagnostic survey, which was conducted to gather the opinions of representatives from the State Forests' districts across Poland who were participating in the *Stay Overnight in the Forest* programme (comprising 425 authorised interviewees). The survey aimed to assess the relevance of implementing innovative advancements and modern information and communications technology (e.g., mobile apps, social media, websites, etc.) in developing a new tourism and recreation offering for Poland's forested areas. Hence, the research involved conducting an environmental survey among representatives of all forest districts in Poland within the period from 25 April 2023 to 27 May 2023. The entire research process, including obtaining official approvals from the General Directorate of State Forests, was a lengthy and comprehensive undertaking. A survey questionnaire was created using the Microsoft Forms web-based programme and was made available online to representatives of all forest districts of the State Forests in Poland who have been participating in the *Stay Overnight in the Forest* programme since 1 May 2021 [63]. This programme constitutes a significant component of the contemporary tourist and recreational offering of the State Forests in Poland. The main survey, involving a group of 425 forest districts authorised to conduct the survey in 2023, followed a pilot survey conducted one year earlier in 2022 (from 1–12 August 2022). The pilot survey was supplemented with phone interviews (conducted from 29 July to 12 August 2022) with representatives from a selected group of 10 forest districts within the Regional Directorate of State Forests in Toruń that were participating in the *Stay Overnight in the Forest* programme. The results of the pilot survey and phone interviews held in 2022 aimed to verify the accuracy and reliability of the developed research tool, i.e., the survey questionnaire. Subsequently, following the completion of the main survey (conducted from 25 April 2023 to 27 May 2023), individual phone interviews were conducted with selected forest districts across Poland. These interviews were designed to assist in clarifying any interpretive uncertainties related to ecotourism in forest areas. This comprehensive approach ensured the correct application of the research method and the fulfilment of the research objectives and hypotheses outlined in the manuscript.

The main survey in 2023 encompassed 425 forest districts that were eligible for the study out of a total of 429 such units in Poland. Hence, the entire sample was utilised [64,65]. The total number of questionnaires returned from the survey amounted to 349, which represented 82.1% of all eligible forest districts. Following preliminary verification, 342 correctly completed questionnaires were included for further analysis, accounting for 80.5% of the total. Notably, a significant portion of the surveyed forest districts, specifically 258 districts (75.4%), are situated in close proximity to urban agglomerations. This includes 58% of the districts located in the suburbs of large cities with more than 100,000 inhabitants. Furthermore, the survey was supplemented by telephone interviews conducted in May 2023 with selected forest districts in the country, primarily those situated within the boundaries of promotional forest complexes in Poland. A schematic representation of the research procedures is depicted in Figure 3.
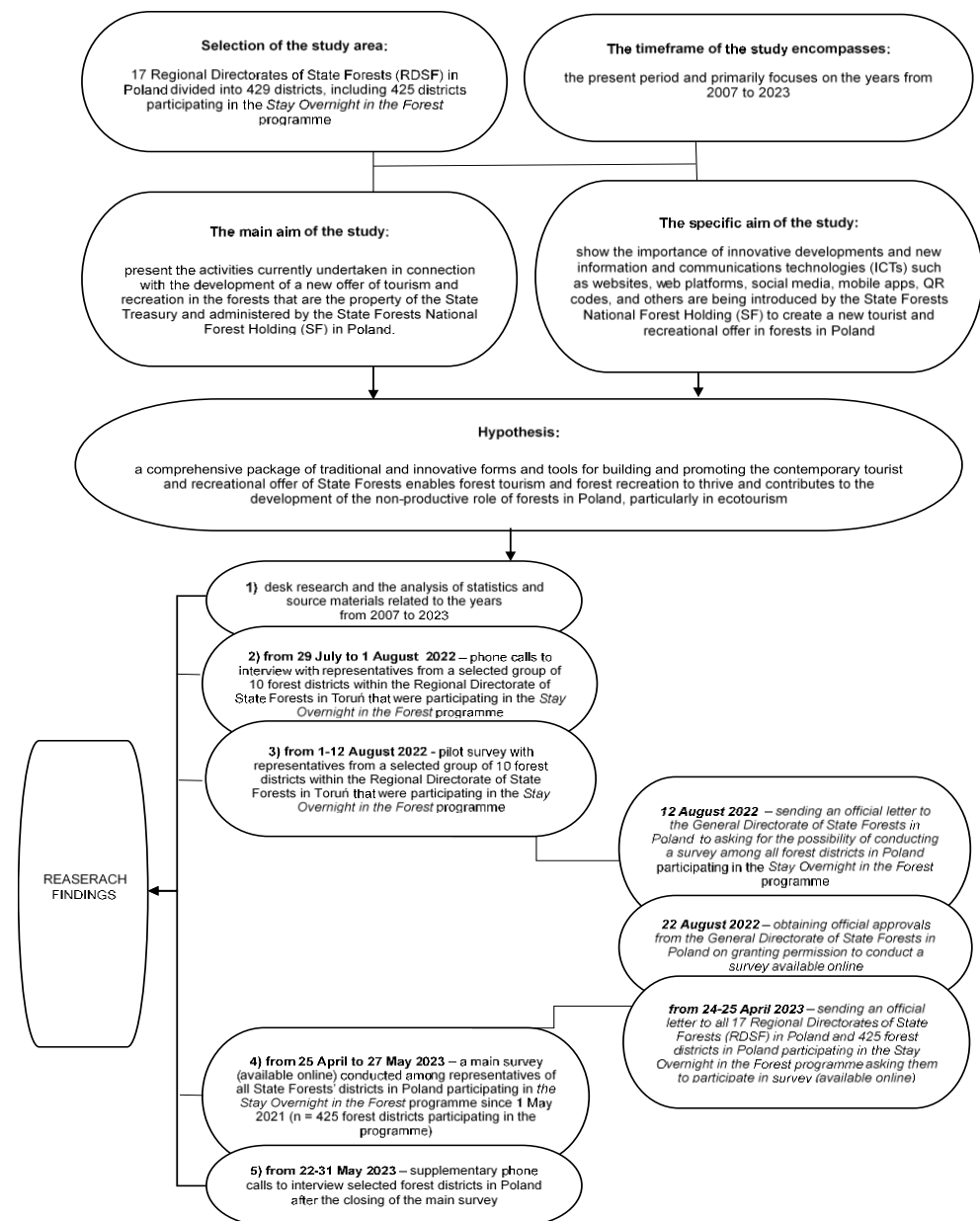
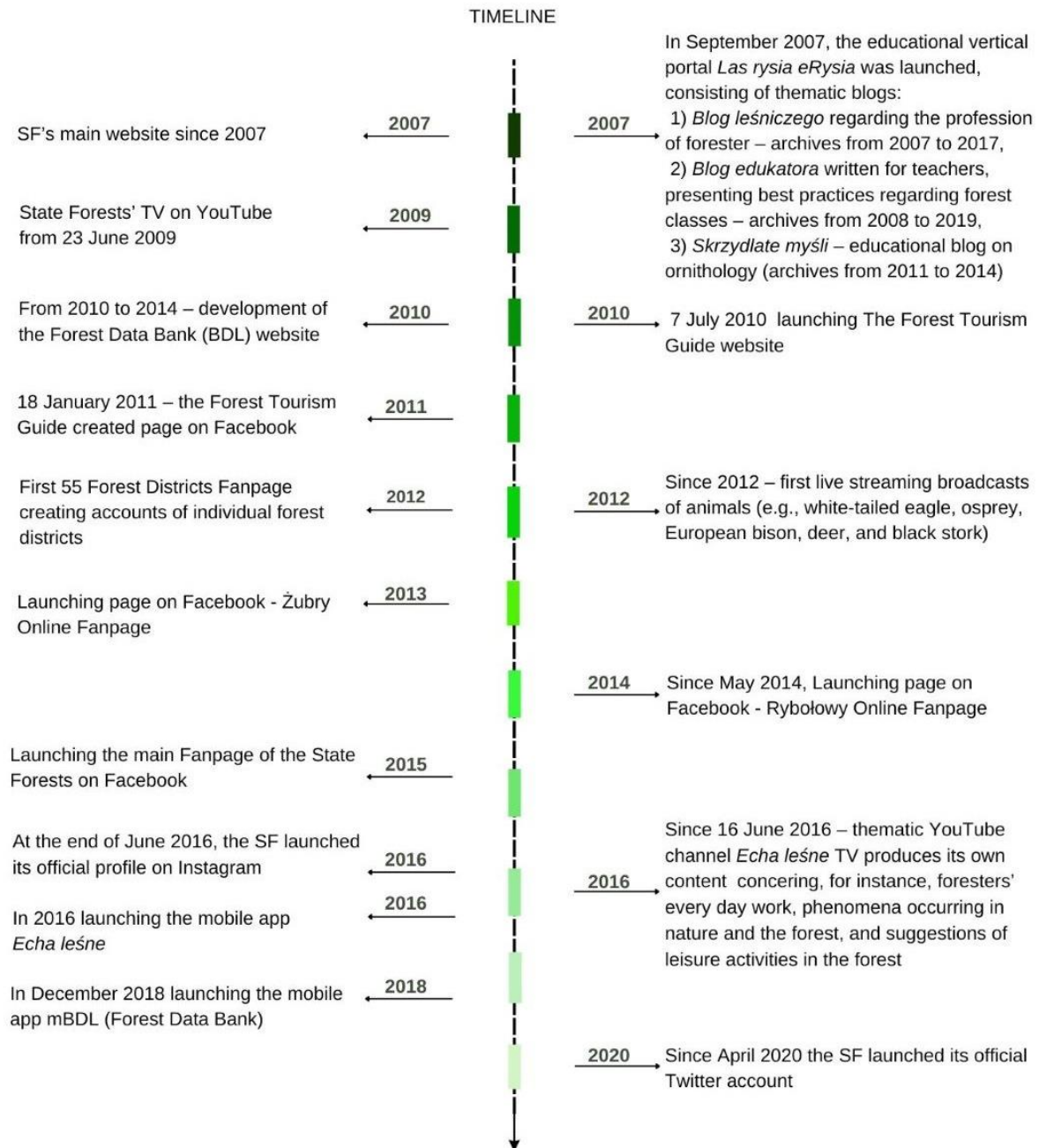**Figure 3.** Research procedure (source: own elaboration).

