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Article

Landscapes of Watermills: A Rural Cultural Heritage Perspective in an East-Central European Context

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Abstract: Recent studies in rural heritage tourism have highlighted that an evolutionary economic geography perspective could be helpful in determining whether cultural heritage tourism could stand as a branching-innovating trajectory. Its evolution can be understood by presenting specific mechanisms of layering, recombination and conversion that leads to path development. We contribute to rural heritage tourism by basing our study on perceptions of tourists and local officials on the Rudăria Watermills, Romania. Based on survey and interview data, we document the strengths and limits of local watermills for tourism and describe the entrepreneurial agents involved in path development. Our findings point to the important role played by a local NGO in developing a path for tourism for the watermills, as well as the active involvement of local authorities and other local cultural leaders for including the mills in national and international tourism circuits.

Keywords: watermills; rural heritage; rural tourism; Rudăria; Romania

1. Introduction

Watermills are pre-industrial heritage. In the future, tourism developed around industrial heritage will attract an increasing number of tourists because the profile of tourists is changing; they want more demanding, segmented tourism in which aspects of heritage, environment, discovery of new places and culture is more appreciated [1]. Besides the economic function of the mills, they also fulfil a social function. Throughout time and up to the present day they have been marks of the identity of the local population and for nostalgic tourism [2]. In order to valorize industrial heritage, it is necessary to find new conversion ideas that are financially sustainable [3]. As Cosgrove [4] states, landscapes are symbols of collective cultural conceptions. The regeneration and preservation of cultural heritage both tangible and intangible is one of the main concerns of our century [5].

Tourism is an alternative for the development of rural mountain communities because it can contribute to the revitalization of economic sectors and thus to the improvement of the life of the population [6]. Agrotourism is a notion that refers to farm tourism expressed through unique tourism practices, from sociocultural events to agricultural practices and with traditional accommodation so that tourists can relive certain memories and experience nostalgia or feel the taste of the countryside [7,8]. Rural heritage tourism, on the other hand, includes all forms of rural tourism that can be used for tourism purposes. Watermills are a rarity, and the functioning ones are a unique feature that should be protected as industrial monuments, constituting an important part of the cultural heritage. Watermills are usually a forgotten part of cultural heritage and are among those monuments which are most vulnerable to destruction [9].

The aim of this study is to discuss opportunities for rural heritage tourism development in the Eftimie Murgu commune around the Rudăria Watermills. The first objective we wanted to achieve is to identify and understand the tourist importance of the watermills in Rudăria. The second proposed objective is to analyse the motivations of tourists and their perceptions about the watermills in Rudăria. Under the influence of certain factors, a tourist has a clear-cut perception of a specific tourist site. This perception may be different from or similar to the perception of the planner [10]. A third

objective is to analyse the satisfaction of tourists after they have visited the watermills and how local NGOs could further develop the integration of the watermills into local and regional tourism. Understanding landscape values influences how a site is conserved. Conservation of a site requires understanding the real values, but also adapting to the perceptions of planners [10].

We contribute to international rural heritage studies [11–13] and to Central and Eastern Europe rural heritage works [14] in particular by highlighting how a unique landscape of Rudăria Watermills is perceived by tourists and locals and how local NGOs contribute to developments in terms of rural heritage perspectives. As Brouder [15] argues, more studies on consumption-oriented paths in tourism studies are needed and we try to shed light on how the Rudăria Watermills are perceived as a product of the landscape of rural tourism consumption.

2. Theoretical Background

Watermills serving the local population are a rarity, and those that do work are unique sites that should be protected. As well as incorporating them into open-air museums, changing their function to serve as a restaurant or cultural centre is one way for the mills to be conserved [9].

The rural environment provides a plethora of traditional activities and opportunities for relaxation and rejuvenation [16]. Activities such as fishing, hunting, walking, and horse riding afford tourists the opportunity to appreciate the tranquillity and beauty of the natural landscape. This environment provides a distinctive opportunity to escape the frenetic pace of urban life and embrace a more relaxed way of living. Furthermore, rural tourism offers a significant cost advantage over urban areas, with activities and services often being more affordable. The reduced cost of products and services contributes to the appeal of rural destinations for those seeking to experience country life on a budget.

Furthermore, rural tourism provides economic opportunities for local residents through the development of local businesses [17]. Local artisans and farmers may benefit from an increased demand for their products, which can be promoted and sold through tourism. Farmers may establish direct marketing channels to sell their agricultural products and processed foods to tourists or local retail establishments, thereby enhancing the local economy and supporting the sustainability of rural communities [18]. Cultural heritage tourism has been considered important through the lens of evolutionary geography [13], but ways in which watermills could be integrated into rural heritage tourism is less studied in a Central and Eastern European context [5].

Tourism has brought socio-economic benefits to rural areas in Europe. Various studies have shown how rural tourism has helped to mitigate emigration in Spain [19–21], while in Croatia rural tourism has been a source of development for agriculture in Croatia [22]. Furthermore, Rachel Dodds [23] conducted a case study about Calvia, a municipality located on the island of Mallorca in the Balearic Islands, on sustainable tourism and policy implementation for the rural area. Calvia is a good example of a mass tourism destination that due to the pressure of tourism in the 1980s has reached economic, environmental and social decline. A sustainable tourism policy approach has been established to support other tourist destinations in implementing sustainable tourism [23].

Other worldwide examples of rural tourism are presented in South America and Asia. For instance, Gale [24] specified that rural tourism provides new sources of income for families living in Chile. Moreover, Fleischer and Pizam [25] have shown that rural tourism has contributed to the decreasing income of kibbutzim in Israel. Another study by Çorapçioğlu [26] on the province of Antalya in the central Mediterranean basin presents the society's lifestyle and cultural structure. The study highlights that watermills are not included in the conservation programme in Turkey. The lack of inclusion of watermills for tourism needs actions to initiate concrete measures of their cultural, historical and ecological value.

In Romania, Iorio and Corsale [27] highlight the benefits of rural tourism development due to its potential for socio-economic development of rural areas. On the other hand, Hognogi et al. [5] discuss the importance of watermills in the Someşul Mare river basin in Romania. The representativeness of the mills is given by the current number of hydraulic installations. The importance of the mills is confirmed not only by the technique by which flour was obtained, but they

also played an important role in the life of the local people through their sociocultural function, as they represented a place for socializing and were perceived by the locals as meeting places [5]. Our study pushes forward these debates by going deep into the case of a unique watermill landscape and highlights how it could be better put into practice for rural heritage tourism.

3. Materials and Methods

Our initial approach was to undertake a geographical analysis of the context in which the watermills are situated. To this end, the following types of spatial data were combined in ArcGis 10.3: Corine Land Cover (Land Copernicus) [28], Digital Elevation Model (Land Copernicus, EU DEM 25 m resolution) [29], and vector data of water and transportation networks obtained from Geofabrik.de (open source OpenStreetMap) [30]. Subsequently, the official administrative-territorial boundaries were obtained from the Romanian National Agency for Cadastre and Real Estate Publicity [31]. The boundaries and characteristics of protected natural areas were obtained from the Romanian Ministry of the Environment [32]. For aerial views/panoramas, Google Earth Pro was utilized.