4. Results

4.1. Use of Information and Communication Technology

It should be emphasised that, due to society's increasing access to the Internet (both mobile and fixed line), since 2007, the State Forests has been implementing innovative improvements and new information and communications technologies in its offer of tourism and recreation (both in local forest districts and throughout all of Poland). In response to the present-day needs of people practising forest tourism and recreation, over the past 15 years, the State Forests has launched the first public information channels. These include the following (Figure 4):

- Websites and web portals such as the State Forests' homepage [66], an educational vertical portal *Las rysia eRysia* [67], the *Forest Tourism Guide* website [27], live streaming from animal webcams installed by the forest districts in the nests of birds (mainly white-tailed eagle, osprey, and black stork) and in forest clearings (European bison and deer watching) [68], and the State Forests' TV[6] on YouTube [69];

- A thematic YouTube channel *Echa leśne TV* produces its own content concerning, for instance, foresters' everyday work, phenomena occurring in nature, and the forest, and suggestions of leisure activities in the forest. Currently, the channel has 172,000 subscribers and 40,105,121 viewers (at 29 October 2022) [70].

TIMELINE

SF's main website since 2007 ← 2007

2007
In September 2007, the educational vertical portal *Las rysia eRysia* was launched, consisting of thematic blogs:
1) *Blog leśniczego* regarding the profession of forester – archives from 2007 to 2017,
2) *Blog edukatora* written for teachers, presenting best practices regarding forest classes – archives from 2008 to 2019,
3) *Skrzydlate myśli* – educational blog on ornithology (archives from 2011 to 2014)

State Forests' TV on YouTube from 23 June 2009 ← 2009

From 2010 to 2014 – development of the Forest Data Bank (BDL) website ← 2010

2010 7 July 2010 launching The Forest Tourism Guide website

18 January 2011 – the Forest Tourism Guide created page on Facebook ← 2011

First 55 Forest Districts Fanpage creating accounts of individual forest districts ← 2012

2012 Since 2012 – first live streaming broadcasts of animals (e.g., white-tailed eagle, osprey, European bison, deer, and black stork)

Launching page on Facebook - Żubry Online Fanpage ← 2013

2014 Since May 2014, Launching page on Facebook - Rybołowy Online Fanpage

Launching the main Fanpage of the State Forests on Facebook ← 2015

At the end of June 2016, the SF launched its official profile on Instagram ← 2016

In 2016 launching the mobile app *Echa leśne* ← 2016

2016 Since 16 June 2016 – thematic YouTube channel *Echa leśne* TV produces its own content concering, for instance, foresters' every day work, phenomena occurring in nature and the forest, and suggestions of leisure activities in the forest

In December 2018 launching the mobile app mBDL (Forest Data Bank) ← 2018

2020 Since April 2020 the SF launched its official Twitter account

Figure 4. Timeline of new ICTs implemented by the State Forests to expand the current forest tourism and recreation offer (source: own study based on [27,28,36,39,40,61,66,68–73]).

This is all about enhancing society's access to up-to-date forest-related educational and tourism content, which includes information about tourism values and development, as well as major tourist amenities. In doing so, it serves the non-productive (i.e., social) function of the forest as designated by the Polish legislation (Forest Act of 28 September 1991—Dz.U. of 2022, item 672, 1726) [56].

According to [21], the most significant characteristics of mobile apps are their practical utility and user access to content, which are crucial in assessing their usefulness and their

ability to fulfil the need for information. This also applies to forest-related mobile apps promoted by the State Forests in Poland. Consequently, we chose to assess the functionality of 13 forest-related mobile apps and the quality of their content by installing them on two test smartphones operating with Android.

The analysis of the features and utility of the tested applications, which vary in spatial scope and primary theme, reveals that as of 31 October 2022, the vast majority, specifically nine forest-related apps (comprising 69.2% of all of the apps analysed), regardless of their spatial scope, offer access to content related to tourism values, tourism development, and/or key tourist amenities in forests across various regions of Poland (Figure 5, Table 2).
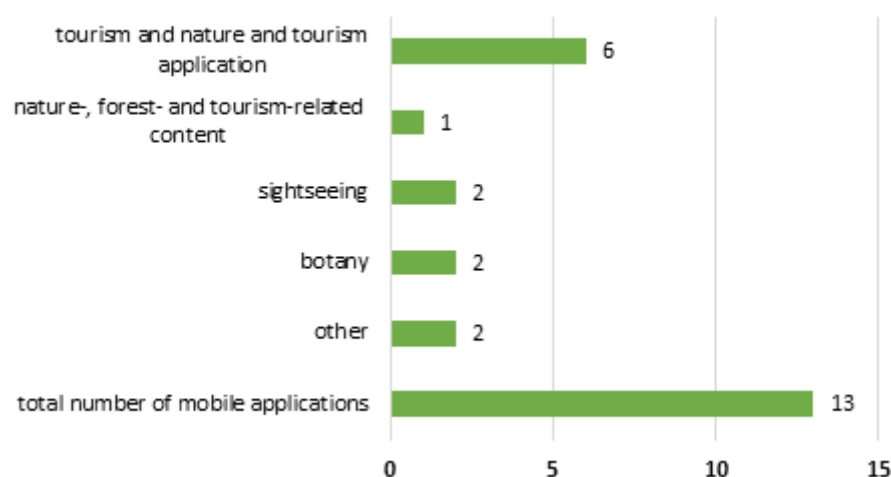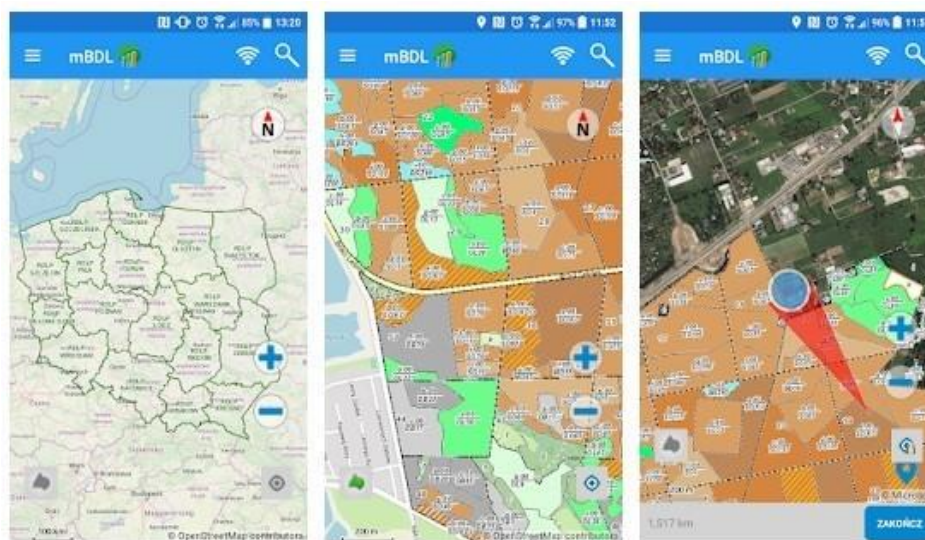

Figure 5. Main themes of forest-related mobile apps offered to forest users in Poland by the State Forests (source: own study based on forest data and mobile applications of the State Forests National Forest Holding (SF) in Poland (as of June 2023).

We analysed two apps with primarily sightseeing content (comprising 15.4% of all forest-related applications), six apps focused on tourism, nature, and tourism (accounting for 46.2%), and one app with content related to nature, forests, and tourism (7.7%)—as shown in Table 2. All of these apps provide users with valuable information about the geographic locations of sites, utilising various types of maps. These maps range from diverse Google maps (e.g., "Od Bałtyku po Kaszuby" or "Kraina Buka") to simplified maps on Traseo. pl (e.g., "Puszcza Knyszyńska"), specialised cycling maps like OSM HIKE and BIKE (e.g., "Nadleśnictwo Gdańsk") [74,75], and forest-themed maps (mBDL) [35,79,80]. Importantly, all nine apps are capable of functioning offline, meaning they can be used without an internet connection, enabling forest users in various parts of Poland to make the best use of their smartphones. This also allows individuals engaged in forest tourism and recreation to spend their leisure time in an engaging manner while participating in various outdoor activities within the forest. Users of these applications can effectively employ them in questing, which combines sightseeing, regional education, active leisure, and the promotion of cultural and natural heritage. The main concept behind this activity involves solving puzzles and riddles (referred to as quests) and enables mobile app users to seek treasures or explore unmarked routes within the forest. According to [81–83], quests are innovative and serve as an unconventional tool for educating tourists and local communities. Two forest-related apps, "Kraina Buka" and "Wilczy Szaniec", perfectly exemplify this concept (Table 2). "Kraina Buka" allows users to utilise their smartphones to solve quests in the forest area of the Elbląg Upland within the bounds of the Elbląg forest district (Regional Directorate of the State Forests in Gdańsk). "Wilczy Szaniec" takes users on three thematic quests (the Bunkers Quest, the Stauffenberg Quest, and the Nature Quest) in the forest district of Srokowo (Regional Directorate of the State Forests in Olsztyn). Out of the 13 currently available forest-related mobile apps, approximately 69.2% have a local scope, focusing on specific forest districts, and regional coverage,

encompassing several neighbouring forest districts, often falling under different Regional Directorates. In general, only four apps, namely, "Adaptacja do zmian klimatu AR", "mBDL", "Echa leśne", and "Czyj to liść", have a national reach. Among these, the "Mobile Forest Data Bank (mBDL)" is particularly noteworthy [76,84]. It was developed by the Forest Management and Forest Surveying Office upon the request of the State Forests. The core content of this mobile application comprises forest-themed maps from the Forest Data Bank (BDL), including a base map, tree cover map, maps indicating forms of ownership, forest habitats, plant communities, and a hunting map. In addition to sector-specific maps, users can display predefined raster backgrounds such as topographic maps or aerial/satellite orthophotographs, as well as external WMS maps. The app offers various features, including "tree stand description for forests regardless of ownership, the ability to search for forest sub-areas and cadastral parcels, forest address points, as well as other tools useful in the forest, such as measuring distance and surface area, reading coordinates, navigating to a location, route registration, point saving, exporting/importing saved points and routes, and uploading personal SHP files" [77,85,86]. According to the General Directorate of the State Forests, the mBDL app was downloaded 100,000 times for Android devices in August 2022 alone. Additionally, the geoinformation portal GISPLAY.PL [86] reports that in the first six months of 2022, the new version of the mobile app mBDL was enhanced by adding the following (Figure 6):

- The option to save photos next to points and routes;
- The option to share the location directly from the app's menu;
- An available updated lookup engine;
- A local data updated engine (offline);
- Modernised graphic content on several app screens;
- Bug fixes for selected features.

Figure 6. Examples of maps used in the mBDL application (source: [86]).

Table 2. Description of forest-related mobile apps and their features expanding the current tourism and recreation offer of the State Forests National Forest Holding (SF) in Poland.

Mobile App's Name	The App Is Free?	Compatible Software:			Operation of the Application in Offline Mode	App's Main Theme	Spatial Range of the App's Content	Layers with Maps	Tourist Content Regarding Tourist Values and Development, Major Tourist Amenities	Information about Location of Tourism Facilities	App's Additional Features
		Android That Supports Smartphones	Phone Windows	iOS Supporting e.g., iPhones and iPads							
Wilczy Szaniec	Yes	Yes	No	Yes	Yes	Sightseeing theme	Local coverage	Yes (linked with Google map layer)	Yes	Yes	− taking part in *Szlakiem bunkrów*, *Szlakiem Stauffenberga*, and *Przyrodniczy* quests − information about events
Puszcza Notecka	Yes	Yes	No	No	Yes	Sightseeing theme	Regional coverage	Yes (linked with 5 different map layers + map of fire hazards)	Yes	Yes	− thematic sections (tourism, education, events, culture and history, nature, the State Forests etc.)
Adaptacja do zmian klimatu AR	Yes	Yes	No	Yes	Yes	Information about local storage reservoirs, preventing water erosion, fire protection of the forest and adaptation to climate change	Nationwide coverage	No	No	No	− displaying 3D animations directly outdoors after a photo of an object has been taken