The second phase of the investigation entailed the mapping of the watermills. This was achieved by means of a Garmin GPS GPSmap 78s GPS, which enabled the precise capturing of data points and their subsequent upload in vector format within ArcGIS 10.3. On this occasion, we also carried out a first participatory observation by talking to the managers and users of the mills during their operation and/or maintenance.

Third, a questionnaire was distributed to a sample of 157 tourists who had visited the watermills, eliciting their views on their experiences at the site. The questionnaire comprised 12 questions, including seven closed questions on aspects as: access routes, parking places, accommodation possibilities in the area, dining possibilities in the area, the state of conservation of the mills, information available about the Rudăria mills, contact with the locals, products that can be bought from the mills, and the general appearance of the village. The tourists gave a mark on a scale from 1 to 10. Additionally, the questionnaire included five open-ended questions, which provided respondents with the opportunity to express their opinions on the primary attractions of the Rudăria Watermills, potential enhancements to the tourism product of the mills, their accommodation choices, a list of previously visited or planned tourist attractions, and their place of origin. In addition to the questions pertaining to the subject matter, three demographic inquiries were incorporated on the respondents' age, gender, and occupation. The questionnaire was applied in the field at the Rudăria Watermills in August–September 2022. The time taken to complete the questionnaire varied according to the way each person responded, but took no more than 10 minutes. A total of 157 individuals answered the questionnaire, of whom 94 (61%) were female and 63 (39%) were male. The age of the respondents ranged from 18 to over 70 years. The age group with the highest percentage is 51–60, at 21%. The next highest age groups are 21–30 (19%) and 41–50 (18%). In contrast, the age group comprising the smallest proportion of respondents was that of individuals aged 70 and above, representing only 5% of the total sample. After entering the questionnaires into a Microsoft Excel spreadsheet, the next step was to analyse the respondents' answers, especially using the pivot function. The respondents' home locality was also given an XY coordinate and imported into ArcGis 10.3. We did not collect any personal data (such as name, telephone number, home address) and the participants gave their full consent at the beginning of the questionnaire.

Furthermore, 20 local stakeholders were interviewed in April 2024 in order to gain a deeper understanding of the social, economic and cultural context of the site and watermills. The semi-structured interviews were conducted using a set of 12 questions, which were designed to elicit information regarding the role of the mills in the local area, their significance to the community, the ways in which they are currently utilized, their engagement with local community resorts, and their importance for tourism development. The participants provided informed consent and were subsequently anonymized. A summary of the general characteristics is provided in Table 1. The interviews were fully transcribed and subjected to thematic coding in accordance with the procedures outlined by Braun and Clarke [33]. The entire data collection and methodological study of this article was approved by the Scientific Council of University Research and Creation of our university (no. 33279).

Table 1. Demographic characteristics of interview respondents.

Interview code	Age group	Gender	Education level	Position	Born in Eftimie Murgu?	Lives in Eftimie Murgu?
I1	60–70	M	High school	Former mayor	Yes	Yes
I2	50–60	M	University	Mayor	Yes	Yes
I3	50–60	M	PhD	Former mayor	Yes	Yes
I4	40–50	M	University	Local councillor, engineer	Yes	Yes
I5	20–30	M	University	Priest	No	Yes
I6	50–60	F	University	Local councillor, guesthouse administrator	Yes	Yes
I7	30–40	M	University	Public servant	Yes	Yes
I8	40–50	F	University	Restaurant administrator	Yes	Yes
I9	40–50	F	University	Guesthouse administrator	Yes	Yes
I10	40–50	M	University	Local councillor	Yes	Yes
I11	40–50	M	University	Secretary	Yes	Yes
I12	40–50	M	High school	Local councillor	Yes	Yes
I13	60–70	M	High school	Former local councillor	Yes	Yes
I14	50–60	F	University	Merchant	Yes	Yes
I15	40–50	M	University	Former pastor	No	No
I16	50–60	M	University	Accountant	No	No
I17	40–50	F	University	Teacher	Yes	No
I18	40–50	M	University	Commercial director, local councillor	Yes	No
I19	40–50	M	University	NGO president	No	No
I20	30–40	M	University	Public servant	Yes	Yes

4. Study Area

The Rudăria Watermills are located in the territory of the Eftimie Murgu commune, of which the old name was Rudăria. With its 1,420 inhabitants in January 2024 (INS, 2024, [34]), Eftimie Murgu is located in the south-west of Romania, in the south-east of Caras-Severin County (see Figure 1). The Eftimie Murgu commune constitutes a component of the territories collectively designated as the “country/*pays*”, which encompasses a larger region comprising multiple localities. Indeed, the great depressions of the Carpathian Mountains have been known since ancient times under the name of “country/*pays*”. To be designated as such, a depression must exhibit characteristics of a plain and be circumscribed by mountain peaks. Additionally, it must support a population whose primary occupation is agriculture and encompasses multiple villages [35]. The case in question applies here due to the fact that the depression comprises approximately 15 villages, a total population of less than 15,000 inhabitants (INS, 2014, [34]), no urban settlement, and no railway. Access to the region is provided via a second-rank national road, the DN57B, which connects the depression to two small urban settlements: Băile Herculane and Anina. Băile Herculane is situated approximately 70 kilometres to the south of the commune. It is renowned for its spa and thermal springs, which attract tourists from across Europe. Situated approximately 50 kilometres to the west is Anina, a mining town with a lengthy history of coal and iron exploitation. It provides access to awe-inspiring natural landscapes and tourist trails.