Table 2. *Cont.*

Mobile App's Name	The App Is Free?	Compatible Software:			Operation of the Application in Offline Mode	App's Main Theme	Spatial Range of the App's Content	Layers with Maps	Tourist Content Regarding Tourist Values and Development, Major Tourist Amenities	Information about Location of Tourism Facilities	App's Additional Features
		Android That Supports Smartphones	Phone Windows	iOS Supporting e.g., iPhones and iPads							
mBDL	Yes	Yes	No	Yes	Yes	Information about habitats and phytosociological descriptions of forests, hunting management, information on forest fires and other information concerning forest areas, including tourism	Nationwide coverage	Yes (the basic content of this mobile application is forest thematic maps such as: a base map, tree cover map, maps of forms of ownership, forest habitats, plant communities and a hunting map; in addition to sector-specific maps, the user can display predefined raster backgrounds such as topographic maps or aerial/satellite orthophotographs, as well as external WMS maps)	Yes	Yes	− saving photos next to points and routes, − sharing the location directly from the app's menu, − available update lookup − offline local data update, − interactive map and dataset creator (data filtering)
Kraina Buka	Yes	Yes	No	No	Yes	Nature and tourism themes	Regional coverage	Yes (linked with 2 Google map layers—basic map and satellite map)	Yes	Yes	− communication between tourists and forest district's services (e.g., possibility to report illegal dumping sites, traces of poachers, fires or other hazards), − taking part in quest, − animal postcard creator, − QR codes scanner,
Puszcza Gorzowska	Yes	Yes	Yes	Yes	Yes	Nature and tourism themes	Regional coverage	Yes (linked with 5 different map layers)	Yes	Yes	− dataset creator (data filtering), − favourite locations planner, − QR codes scanner, − current weather forecast,

Table 2. *Cont.*

Mobile App's Name	The App Is Free?	Compatible Software:			Operation of the Application in Offline Mode	App's Main Theme	Spatial Range of the App's Content	Layers with Maps	Tourist Content Regarding Tourist Values and Development, Major Tourist Amenities	Information about Location of Tourism Facilities	App's Additional Features
		Android That Supports Smartphones	Phone Windows	iOS Supporting e.g., iPhones and iPads							
Puszcza Knyszyńska	Yes	Yes	No	No	Yes	Nature, forest and tourism themes	Regional coverage	Yes (linked with simplified tourist maps Traseo.pl)	Yes	Yes	— favourite locations planner, — QR codes scanner, — information about events (last updated in 2015), — thematic sections (tourism, nature and forest tourism, forest infrastructure, valuable natural sites, mushroom forests, the Knyszyn Forest Landscape Park)
Leśne Arboretum Warmii i Mazur	Yes	Yes	No	No	Yes	Botanical theme	Local coverage (applies to the Forest Promotional Complex Lasy Olsztyńskie in the forest district of Kudypy, Regional Directorate of the State Forests in Olsztyn)	No (simplified plan of the arboretum only)	No	No	— favourite locations planner,
Pilskie lasy	Yes	Yes	No	No	Yes	Tourist theme	Regional coverage	Yes (linked with the base of the topographic map-Map of Poland Compass and *Pilskie Lasy* ver.1.15 Compass)	Yes	Yes	— saving GPS location and track, — compass function, — route planner

Table 2. *Cont.*

Mobile App's Name	The App Is Free?	Compatible Software:			Operation of the Application in Offline Mode	App's Main Theme	Spatial Range of the App's Content	Layers with Maps	Tourist Content Regarding Tourist Values and Development, Major Tourist Amenities	Information about Location of Tourism Facilities	App's Additional Features
		Android That Supports Smartphones	Phone Windows	iOS Supporting e.g., iPhones and iPads							
Od Bałtyku po Kaszuby	Yes	Yes	No	No	Yes	Tourist theme	Regional coverage	Yes (linked with 5 different Google map layers)	Yes	Yes	– dataset creator (data filtering), – directory, – calendar function
Nadleśnictwo Gdańsk	Yes	Yes	No	Yes	Yes	Nature and tourism themes	Depending on the choice of map, nationwide coverage or local (applies to the forest district of Gdańsk in Regional Directorate of the State Forests in Gdańsk)	Yes (linked with 5 different Google map layers and specialised cycling maps OSM HIKE & BIKE)	Yes	Yes	– saving GPS location and track, – redirect to https://geocaching.pl/ accessed on 5 October 2023, – audio guides with interactive maps of the flora and fauna of the Marszewo Forest Botanical Garden in Gdynia, – communication between tourists and forest district's services (e.g., possibility to report illegal dumping sites, traces of poachers, fires or other hazards),
Echa leśne	Yes	Yes	No	Yes	No	Forest and nature themes	Nationwide coverage	No	Depending on the topic of the article	No	– mobile edition of the magazine (quarterly) with multimedia such as photos, videos and audio recordings of, for example, bird calls

Table 2. *Cont.*

Mobile App's Name	The App Is Free?	Compatible Software:			Operation of the Application in Offline Mode	App's Main Theme	Spatial Range of the App's Content	Layers with Maps	Tourist Content Regarding Tourist Values and Development, Major Tourist Amenities	Information about Location of Tourism Facilities	App's Additional Features
		Android That Supports Smartphones	Phone Windows	iOS Supporting e.g., iPhones and iPads							
Czyj to liść?	Yes	Yes	No	Yes	Yes	Botanical theme	Nationwide coverage	No	No	No	− key for labelling 26 selected, most common species of shrubs and trees, − mini-atlas with a brief description of shrub and tree species, interesting facts, most significant characteristics, and photos, − option to make one's own 'e-herbarium': a catalogue with photos of trees and shrubs seen and recognised on the forest trails

Source: own study based on forest data and mobile applications of the State Forests National Forest Holding (SF) in Poland [28,37,74–78] (as of June 2023).

4.2. Social Media Profiles of the State Forests

The analysis, which assessed the functionality of all 13 mobile apps provided by the State Forests and their organisational units (forest districts), identified 24 interesting and useful features. Among these, several are particularly convenient for individuals engaged in forest tourism and forest recreation:

- Saving the GPS locations and tracks (two of the analysed apps);
- Favourite locations/route planner (four apps);
- QR codes scanner (four apps);
- Saving photos next to locations and routes (one app—*mBDL*).

Tourist information is understood as the transfer of information and a set of other activities contributing to the spread of arrivals in time and space, providing them with an opportunity to learn about and use the existing tourism values to a fuller extent. The main recipients of such information are tourists [20]. However, one must not forget about local residents seeking recreation who often use such information. As demonstrated by the current tourism and recreation offer of the State Forests, there are many ways in which sightseeing and tourism information concerning a specific site or region, including forest-land, can be disseminated and publicised. These include classic sources like tourist guides, maps, booklets, sector-specific publications, and educational events for the community. However, increasingly, it is possible to use information and communication technologies (ITCs) such as websites, web portals, YouTube TV, or mobile applications. Nevertheless, in the era of the Internet, social media are the most significant because, due to their interactive nature and user-generated content, they are considered a reliable and useful source of readily available information [21,78,87]. This broad spectrum has a high user count—4.62 billion (as of January 2022—according to [88]). This is because social media represent "any place on the web where we can publish content, contact other people and, hence, build or become a member of a community" [89]. It carries opinions and trends that shape needs and behaviours, including those associated with participation in tourism [21] or recreation. Thus, it is not surprising that the State Forests and its subordinate forest districts commonly make use of social media in their educational and promotional activities and communications with society. Three social media platforms are especially important in that respect—Facebook [73], Instagram [72], and Twitter [36]—constituting essential and innovative tools for building and promoting the current tourism and recreation offer of the State Forests in Poland (Table 3).