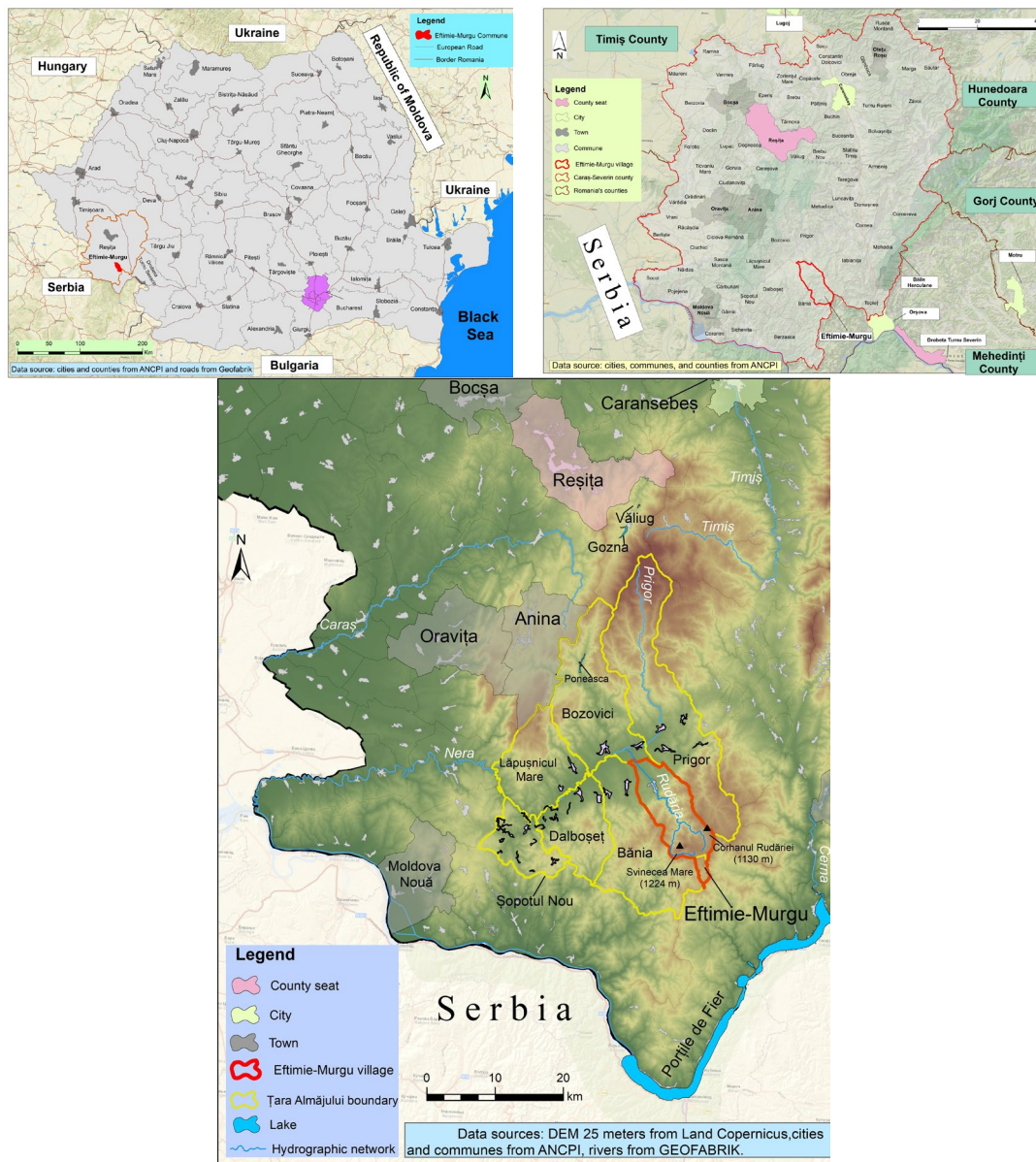


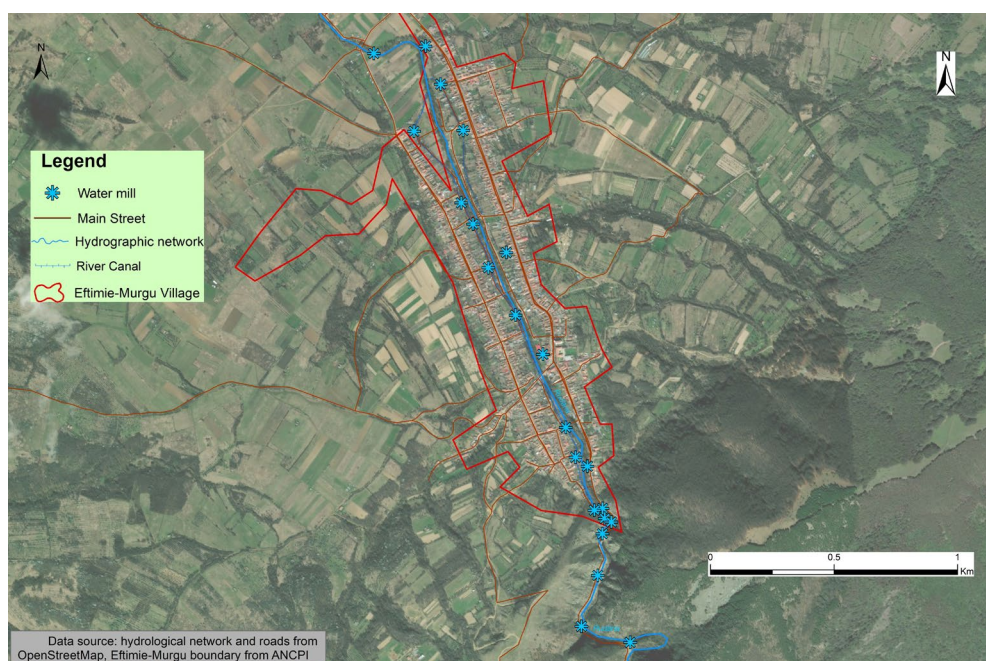
Figure 1. Geographical setting of the study area. [28–32].

A significant portion of the administrative territory of the Eftimie Murgu commune is situated at elevations exceeding 900 metres, with the highest point reaching 1,224 metres. In contrast, the village is located at an altitude of only 300 metres (Figure 2). In this context, the slope plays a role in determining the direction of water and its run-off, but also in the accumulation or deposition of eroding materials. Slope is particularly important because it can accelerate or blur geomorphological processes depending on certain thresholds. In terms of land use, the largest area is occupied by deciduous forests, with more than half of the total area – 66.89%. This deciduous forest belt corresponds to the mountainous area, while in the north of the depression there is arable land used for various cereal, potato and legume crops. In addition to the agricultural area, due to the location of the depression in the intramontane area, this village is characterized by its forest area, being the second most forested county in Romania. Due to the illegal deforestation that has occurred over time and the fact that the commune has two protected areas, in 2007 the first Sites of Community Importance (SCI) that are part of the Natura 2000 network were declared, defining ROCSI0032 as the Rudăriei Gorges [36].



Figure 2. Panoramic view of Eftimie Murgu (centre bottom), the Almăjului depression (far plane) and the mountain cliff (near plane) Source: screen capture, Google Earth Pro.

The watercourse draining the Eftimie Murgu commune is the Rudăria river, with a length of about 30 km. It runs through beech forests and breaks through granite cliffs, enters the village and runs through the middle of it, a suitable place for the 22 watermills. The hydrographic system of the commune exerts a considerable influence on local agricultural and economic activities. The watermills on the Rudăria river represent a significant aspect of both technical and cultural heritage, having been in use since the 18th century for the milling of cereals. Such examples demonstrate the efficient use of local water resources and their importance in community life [37]. The Rudăria watermills have been acknowledged at the European and national levels for their distinctive cultural and historical significance. They constitute one of the most extensive functional watermill complexes in South-Eastern Europe, are included in the European cultural heritage and attract a considerable number of tourists and researchers. In Romania, the Rudăria watermill complex is afforded protection as a historical monument and a symbol of rural heritage. The acknowledgment of these mills plays a pivotal role in the promotion of tourism and the preservation of local traditions. A total of 22 mills are located in the territory of Eftimie Murgu. Of these, nine are situated in the Rudăriei Valley (in an upstream position relative to the village), while the remaining 13 are located within the inhabited area of the village (Figure 3).



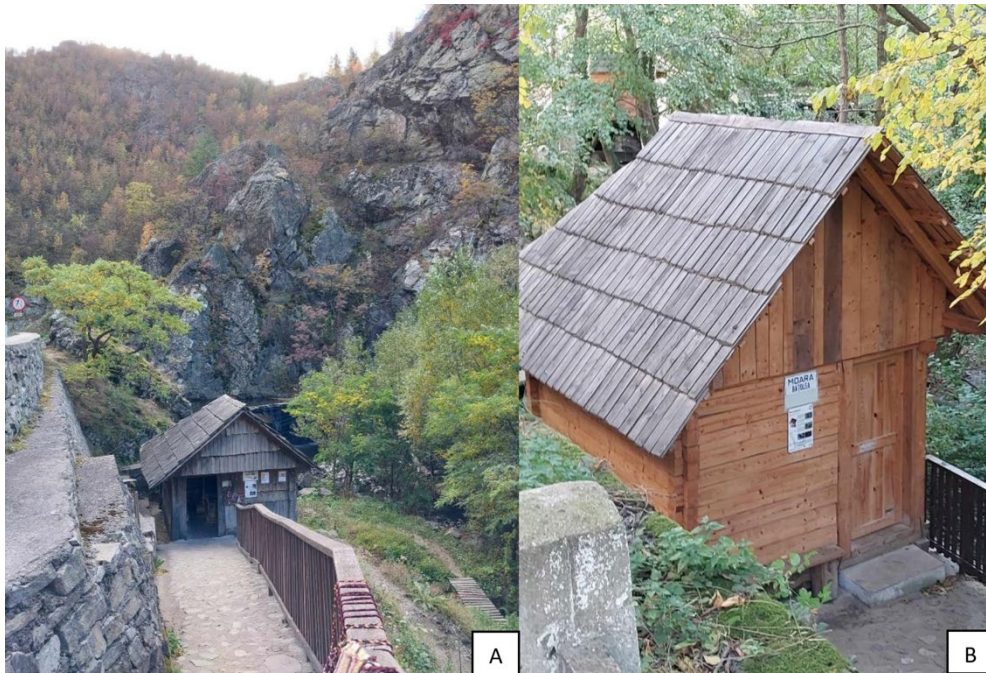


Figure 3. Map of the Rudăria watermills (up). A – Trăiloanea water mill. B – Bățolea water mill (authors own photo).

In 1874, there were 51 watermills operating in the village of Eftimie Murgu. However, several successive floods reduced this number to 22 [38]. In the past, approximately 600 watermills were documented in the western region of Romania, the primary function of these mills being the grinding of grain for the local population. Presently, the number of these structures has diminished to less than 100. Furthermore, these watermills represent a substantial component of the ethnological heritage of the region, offering environmentally friendly, non-polluting, and minimally disruptive operations [39]. The upkeep of these watermills is the responsibility of the villagers, as they are an integral part of their way of life. In addition to their primary function of milling, the watermills on the Rudăria River serve as important gathering places for the local community [38].

Despite the spectacular landscape and the exceptional number of mills on the water, there are only two tourist accommodation units in the village. In fact, there are only eight accommodation units in the whole depression, with a total of no more than 70 rooms. This does not automatically mean that there are no tourists, but they only choose to make a brief stop in Rudăria, often staying in one of the largest tourist resorts in Romania, Băile Herculane, less than 60 km away.

5. Results and Discussions

5.1. Profile and Degree of (In)Satisfaction of Tourists with the Rudăria Watermills

The first category of results pertains to the analysis of questionnaires administered to tourists who visited the mills in Rudăria. Tourists visiting the Rudăria Watermills come from all over Romania, especially from the south-western half. Most tourists come from Timisoara (the regional city of western Romania) and the capital city Bucharest. Of the respondents, 69% were visiting the Rudăria Watermills for the first time; 14% had been once before and 11% more than three times, while only 6% or nine people had been twice. At the same time, 32% of the respondents answered that they heard about the mills from relatives/friends, 29% from the internet in general, 12% said they heard from the online press and 10% from other sources. Only 1% heard about it from print media. Additionally, 68% travelled to Rudăria with family, 15% travelled as an organized tour, 3% travelled as a spontaneous organized tour and only 1% on their own.

In terms of the primary attractions for tourists, the tradition itself accounts for 23.13% of visitors, with the landscape of the Mulinological Complex representing a further 21.09%. The Mulinological

Complex itself is the primary attraction for 14.29% of tourists, while the conservation of the mills accounts for an additional 12.24%. The responses indicating the most significant factors influencing tourist’s decisions included location, the local population, organic products, and originality, collectively representing approximately 10% of the total responses. It should be noted, however, that the Rudăria Watermill are not a destination in and of themselves. Indeed, only 31% of respondents indicated that they had visited the mills in Rudăria in isolation, with the remainder making this site part of a broader tour.

With regard to the level of satisfaction among tourists, the highest ratings were associated with interactions with local residents in Rudăria (9.24/10), followed by the availability of goods for purchase and the condition of the watermills. The primary concerns identified by tourists pertain to the limited scope for accommodation and mass tourism, as well as accessibility by car and the quality of information available (Figure 4).

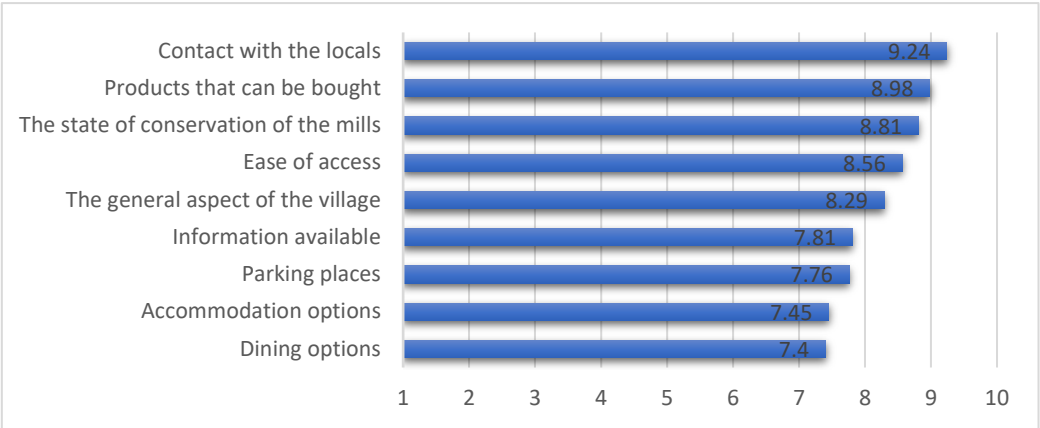


Figure 4. Please rate your satisfaction on a scale of 1 to 10 (1 being very dissatisfied and 10 being very satisfied).

Through an open question, tourists were asked to provide feedback on potential improvements to Rudăria. The majority of respondents indicated a desire for additional information, litter bins, enhanced cleanliness, greater promotion and publicity of the area, the provision of ecological toilets, larger and more affordable parking, the erection of information signs at key points at a greater distance, such as in Oravița, the availability of a tourist guide to provide information about each mill, the distribution of leaflets, and the establishment of a restaurant or dining venue that offers traditional, authentic cuisine. The respondents indicated a desire to gain knowledge about the production of flour and the construction of miniature watermills during their visits to the mills. In terms of transportation, respondents indicated a preference for the availability of cable cars or all-terrain vehicles for rental. As a result, respondents indicated a desire for enhanced organization of the various components, improved access routes, and the rehabilitation of the village road. Additionally, some respondents suggested modifications to the roofing of select mills. The erection of protective structures along the route, particularly in narrow sections, and the implementation of safety nets on unstable slopes to prevent rockfalls would be beneficial.