The State Forests made their initial attempts to use social media to promote forest tourism and forest recreation in Poland in 2012. During that time, a total of 55 organisational units (forest districts) of the State Forests established their Facebook profiles. Their activities were coordinated and supported from the outset by the State Forests' Information Centre [85]. Consequently, by 2013, the fan count of the most popular profiles (fanpages) of forest districts had already exceeded 5000 [41]. By the end of 2016, approximately 156 forest districts were managing their individual fanpages, some amassing more than 36,000 fans [38]. Currently, the State Forests' Information Centre coordinates and provides ongoing support to administrators through a closed Facebook group named "Lasy Social Media", as well as via email. They prepare current materials and documents that can be utilised by staff engaged in social media communications. Consequently, as of 2022, a significant majority of forest districts in Poland already have their own Facebook profiles. This has greatly facilitated the organisation of various national media events, such as the International Day of Forests, Bee Day, and Polish Forget-me-not Day. These events are primarily educational [33] but also serve to promote various physical activities in the forest. At present, two national fanpages ("Żubry Online" and "Rybołowy Online", are administered by specific forest district personnel on Facebook (Table 3). The "Żubry Online" fanpage, which offers the live streaming of European bison, has been the most popular since its launch in 2013. From 2013 to 2020, the number of fans increased by 83,500, representing an increase of +355.3%, rising from 23,500 fans in 2013 to approximately 107,000 fans in 2020.

Table 3. Main social media profiles of the State Forests launched and coordinated by the State Forests' Information Centre in Warsaw or administered by employees of other organisational units of the SF.

Type of Social Media	Year of Launch	The Main Purpose of the Functioning of the Channel
Facebook—Żubry Online Fanpage [39]	2013 (from 2012, only online broadcasts were conducted)	The fanpage is used for publicising the development project "Comprehensive Project for the Protection of European Bison" by the State Forests; the fanpage shares information about subsequent stages of the project, including the creation of new herds, provides education, and disseminates methods for the management of the European bison population. The animals can be observed from a camera installed at the northern edge of the Białowieża Forest, in a forest clearing within the premises of the Browsk Forest District (Regional Directorate of the SF in Białystok).
Facebook—Rybołowy Online Fanpage [40]	May 2014	The fanpage provides live streaming from ospreys' nests in two locations, namely, the Barlinek Forest and the Napiwoda-Ramuki Forest. In previous years, it has also featured live streaming from the Lipka Forest District. This platform was used to publicise the project "Protection of Osprey (Pandion haliaetus) in Selected SPAs Natura 2000 in Poland". The fanpage contains information about the completion of subsequent milestones in the above-mentioned project, including the construction of new platforms for nests, the stocking of lakes with fish, scientific conferences, and the monitoring of birds with GPS transmitters attached. Administrators of the social media portal also provide information on the species of birds and methods for managing and protecting their populations.
Facebook—Main Fanpage of the State Forests [41]	2015	The main goal is nature and forest education as part of the State Forests' campaign "Dla lasu, dla ludzi" (For the Forest, for the people). This aims to raise awareness within society that the role of foresters is to balance the preservation of the forest as a complex natural ecosystem with meeting the expectations of society and the demands of the wood industry and national economic development.
Instagram (official profile of the State Forests) [72]	At the end of June 2016	Instagram, as the largest photo-sharing social networking service, is where photos taken by foresters and forest enthusiasts are shared with the official purpose of presenting and promoting the beauty of the forests owned by the State Forests, showcasing the work of foresters, and disseminating nature education.
Twitter (official account of the State Forests) [36]	April 2020	Official posts/tweets are related to forest issues in connection with the latest news from Poland and the world, particularly focusing on forest conservation. These tweets are accompanied by videos and photos submitted by foresters and forest enthusiasts. They enable followers to engage in discussions on various topics and expand on different issues through retweeting, which involves responding to a tweet (post) shared by the account's administrator.

Source: own study based on [36,39–41,72].

As of today (30 October 2022), this fanpage has 105,000 followers and approximately 10,700 likes [39], which serves as positive feedback for the State Forests' use of this channel for communicating information to the public. Given that present-day communication with society is predominantly based on social media, the State Forests took care to launch its main fanpage on Facebook in 2015. In 2019, it received the main prize in the Power of Content Marketing Awards contest in the Content Marketing—Agriculture and Related Areas category for its genuine engagement-building content [33]. The main fanpage of the State Forests has consistently garnered significant interest from the start. Its popularity is evident in the growth dynamics and the continuously increasing trend in the level of engagement from the fanpage users, measured by the number of followers and the posts viewed by them (Table 4). During the initial years following its launch, the main State Forests' Facebook profile had less than 30,000 followers (7000 in 2015 and 29,000 in 2016)

and shared around 1000 posts per year. It was only recently, particularly during the COVID-19 pandemic, that the number of followers finally exceeded 100,000. In 2020, the profile had as many as 112,000 fans, representing an increase of approximately 21,000 followers compared to the preceding year in 2019 (91,000 fans). As of 30 October 2022, the primary Facebook fanpage of the State Forests boasts 143,000 fans [73], signifying an increase of +27.7% over two successive years.

Analyses from the State Forests' Information Centre for 2020 alone indicate that approximately 2500 posts were shared, reaching 87,602 users daily, with an impressive engagement rate of 59%. The total number of profile views in 2020 amounted to 70 million, and these figures exclude sponsored posts [32]. To further extend the popularisation and educational and social activities of the State Forests on social media, the State Forests' Information Centre launched an official SF's profile on Instagram, the largest photo-sharing social network, in 2016. In less than six months, 388 photos were shared, receiving 134,512 likes and 1486 comments [90]. By the end of 2016 and the beginning of 2017, the profile had already amassed 3165 followers. In 2020, this number saw an impressive increase of 30,235 fans, reaching a total of 33,400 followers, which represents a remarkable +955% growth compared to 2016. As of 30 October 2022, it has 42,000 followers, marking an increase of 8600 fans over the past two years. During this time, 2304 posts have been shared. Twitter is the most recent social media platform that the State Forests joined in April 2020. As of 30 October 2022, statistics [36] indicate there are 23,000 followers who have had the opportunity to read approximately 4400 tweets.

4.3. Survey Results

Surveys have revealed that among the tools utilised by forest districts in Poland to develop and promote the contemporary tourist and recreational offerings of the State Forests, as well as to popularise forest tourism and forest recreation, a variety of forms and tools have been employed successfully [90–92]. Among them, the most popular tools, including educational and ecological classes and workshops for the public, events designed to promote nature and forest education, and the system for marking and expanding tourist infrastructure, still hold a significant position. However, in response to the evolving needs of forest tourism and recreation enthusiasts over the past 15 years, the State Forests has taken steps to provide the public with the first nationwide information channels. Leveraging innovative solutions in the form of new information and communication technologies, the State Forests, along with its subordinate forest districts, has begun to enhance the existing system of traditional sightseeing information with a modern, digital, and interactive system. This includes the use of mobile applications, social media, websites, portals, and online television through the YouTube channel (Table 4).

The survey reveals that among modern tools, the most successful are active social media activities (e.g., Facebook, Twitter, Instagram, and YouTube), accounting for 13.3% of all responses, and the utilisation of the Forest Tourist Guide website [27] at 11.2%. An increasing number of forest districts are also recognising the significance of the mBDL [28] mobile application, which was introduced in 2018 and has been providing maps for mobile devices (such as smartphones, iPads, and iPhones) since 2021. This application is being effectively employed as a practical tool to enhance and promote the modern tourist and recreational offerings of the State Forests (Figure 7).