In conclusion, the Rudăria Watermills attract a considerable number of tourists from across Romania. However, the international dimension is limited, and the majority of tourists do not select the mills as a specific destination, but rather as part of a broader tour. Conversely, the highest satisfaction rate among tourists is not associated with the mills themselves, but rather with their interactions with local residents and their products. The primary areas identified for improvement by tourists pertain to the provision of information, cleanliness, and the general state of tourist infrastructure.

5.2. The Role and Importance of the Rudăria Watermills

5.2.1. The Link between the Rudăria Watermills and the Past

The watermills originated from the necessity to achieve equilibrium between the demands and necessities of human societies and the potential resources in different environments. “These mills date back a long, long time, we do not know exactly when [...] With the emergence of the current village’s glasshouse, the mills date back to then. They had a role and have a very important role today because here they used to grind the grains of both wheat and corn for the needs of the animals, the poultry in the yard and for their own consumption” (M, 65 years old, administration).

Given that bread was the most important component of people’s way of life in the past, the mill and the miller’s profession are considered a part of social history studies because of its connection to livelihood, nutrition, the way of gathering food and its effect on the development and continuity of life in terms of socio-economic structure [40]. This is also confirmed in Rudăria, where the mills “provided food for them by grinding wheat or maize grains and of course for feeding the animals in their households” (M, 40, entrepreneur).

The watermill, as part of the materialistic culture of the past, on the one hand, with its special capacity, shaped local communities, gave them an identity and continued their life [40]. In Rudăria, “watermills represent a living testimony of the past, a way of living eco, natural, the memory of a past world [...]. But which with the help of watermills is kept alive. For the village of Rudăria it represents an element of uniqueness, linked to the past” (F, 46, educator).

The natural landscape has been treated as a resource of factors that favour or prevent the location of a particular mill and the possibility of their persistence as technological and economic conditions have become increasingly unfavourable throughout history [41]: “they are a jewel – they were designed by our ancestors” (M, 40, entrepreneur).

As Hognogi et al. [5] posit, nostalgia can become a resource in its own right in the context of individualizing a particular type of tourism. This suggests that the heritage of the watermills, with all its attributes, has a strong potential for heritage tourism. In addition to their economic utility, the watermills served an important social function, namely socialization. They also served as identity marks for local communities and as a source of inspiration for nostalgic tourism [5]. Also in the case of Rudăria, the watermill had an important social function “Both the mill, the 20–30 associates or rangers and the sheepfold on the mountain where the sheep gather had this role of strengthening the spirit of cooperation, the spirit of association” (M, 53, former mayor).

The mills played a pivotal role in the sociocultural fabric of the local communities. The nostalgic memories of the interviewees encompass recollections of visiting the mill to fulfil a current need (e.g., obtaining flour) and the human interactions generated by the mill’s social function. These stories can be transformed into standalone narratives, offering insights into the local history [5]. Through their “link to the past, those who feel the need to have a link to the past. For those who are more nostalgic and crave a flour mill grind, it’s the watermill” (F, 50, entrepreneur).

In conclusion, watermills have historically occupied a variety of roles. They have served as a source of sustenance, providing food for humans and animals alike. Additionally, they have been a form of organization, both in the construction and maintenance of the mills themselves and in the organization of the milling process. Over time, these elements coalesced to form a distinctive spirit, identity, and sense of nostalgia.

5.2.2. The Conservation and Restoration of the Rudăria Watermills

The 800-year period of operation of watermills in northern Poland has led to the generation of a special type of cultural landscape, called a “*molinotop*”. Among a wide range of biotic and abiotic factors, the most important role in shaping mill-based landscapes was played by artificial landforms and specific transformations of the hydrographic network. The cultural landscape is defined by Myga-Piątek [42] as a “landscape transformed by human activity as a result of the development of civilisation”.

A survey conducted by Vashisht [43] revealed that the majority of young people from rural areas are now preparing to work in nearby cities. The availability of well-paid jobs and the presence of superior basic facilities in urban areas are the primary reasons for their decision to remain in cities. The preference for agricultural work and their ancestral watermill business has significantly diminished. This phenomenon is also corroborated by the case of Rudăria, where it was observed that “already young people are leaving; they have no jobs here, they cannot find one and they are not interested in working the land” (M, 40, entrepreneur).

Nowadays, most of these mills are run by elderly family members, as they are highly emotionally attached to their traditional technology. The strongly stated reasons justify the label of “dying industry” attributed to the craft of watermilling [43]. Likewise, in the case of Rudăria, the population that has remained in the village is mostly made up of older people “The population in the village has started to decline for a few years [...]. After 2000, I don’t know, the population ageing, the young people have left for the city, there are not many of them anymore and the animals are not kept as much” (M, 40, administration).

Vashisht’s study [43] indicates that slow, stone-ground flour has a higher nutritional value than high-speed, roller-ground flour. Consequently, its market price is likely to be higher. In the current context, where individuals are increasingly health conscious, such a healthy product may become a preferred choice. Consequently, this modest local enterprise can be transformed into a lucrative industry with minimal effort. In the case of watermills in Rudăria, people perceive flour for consumption as being much better: “Even though watermills are now technologically outdated thanks to electric mills, people continue to use them because flour ground in watermills is perceived by people as much better quality for personal consumption than in electric or store-bought mills” (M, 41, NGO).

The current situation of traditional watermills in the Himalayan region and the necessity for technical improvements to enhance their energy efficiency is presented by Vashist in his 2012 study [43]. He suggests that organizations and agencies promoting traditional technologies should focus their efforts on improving the traditional design without altering its fundamental structure. It is recommended that these organizations plan their course of action with the understanding that “change should always be gradual and not sudden. Currently, the only consumers who will continue to utilize this technology are those who demand high-quality flour. Otherwise, the technology will likely be replicated in a museum, where it will be displayed in a glass cabinet.

The Thorpe Watermill is the only known example in Australia of a traditional water-powered flour mill that can be operated in the original way. Today, the mill stands majestically as the centrepiece of the farm, and great satisfaction can be taken from knowing that it will continue to do so for another 165 years. “Every summer, we open and run the mill for an occasional special interest tour, but essentially we don’t have time to get too involved in tourism” [44].

A case study of watermill construction in Ponthieu [45] revealed a positive correlation between the degree of political fragmentation and the prevalence of watermill construction. This was attributed to the intensification of investment in watermill construction in areas where rulers had control over smaller territorial units. The effect of political fragmentation on mill construction was found to be due to its influence on the ability of rulers to limit competition. This led to the construction of competing mills and lower milling prices, which reduced the total milling costs for peasants. When political power is shared among a larger group with significant investment opportunities, even without changes in the institutions enforcing property rights, the level of competition increases and can increase the rate of investment in the economy. A similar situation is observed in Rudăria, where “there were 51 mills and now we have only 22 mills” (M, 40, administration).

Studies [46] have demonstrated that the preservation and restoration of cultural heritage are crucial for the preservation of a society’s identity and collective memory. Such actions contribute to the maintenance of integrity and authenticity, thereby ensuring the transmission of knowledge and traditions to future generations. Preventive conservation, which encompasses monitoring and maintaining optimal storage and display conditions, is of paramount importance in preventing physical and chemical degradation of heritage objects. This conservation and restoration of

watermills has also taken place in the case of Rudăria, where “members of each mill participate in their maintenance. [...] But lately also various actions have been made by NGOs and here I would mention [...] Home in Banat, which has made an action of greening [...] and printed a book in which all the mills in Banat are included. [...] The Town Hall has even started several years ago to support the repair of the mills financially or with various materials. Also the locals and the NGOs, I even mentioned one of them, and the town hall” (F, 50, teacher) and “Fortunately, the locals together with the local council take care of the mills and moreover try to bring mills which are in a state of decay back to life” (M, 31, priest).

A 2013 study [47] dealing with historical and philosophical issues in the conservation of cultural heritage posits that restoration is employed when preventive conservation has been insufficient, with the objective of repairing and stabilizing damaged objects and restoring them as closely as possible to their original state. In the case of Rudăria, according to people in the administration, there has been an action to restore the watermills of Rudăria according to which: “with the help of the association Home in Banat we managed to inaugurate, to start a project with the route of the watermills. Really ok, some markings have been made, it’s all for our own good” (M, 54, administration); “three years ago, four years ago it was with the association Home in Banat, then we cleaned, we made tourist trails, we cleaned the riverbed, we worked on them, we intervened to make them functional again” (M, 35, administration).

Conservation and restoration are not only important from a cultural point of view, but also have significant economic benefits. Cultural tourism, which attracts millions of visitors to heritage sites worldwide, generates substantial income for local communities and contributes to sustainable economic development [48]. The conservation and restoration that have also taken place in the Eftimie Murgu commune have contributed slightly to attracting tourists to the area. “Ten years ago you could count on your fingers those who came to visit the mills [...]. By promoting them and through the Home in Banat Association but also on television, media and social networks the number of visitors increased significantly [...]. Especially after the Bigăr waterfall fell I think it is the most important objective in Almăj” (M, 53, former mayor).

The conservation and restoration of cultural heritage is of paramount importance for the preservation of cultural heritage, ensuring it remains accessible and relevant for future generations. Conservation and restoration of architectural heritage involves not only repairing and maintaining historic structures, but also a careful approach that integrates traditional elements in a harmonious way. In the case of the Rudăria Watermills, “it has lost its traditional style. Instead of authentic shingles OSB has appeared, instead of stone cement has appeared. [...] Tourists come to Rudăria to see something specific, not just to see a finished OSB, not to mention the dovetail style of the corner joints” (M, 40, administration).

Adopting traditional techniques does not necessitate abandoning technological progress; rather, it entails combining the wisdom and construction methods of the past with contemporary innovations. In the case of the Rudăria Watermills, the change took place with the use of new materials: “change refers to the maintenance of the mills that took place through the use of new materials. Although new materials were used, e.g., OSB, cement, they did not intervene on the mills in a traditional, authentic way that faithfully respected the structure, construction and conservation of the Rudăria Watermills [...]. In the past, wood was the main material used to build the mills, e.g., wooden poles, guttering” (F, 40, administration).

This balance ensures a sustainable relationship between watermills and their environment, allowing them to remain relevant and functional in a modern society. Similarly in the case of the Rudăria Watermills, the mills should retain their authenticity: “The mills should retain their authenticity through the natural materials from which they are built [...]. For example the valley that feeds the mill and through which the water flows and the other elements of the mills should be rebuilt from beech wood [...] as they were made by the old masters, beech wood from the Rudăria forest” (T, 41, NGO).

It is therefore evident that adequate funding and proactive measures are essential to prevent deterioration and sustain cultural heritage, ensuring that traditional heritage continues to be a living

part of the rural landscape. However, without concrete measures, most traditional buildings risk collapse.

In conclusion, the original primary function of the mills has undergone a significant transformation in the present era. While flour was previously a vital component of the human diet, it is now widely available, rendering the mills less essential, particularly as younger individuals migrate from rural areas and the elderly constitute the primary users of the mills. However, the aspirational dimension is now becoming a factor. Flour produced by watermills is now regarded as a quality product, and the practice of milling itself is becoming of interest to tourists.

5.2.3. The Role of Watermills for the Community

Watermills have played a key role in the economic development of rural communities [49]. They were used to grind grain, which allowed farmers to turn grain into flour, a staple of the local diet. By automating the milling process, watermills increased productivity and reduced manual effort, allowing communities to focus on other economic and agricultural activities. For the community, the watermills at Rudăria played an important role in terms of the usefulness of the mills, primarily for obtaining food for both the population and the animals of that period: "They helped them to grind grain for themselves and their animals, for their corn and their animals" (M, 50, entrepreneur).

Nowadays and in the past the watermills have played the same role for the community in the case of Rudăria: "In the past and nowadays they have the same purpose, to grind the corn grain, to make flour from which we make *coleșă*, *mămăliga* [...] and first and second part for animal feed are made, grind wheat grains, corn, barley to make fodder for raising pigs, sheep and poultry possibly" (I, 40, administration).

Watermills and water infrastructure have also had a significant social impact [50]. They became central points in community life, where people met, exchanged information and strengthened their social relationships. Furthermore, watermills contributed to community cohesion through cooperation and mutual aid during milling processes in rural communities. In addition to the role of providing food for the population and the household, the Rudăria watermills also played an important role in terms of socializing people, of cooperation "Either the 22 mills or the 48. The pre-war period much more played a social role, a role of strengthening the spirit of association, so Rudăria had this spirit of cooperation." (M, 53, former mayor).

Although the watermills in Rudăria played an important role in terms of providing food, in terms of cooperation, they are a living testimony of the past "The watermills for me are part of the heritage left by my parents, they are a treasure of inestimable value that we must take care to preserve, preserve and pass on to our children" (M, 40, entrepreneur). Another responder states that "I grew up here in Rudăria and always wanted to go back. I love the place. For me the village and the mills mean a lot, it means childhood, it means, I don't know, a quiet life and that's what inspires me" (M, 40, entrepreneur).

In the global context, the technology behind watermills has constituted a significant step in the technological evolution of society. The utilization of water power to drive grinding mechanisms represented an innovation that paved the way for the development of other hydraulic technologies. This was an early form of renewable energy use, demonstrating the ingenuity and adaptability of rural communities [51]. In the case of the Rudăria Watermills, they play an important role: "primarily they are important because people use them. If you produce at the mills, electricity is consumed; here they use water and don't consume money" (M, 56, entrepreneur).