Table 4. Types of tools for creating and promoting the current tourist and recreational offer in forest areas managed by Forest Districts participating in the survey who supervised by the Regional Directorates of State Forests in Poland.

No.	Name of the Regional Directorates of State Forests (RDSF) in Poland	The Number of Indications (Responses) from Forest Districts Supervised by the Regional Directorates of State Forests												
		Information Sheets, Printed Materials	Educational and Ecological Classes and Workshops for the Public	Events Designed to Promote Nature and Forest Education	The System for Marking and Expanding Tourist Infrastructure	Introduction of Appropriate QR Codes (Photo Codes) on Individual Information Boards	Rental of Audio Guides with Recorded Information about Individual Objects on the Tourist Route	Active Social Media Activities (e.g., Facebook, Twitter, Instagram, YouTube)	App mBDL	Other Forest Mobile Apps Available on the State Forests' Website	Tourist Mobile Apps (e.g., Komoot)	Use of Different Online Maps to Find Tourist Content	Use of the Forest Tourist Guide Website	Other
1	RDSF in Bialystok	5	18	13	11	1	0	10	9	2	0	0	10	1
2	RDSF in Gdańsk	4	3	5	6	3	0	7	7	0	1	0	6	1
3	RDSF in Katowice	11	25	20	17	0	0	13	12	2	0	0	17	1
4	RDSF in Kraków	9	11	10	8	1	0	8	6	2	0	2	6	0
5	RDSF in Krosno	9	14	19	13	3	0	20	8	0	0	2	15	0
6	RDSF in Lublin	7	14	10	11	3	0	10	8	1	0	2	4	1
7	RDSF in Łódź	6	15	15	7	1	0	7	12	0	0	1	11	0
8	RDSF in Olsztyn	8	20	21	15	1	0	9	7	1	0	0	8	2
9	RDSF in Pila	6	6	9	8	1	0	10	7	3	1	1	8	0
10	RDSF in Poznań	8	14	14	9	4	0	12	2	2	0	1	7	1
11	RDSF in Radom	8	11	15	4	3	0	6	6	2	0	0	5	0
12	RDSF in Szczecin	11	15	14	20	1	0	4	15	2	0	0	15	1
13	RDSF in Szczecinek	6	18	15	18	2	0	13	15	3	0	1	12	0
14	RDSF in Toruń	7	12	13	9	2	0	19	10	0	1	1	7	1
15	RDSF in Warszawa	5	9	9	4	1	0	6	3	0	0	1	1	0

Table 4. *Cont.*

No.	Name of the Regional Directorates of State Forests (RDSF) in Poland	The Number of Indications (Responses) from Forest Districts Supervised by the Regional Directorates of State Forests												
		Information Sheets, Printed Materials	Educational and Ecological Classes and Workshops for the Public	Events Designed to Promote Nature and Forest Education	The System for Marking and Expanding Tourist Infrastructure	Introduction of Appropriate QR Codes (Photo Codes) on Individual Information Boards	Rental of Audio Guides with Recorded Information about Individual Objects on the Tourist Route	Active Social Media Activities (e.g., Facebook, Twiter, Instagram, YouTube)	App mBDL	Other Forest Mobile Apps Available on the State Forests' Website	Tourist Mobile Apps (e.g., Komoot)	Use of Different Online Maps to Find Tourist Content	Use of the Forest Tourist Guide Website	Other
16	RDSF in Zielona Góra	3	10	8	11	1	0	7	7	0	0	1	6	1
17	RDSF in Wroclaw	8	17	11	13	2	0	12	10	1	0	1	8	0
	Sum of indications	**121**	**232**	**221**	**184**	**30**	**0**	**173**	**144**	**21**	**3**	**14**	**146**	**10**
	% indications, where 100% = 1299 total responses	**9.3**	**17.9**	**17.0**	**14.2**	**2.3**	**0.0**	**13.3**	**11.1**	**1.6**	**0.2**	**1.1**	**11.2**	**0.8**

Source: own study based on survey conducted research (i.e., 342 correctly completed questionnaires).

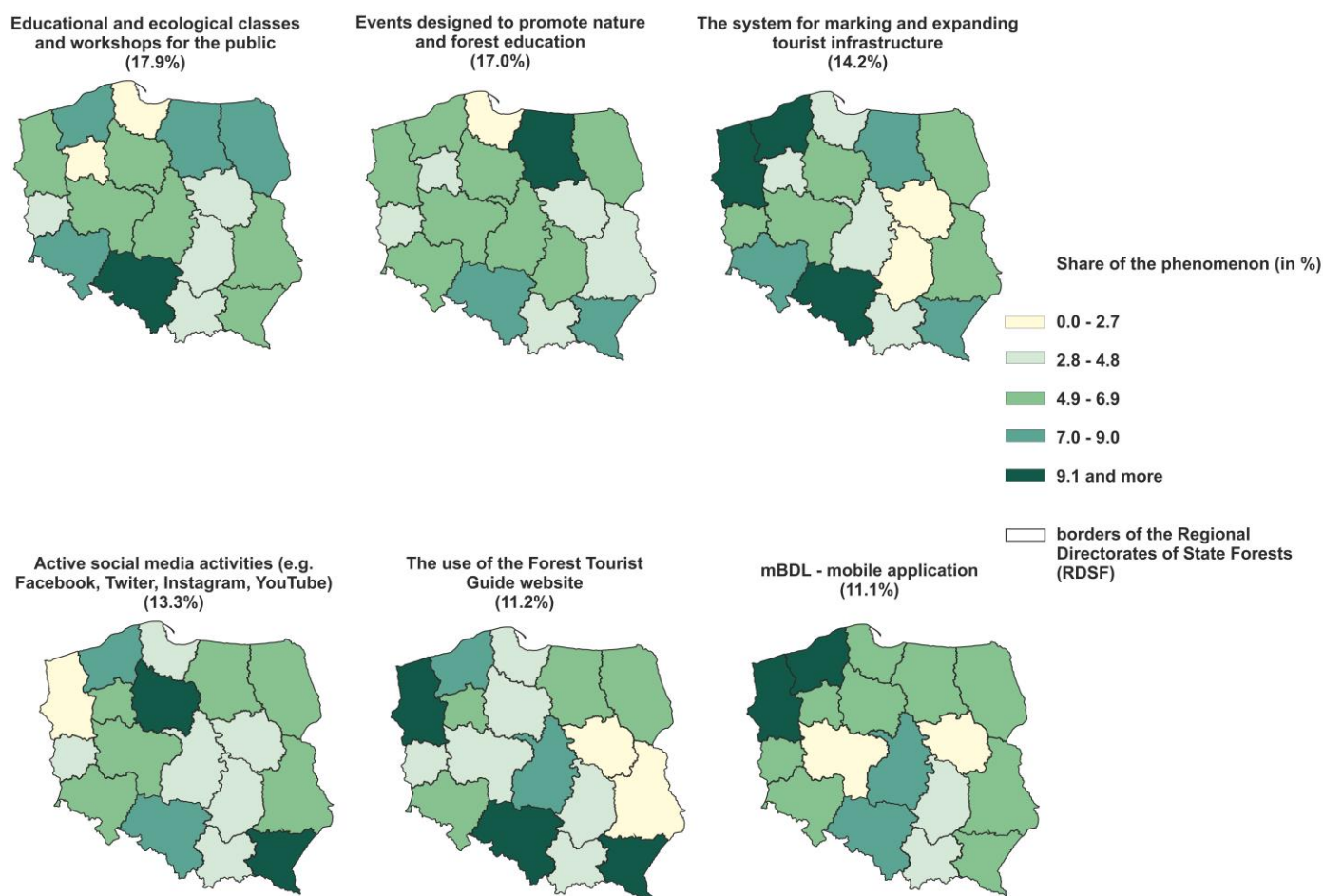*4.4. Stay Overnight in the Forest Programme*