Watermills were among the first examples in the world of sustainable use of natural resources. The use of water as a source of power has the advantage of avoiding the need to burn fossil fuels, thus reducing pollution. Furthermore, the construction and operation of mills have been adapted to minimize the impact on the environment, demonstrating a harmonious symbiosis between human activities and nature [52]. In Rudăria, people are of the same opinion because "The more expensive the electricity, the more beneficial the mill will be with water from God" (M, 56, entrepreneur).

In conclusion, mills can be considered an intergenerational pivot due to their dual status as a tangible and sentimental heritage. Nevertheless, they continue to be utilized as a means of both identifying with one's heritage and promoting the local community.

5.2.4. The Role of Watermills for Tourism Development

Tourism can be considered a distinct economic sector, encompassing a wide range of services. These include advertising, promotion, information, accommodation, catering, leisure and entertainment. Tourism acts as a significant driver of the global economy, creating a specific demand for goods and services that stimulates growth in their production [53,54]. The watermills at Rudăria can play an important role in terms of tourism development: "Obviously, more tourists means more money coming into the community, more food, more products from the community [...] a valorization there at the place where it's produced, and a cheese, and a flour, or a jam [...]. More accommodation, more people involved, engaged in tourist services, yes, I think that would increase" (M, 50, teacher).

According to other studies [55], tourist demand leads to the adaptation of supply, manifested by the development of tourist infrastructure and, indirectly, by stimulating production in related sectors, such as the construction of new means of transport and recreational facilities. In the case of the Rudăria mills, this tourist demand has also led to the development of tourist infrastructure: "an increase in the number of tourists in the commune has been observed [...]. Tourism due to the watermills has influenced the village in a beneficial way by developing the tourist infrastructure [...] several guesthouses have appeared, places where you can eat, even a parking lot has been created" (M, 41, NGO).

The expansion of tourism is generating a significant increase in output. In addition to the economic impact, tourism also has a profound sociocultural significance, directly influencing both tourists and local residents in the areas visited. The effects of tourism are also reflected in the quality of the environment, the use of leisure time, and not least in interhuman relations [56]. In Rudăria, this social impact on tourism is also reflected: "secondly from a social point of view through the bonds that are created between people, through the interaction of people with tourists and through the social role watermills get to be promoted further" (M, 40, administration).

Tourism contributes to meeting people's material and spiritual needs. Natural and man-made resources are sustainable and can be harnessed without the risk of depletion through tourism alone. Moreover, tourism developments, through their objectives and content, align with efforts to rationally exploit resources and protect the environment [57]. This exploitation of resources and environmental protection is also embodied in the Rudăria Watermills "The Rudăria Watermills were used in the past to grind grain, corn or wheat by which flour was obtained in an eco-friendly way and used by locals for their own consumption" (M, 40, administration).

In the global context, the growth in the number of tourists has a positive impact on the local economy, as it increases demand for local services such as accommodation and restaurants. This additional revenue can be reinvested in infrastructure and public services [58]. Similarly, in Rudăria, the increase in the number of tourists "has led to the stimulation and development of the economy and infrastructure of the village in the case of the watermills in Rudăria" (M, 40, entrepreneur).

The development of infrastructure and services is also a positive effect, as it allows the community to cope with the influx of tourists by investing in improving roads and other facilities, which also improves the quality of life of residents [59]. Tourism can create a wide range of jobs, from the hospitality sector to tour guides and local artisans, which helps to reduce unemployment and stabilize the population [60]. The effects due to watermill tourism are also present in the case of the watermills at Rudăria: "They are important for the community because thanks to the mills, they started to make guesthouses and market the finished products from the mill" (M, 47, administration).

The development of such rural ensembles in the context of tourism represents a potential opportunity for Romanian villages to differentiate themselves in the international tourism market. Potential visitors are offered tours based on experiential tourism, which involves the creation of outdoor museums that reproduce a certain period in the history of the rural

community [61]. In the case of the Rudăria Watermills, the development of experiential tourism was among the interview respondents' views: "there should be at every, every mill or at least one mill that has a destination, that is a museum, a mill museum. I mean someone should be there all the time, to explain and show how it works" (UM, 50, teacher).

A study of Smith [61] on the relationship between culture, tourism, and regeneration identified the potential benefits of developing a tourism brand for a municipality, both economically and socially. A well-defined brand can attract the attention of national and international tourists, promoting the unique elements of the commune, such as traditions, landscapes, and gastronomy, thus differentiating the destination in the tourist market. In the case of Rudăria, the creation of a well-defined brand can attract tourists: "the watermills of Rudăria are in fact the second largest watermill park in Europe" (F, 40, administration).

A tourism brand serves to highlight the cultural and natural heritage of the commune, thereby encouraging its conservation. It is therefore to be expected that tourists interested in local culture and nature will support conservation and sustainability initiatives [62]. In Rudăria, action has been taken to protect and conserve the watermills: "European funding project, collaboration with the Astra museum in Sibiu where there were special events at the reception of the mills [...] there were 110 people at the final reception where people also came from the European Union; there were European funds through the FARE programme" (M, 65, administration).

In the future, the tourism brand can assist the community by diversifying the local economy, providing an economy based not only on agriculture or industry, but also on tourism, making it more resilient to economic fluctuations [63]. As in other cases around the world, tourism activities can provide viable alternatives for residents' incomes, and in the case of Rudăria "if people were aware and as much as possible put on sale the products that they have in their own gardens, they could value these products" (M, 65, administration).

A positive tourism brand can also enhance the image of the commune, attracting investment and new residents, and encourage young people to stay in the commune or return after their studies [64]. In the case of Rudăria too, there are people who have wanted to live and invest in the community again: "I grew up here in Rudăria and always wanted to come back" (F, 40, entrepreneur).

Community involvement in the development of a tourism brand can strengthen social cohesion and a sense of local pride, stimulating collaboration between residents and local authorities [65]. This sense of pride and social cohesion is also affirmed in the case of Rudăria: "both my husband and I participated there and with physical labour and free accommodation for those who came voluntarily to help" (M, 40, entrepreneur) and even the involvement of young people in the area contributes to social cohesion and to the whole community: "we participated together with the children from the high school in Bozovici, with the volunteers there in the rehabilitation of the watermills carried out by the association Home in Banat. We participated together with the children" (M, 50, teacher).

A sustainable tourism brand will prioritize responsible development, ensuring the protection of natural and cultural resources for future generations. Additionally, eco-tourism initiatives and environmentally friendly practices can attract a segment of tourists concerned with sustainability [66]. The people who lived and grew up in Rudăria want to preserve the watermills for future generations: "we are proud of them because so many people come to see them [...] and we keep them with sanctity for our children, for our grandchildren and we carry them on, so that they don't deteriorate" (M, 65, administration).

From the perspective of nostalgic tourism, it is travel undertaken to relive memories or experience aspects of the personal or collective past, with multiple economic and social benefits. It allows tourists to connect emotionally with their past or with special historical periods, generating feelings of personal satisfaction [67]. And in the case of Rudăria, the watermills still represent a sense of personal satisfaction, a connection to the past of the people who grew up here: "For me watermills mean a way of life, tradition, the living preservation of a world long gone, but which manages to live on through this living outdoor museum" (F, 46, educator).

Nostalgic tourism can also revitalize local communities by increasing revenue, which can be reinvested in the preservation of historic sites and infrastructure development [68]. Nostalgic tourism

also serves as an educational tool, promoting cultural awareness and respect for traditions [69]. This type of tourism can include visits to childhood places and participation in historical re-enactments and themed festivals [70,71]. For many people in Rudăria, the watermills illustrate childhood memories “the watermills mean a lot, they mean childhood, they mean a peaceful life” (F, 40, entrepreneur).

However, the major challenges of nostalgia tourism include ensuring the authenticity of experiences and preserving heritage, which is necessary to protect cultural and historical values for future generations [72,73]. At the level of Rudăria, there is a desire to preserve and ensure authenticity: “I see the difference between flour, a store-bought flour and an authentic mill-made flour” (F, 40, entrepreneur).

To sum up, the impact of the watermills can be considered economic, sociocultural, and environmental. These factors have stimulated the local society and economy, prompting the realization among the local population that a common and seemingly trivial fact – the use of watermills by all – is, in fact, a point of national interest and importance.

5.2.5. Development and Intelligent Promotion of Tourism in the Rudăria Watermills

A 2015 study on smart tourism [74] posits that smart tourism development and promotion entails the utilization of advanced technologies and innovative strategies to optimize the tourism experience and ensure long-term sustainability. This concept is based on the integration of digital technology, modern infrastructure and sustainable practices to create attractive and resilient destinations. A key aspect of smart tourism development is the use of data and analytics to understand tourist behaviour and preferences. By collecting and interpreting data from various sources, including social networks, mobile devices, and reservation systems, tourism authorities can tailor offerings and services in real time to meet visitor needs [74]. This not only enhances the tourism experience, but also enables more efficient management of resources and tourist flows. Technology plays a crucial role in smart tourism promotion. Online platforms, mobile apps, and virtual reality are powerful tools for attracting and informing tourists. For instance, virtual reality allows potential visitors to virtually explore destinations before making a booking, thereby increasing interest and the likelihood of attracting tourists [75,76]. Moreover, the utilization of personalized digital marketing strategies based on individual demographics and preferences can enhance the efficacy of promotional campaigns [77].

In the case of the watermills of Rudăria, it is desired that they should be “more promoted and I do not mean promotion on social networks or on TV. [...] the authorities should have done earlier some festivals dedicated to them. [...] People come, buy local products, they see the difference between flour, a store-bought flour and the authentic mill-made one. I spread the word, I tell others. Next year they come again. It’s a start with this Dairy Day, but it’s not a dedicated day in particular. [...] It should be something special for the mills, because most of the tourists who come here for that know us and less for the Lilac Day, where mainly people from the Almăj Valley area, relatives, close ones come” (F, 40, entrepreneur).

Sustainability is another central pillar of smart tourism development. Sustainable practices include the responsible management of natural resources, the promotion of cultural tourism, and the involvement of local communities in the development process. The implementation of these practices allows tourism destinations to minimize the negative environmental impacts and ensure the long-term economic and social benefits [78]. In the case of Rudăria, the watermills should be developed in a sustainable way: “Also, the watermills at Rudăria should become a must-visit or must-see attraction at least once in a lifetime. The commune should develop through agriculture, sustainable tourism” (M, 41, NGO).

The development and promotion of smart tourism represents an effective and sustainable approach to the management and attraction of tourists. The integration of advanced technology and sustainable practices enables tourist destinations to offer quality experiences while protecting natural and cultural resources for future generations. In the case of Rudăria, there are suggestions that “there needs to be an online promotion site, [...] dedicated to watermills, maintained regularly. Promoted

legends, in my mind just bring you one of the visions, so to say, or a dream. [...] Why shouldn't the whole valley, with the watermills during the tourist season, in the summer season not be full of horse-drawn carts providing transport to tourists for a fee? [...] Each mill should be flanked by young people dressed in folk costumes, offering leaflets and guides, why not in a foreign language." (M, 53, former mayor)

The "smart tourism" label in a small rural community does not have an online high-tech valence. However, the "smart character" of this label is precisely the natural sustainability of the way it is used. Conversely, some stakeholders recognize the necessity of emphasizing the promotion of mills in the digital domain.

6. Conclusions

In this study, the aim was to find different opportunities for rural tourism development in the Eftimie Murgu commune at the Rudăria Watermills. Through the voices of tourists and local people, we identified the importance of watermills for cultural heritage tourism in Rudăria. This was done by analysing the motivations and perceptions of tourists about the watermills in Rudăria. Most tourists proposed a more involvement of local and regional authorities in the development of the watermills for the integration of tourism. Besides their traditional and historical importance, preserving the watermills need to be an important task of rejuvenation for policymakers. The role of a local NGO seems to be critical in its involvement for the better integration of the watermills into regional tourist circuits. On the other hand, the satisfaction of tourists after they have visited the watermills is important because it provides a better understanding of the influences of landscape values and how the watermill sites could be conserved. The lack of accommodation in the area and of means of dealing with tourist waste should be critical issue to be solved by the local and regional planners in the near future.

The findings of the survey of tourists and local stakeholders indicate that the historical and economic significance of the mills is still important, but it is now surpassed by other, newer dimensions. These include the mills' role as a marker of local identity, the evocation of nostalgia, the concept of gastronomic sustainability, and the promotion of rural and nostalgic tourism. The mills primarily attract tourists from across Romania, though they are not typically a primary destination. Rather, they are often part of a circuit or itinerary. Nevertheless, the international dimension remains constrained, largely due to a dearth of promotional activities and a paucity of familiarity with the nuances of interacting with foreign tourists, including a lack of proficiency in international languages among local stakeholders.

Although the mills' visual appeal and the straightforward, centuries-old techniques may appear to be the primary motivators for tourists, the study indicates that their most highly valued aspect is the opportunity to interact with the locals and observe the preparation and production of their products, which contributes to the preservation of the region's distinctive rural character. For the local population, the mills represent a source of pride, both due to their historical role in feeding ancestors and their contemporary status as a tourist attraction. Nevertheless, the declining young population and limited interest in agricultural work present challenges to the future sustainability of the mills. In light of these considerations, it is evident that external intervention is a desirable course of action. This is underscored by the involvement of an NGO and other institutions that are not based in the locality, which have actively contributed to the preservation and promotion of the mills.

Our study has some limitations. First, it is a case study and the results cannot be generalized to other watermills in Romania or the world. Second, a larger sample of participants in surveys and interviews could be made. However, we consider that our results are relevant for this particular case of Rudăria.

A significant challenge for the future is to achieve a balance between maintaining the original purpose of the mills (flour production), preserving them, and promoting them to increase tourist interest, while also ensuring that their physiognomy and the bucolic character of the immediate surroundings remain unaltered.

Further studies could be carried out in different other watermill sites in rural Romania to see if there are similar or different results at the level of rural cultural heritage. Moreover, other studies could be made in Central and Eastern Europe in order to compare different functioning watermills in order to have a broader picture on the complexity of watermill management at a broader regional and transnational level for rural heritage tourism.

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