It is worth mentioning the latest innovative initiative by the State Forests aimed at all enthusiasts of active leisure in the forest: the Stay Overnight in the Forest programme. This programme, designed to promote access to forestland for dispersed camping, represents a new public initiative launched by the State Forests in Poland. It was initiated on 15 February 2021 in selected forest districts and expanded to cover all of Poland on 1 May 2021 following Decision No. 12 of the Director–General of the State Forests on 15 February 2021 [93]. The programme is built around a modern and user-friendly web portal, the Forest Tourism Guide website [27], which is continually updated with information for tourists, including guidance on safe forest experiences and ready-made tour proposals tailored to specific user preferences. Currently, the programme is also integrated with the mobile Forest Data Bank app (mBDL), which was created in 2018 [28]. Starting in 2021, the app has offered maps for mobile devices, such as smartphones, iPads, and iPhones. This development highlights the growing importance of the Internet and related information and communication technologies as tools for contemporary social education and for the creation and promotion of modern digital and interactive sightseeing information.

Surveys conducted in all of the forest districts of Poland revealed the greatest interest in the *Stay Overnight in the Forest* programme among forest districts located in close proximity to cities of various sizes ($n = 258$), including in large urban areas with populations exceeding 100,000 inhabitants ($n = 58$), or within designated promotional forest complexes ($n = 46$). When choosing a camping site, individuals opting to spend the night in the forest are primarily influenced by the convenience of being near their homes, which offers an ideal opportunity for weekend getaways in the great outdoors.

The State Forests' final evaluation report on the *Stay Overnight in the Forest* programme, which focuses on promoting access to forestland for dispersed camping during the period from May 2021 to April 2022, was prepared by the Evaluation Centre [30]. The report reveals that individuals spending a night in the forest, regardless of their level of preparedness for the forest experience, typically bring the following items: a sleeping bag for thermal comfort (83% of all respondents), a mobile phone equipped with various functions like maps, a compass, a flashlight, and a camera, which are considered important and useful for campers (66%), and a tarp or canopy (61%), as well as a hammock and a sleeping mat for a comfortable night's sleep (55% each).

As a result, it comes as no surprise that contemporary individuals, not only those participating in the *Stay Overnight in the Forest* programme but also other forest users seeking a peaceful and relaxed forest experience, increasingly carry smartphones with them. These smartphones serve as versatile tools, functioning as compasses, maps, safety devices, and sources of forest-related information, as well as tools for audio and video recording [30]. More recently, they have also become modern touring information systems, providing access to forest-related mobile apps that can work offline. Foresters who participated in in-depth interviews have acknowledged that many users of the forest utilise smartphones for immediate planning to fulfil various needs during their time in the forest. These purposes range from geolocation checks (e.g., for mushroom picking, cycling, or cross-country running) to monitoring physical activity levels (e.g., tracking distances and performance) and the specific planning of routes and trips related to sightseeing, survival, bushcraft, or other outdoor activities.

Hence, the rise in public interest in the *Stay Overnight in the Forest* programme serves as a notable illustration of how the modern State Forests in Poland, leveraging cutting-edge technologies, particularly social media platforms like Facebook, Instagram, Twitter, and YouTube, can establish a new standard of tourist and sightseeing information. This approach effectively promotes active recreational activities in the forest engagingly and appealingly (see Figure 4, Tables 2–4).

Educational and ecological classes
and workshops for the public
(17.9%)

Events designed to promote nature
and forest education
(17.0%)

The system for marking and expanding
tourist infrastructure
(14.2%)

Share of the phenomenon (in %)

0.0 - 2.7

2.8 - 4.8

4.9 - 6.9

7.0 - 9.0

9.1 and more

borders of the Regional
Directorates of State Forests
(RDSF)

Active social media activities (e.g.
Facebook, Twiter, Instagram, YouTube)
(13.3%)

The use of the Forest Tourist
Guide website
(11.2%)

mBDL - mobile application
(11.1%)

Figure 7. Spatial diversity of the 6 main tools used in Poland to create and promote the current tourist and recreational offer in forest areas managed by forest districts supervised by the Regional Directorates of State Forests (source: own study based [26–28] and survey research).

5. Discussion

Ecotourism is increasingly recognised as a valuable tool for advancing global biodiversity and forest conservation [2]. Within the realm of forest recreation tourism, ecotourism, being a pro-ecological form of tourism, holds a distinct and significant role. The dissemination of this form of recreation is achievable with the assistance of both traditional and contemporary information and communication technologies. According to [92] "one cannot ignore changes in the patterns of communication in the contemporary information society where the role of electronic media has become increasingly significant. To many people, instant messenger, chat, or discussion forum interactions, as well as face-to-face contact or communication using other conventional media, are all equally natural". This shift is driven by the fact that the information society is well prepared to receive information, capable of selecting and utilising information from various sources, and adept at leveraging multimedia in various aspects of life, whether as individuals or in group settings [94,95]. Furthermore, as highlighted in reference [91], "we are entering an era when the means of communication, entertainment, and tourism are merging into a uniform stream of experience, and the acquisition of information can take the form of entertainment or become a part of the tourist experience". The profile of an average resident and a tourist, including their economic status, education level, and information-seeking activity, closely aligns with that of an Internet and mobile application user [91]. This convergence underscores the intertwined nature of communication, entertainment, and tourism experiences in the modern context.

Ecotourism in forests has been the subject of numerous studies conducted by researchers in Europe, including Finland, Sweden, and Germany [96], as well as in Asian countries such as Thailand, Bangladesh, and Sri Lanka [97]. These studies have explored various aspects related to both the theme of tourism experiences and the evaluation of destination attractiveness within forest environments. As discussed in the study [98], ecotourism also functions as a valuable tool for forest conservation. However, it is important to note that in some cases, unregulated and excessive ecotourism practices may contribute to deforestation, with forests being cleared for other land uses, such as the development of tourist resorts [99]. To address these challenges, conservation mechanisms like protected areas and payment for ecosystem services are of utmost importance [100]. In line with the perspective offered in reference [101], ecotourism should be strategically located in natural areas of special biological, ecological, or cultural significance, as exemplified by the ecotourism development in the recreational forests of Malaysia [101].

Based on the analysis of available source materials and the results of our environmental survey conducted from 25 April 2023 to 27 May 2023 among representatives of all forest districts in Poland participating in the Stay Overnight in the Forest programme (*n* = 425) since 1 May 2021, as well as in-depth phone interviews carried out with selected forest districts in Poland in 2022 (during the pilot survey) and in 2023, immediately following the completion of the main survey, while in the forest environment (a part of rural areas in Poland), it is evident that new technologies, including forest-related mobile apps, social media, websites, web portals, and forest TV on YouTube, can effectively be employed to implement the concept of 'smart villages' and create an appealing recreational offering for forest tourism and recreational enthusiasts. A prime illustration of this is the current tourism and recreational offerings of the State Forests National Forest Holding. Since 2007, the State Forests, along with its subordinate forest districts, has taken steps to enhance the existing system of conventional touring information, which includes travel directories, publications, albums, tourist maps, educational exhibitions, and occasional events, and has progressively transitioned to a state-of-the-art digital and interactive system. This new touring information system relies on modern technology, utilising the Internet and digital electronic devices such as smartphones, iPhones, iPads, and tablets, among others. However, the new tourist information system should be based on nostalgic advertising. Forest ecotourism should be associated with nature, its protection, and also with recreation. According to [102], nostalgic advertising of a destination is more likely to evoke a sense of history in tourists and thus an intention to visit that place. In the 21st century, people's expectations for improved service quality, unlimited access to online services, and the ability to compare and select the best offers have grown significantly. Social media platforms like Facebook, Twitter, and others, serving as efficient global messengers, play a pivotal role in the decision-making process for travel and tourism [91,92,94–101,103,104]. This is particularly significant in constructing and promoting the current tourism and recreation offerings and novel tourism and recreation products in rural areas that align with the 'smart villages' concept, which unquestionably encompasses the current offerings of the State Forests. One of the most popular internet tools employed by forest districts across Poland for forest education, promoting the activities of the State Forests, and popularising forest tourism and education is Facebook [38–41]. The number of social media profiles continue to grow. Educational and informative content posted on fanpages is frequently noticed by local and national media. Additionally, all forest fanpages contain materials thematically related to the "Welcome to the State Forests" campaign [52]. Simultaneously, due to the widespread availability of smartphones with Internet access, the use of mobile apps in tourism and recreation, including in forest environments, has gained significant importance. Previously, such mobile apps of various natures and forms were widely used to access information and services in other sectors of tourism management. They played a special role in the accommodation sector (booking apps like Booking.com ver. 42.2, Hostelworld ver. 9.42.0, and Airbnb ver. 23.50) [104–106], the catering sector (UberEats ver. 6.194.10007, Pyszne.pl ver. 10.19.0, and Glovo ver. 5.245.0) [107–109], the transport sector (BlaBlaCar ver.

5.158.0, Uber ver. 4.503.10003, Bolt ver. CA.95.0, and Jakdojade.pl ver. 6.0.3) [110–113], the air transport sector (air ticket booking apps like Esky ver. 2.7.3) [114], the tourist information sector (e.g., Foursquare City Guide ver. 11.19.56, Culture Trip ver. 3.2.0, and izi.Travel ver. 7.2.2.514) [115–117], and in promoting physical activity and sports (Caynax ver. 3.7, Strava ver. 337.12, and Google Fit ver. 2023.11.23.00.armeabi-v7a.release) [118–120]. Currently, in response to the needs of forest workers, primarily foresters, and forest tourism practitioners engaging in activities like sightseeing, survival, and bushcraft, as well as forest recreation activities such as cycling, running, and mushroom picking, the State Forests has begun implementing these innovative improvements in their current tourism and recreation offerings. As demonstrated by prior analyses of online sources, the State Forests' current tourism and recreation offerings in 2022 have made 13 forest-related applications available to all forest users in Poland. These apps can be installed free of charge on mobile devices, primarily smartphones with the Android operating system, and less commonly on iPhones and iPads powered by iOS. An analysis of the features and utility of these forest-related apps, varying in spatial range from local to national and encompassing various themes, suggests that a significant majority (nine apps) offer access to sightseeing and tourism content related to tourism values, tourism development, and information about major tourist amenities. Their most recent versions are single apps based on gamification and location, which can be considered a new marketing tool for encouraging and influencing specific tourist behaviours, including active forest tourism and forest recreation in selected parts of Poland [79]. Finally, it should be emphasised that the development of a new tourist information system can contribute to an increase in tourist traffic, which in turn can improve the quality of life of local residents [121].

6. Conclusions

In 2021, 80.7% of the total forest area in Poland was public forestland, including 76.9% owned by the State Treasury remaining under the administration of the State Forests National Forest Holding (SF) [59]. Therefore, this paper aimed to present activities currently undertaken in connection with the development of a new offer of tourism and recreation in the forests in Poland in areas under the management of the State Forests. In order to achieve this research goal, both secondary material from the reports of the State Forests and primary material obtained on the basis of conducted surveys and interviews with representatives of the State Forests were used. The results of the research allowed the following most important regularities to emerge:

- Among the tools used by forest districts throughout Poland to build and promote the contemporary tourism, recreation, and ecotourism offer of the State Forests in Poland, two groups of diverse forms and tools are successfully employed. Conventional tools still hold prominence, with the most popular being educational and environmental classes and workshops for the community (17.9%), events and activities to promote nature and forestry education (17.0%), a marking system, the expansion of tourist infrastructure (14.2%), and more. However, due to the increasing role of the Internet and related information and communications technologies in the world, since 2007, the State Forests has also made the first nationwide information channels available to the community, including websites of the General Directorate of the State Forests and individual forest districts, and State Forests' TV on YouTube. In the group of modern tools, the most successful among the surveyed forest districts (regardless of spatial scope) is social media activity (e.g., Facebook, Twitter, Instagram, and YouTube)—as much as 13.3%, the use of the Forest Tourism Guide website [27] (11.2%), and 13 forest mobile apps, especially the mBDL app [28] (11.1%), which was created in 2018 and since 2021, has provided maps also for mobile devices (e.g., smartphones, iPads, and iPhones) and has been successfully used as a practical tool for building and promoting the contemporary tourism and recreational offer of the State Forests.
- An excellent illustration of the innovativeness of forests and forest ecotourism offerings in Poland is the implementation, from 1 May 2021, of the *Stay Overnight in the Forest*

programme in forest districts throughout Poland (*n* = 425 forest districts participating in the programme). The *Stay Overnight in the Forest* programme is a new public initiative of the State Forests based on a modern, user-friendly web portal [27,28,65] updated on an ongoing basis with information for tourists, including information on a safe forest experience and ready-made proposals of tours targeted at specific users. The programme simultaneously supports the building of good relations and trust between the State Forests and the community by implementing the non-production function, that is, the social role of the forest, and in particular, the tourism, recreation, and ecotourism functions of forests in Poland.

- The surveyed forestry authorities acknowledge that spending the night in the forest has become a fashionable leisure activity among various groups, mainly men aged 25 to 45, especially among urban residents in close proximity to forests, including large, urbanised areas and forests located within the boundaries of promotional forest complexes. In selecting the site, people spending the night in the forest are mainly guided by the proximity of their home, which provides a perfect option for weekend outings in the open.

- The results of the Final Report of the State Forests, prepared in 2022 by the Evaluation Centre on the evaluation of the *Stay Overnight in the Forest* programme, also show that social interest in this programme increased due to using high technology, particularly social media (Facebook, Instagram, and Twitter), to create tourism and sightseeing information and promote active leisure in the forest.

- All of this implies that the role of the Internet and related ICTs as a tool for contemporary social education and creating and promoting modern digital and interactive touring information is still growing.

- Therefore, technological innovation (such as mobile apps, social media, websites and web portals, and YouTube TV) used for developing forest tourism and forest recreation can contribute to the development of a non-productive role, that is, the social role of the forest and in particular, the tourism, leisure, and recreational function of the forests. It will simultaneously contribute to the modernisation and construction of current tourist products in forest areas and design new tourism products in rural areas fitting the concept of sustainable tourism.

This paper is a genuine case study showing how new innovative solutions for the use of the Internet and ICT can be introduced into the forest space and used in building the tourism and leisure offering in ecotourism. This in particular refers to mobile and social media applications, which until now have been reserved for the creation of tourism and leisure offers in other branches of the tourism industry, that is, tourist information, hospitality, catering, transport, etc. Therefore, this article has an applied character and allows one to fill in the gaps in the literature and may also be helpful in building a modern and original tourist offer in other forest areas. This research fits into the concept of sustainable tourism. Thanks to this, the results of the conducted research have a real impact on shaping the ecodevelopment policy at the local and regional level of a given tourist area, not only in Poland, because these results can provide support for forest managers in other countries.

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