

A DECADE OF RURAL TOURISM IN ROMANIA (2013-2023) AND THE POTENTIAL OF EMERGING TECHNOLOGIES FOR SUSTAINABLE DEVELOPMENT

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Abstract

This study is examining the evolution of rural tourism in Romania from 2013 to 2023, focusing on the factors contributing to its growth. Based on data from the National Institute of Statistics, rural tourist accommodations increased by 23% for tourist guesthouses and by 118.8% for agro-tourist guesthouses over the decade. Tourist arrivals in agro-tourist guesthouses more than doubled, with Romanian tourists increasing by 168.6%. Despite the challenges posed by the COVID-19 pandemic, the sector demonstrated resilience and continued growth, with slow fluctuations over the Covid-19 period. The study also briefly touches on how emerging technologies, such as virtual reality or 360-degree videos, could enhance tourist experiences and support the sustainable development of rural areas, ensuring that Romania remains competitive on the global tourism market.

Key words: rural tourism, agro-tourism, Romania, sustainable development, virtual reality

INTRODUCTION

In 2023, the valuation of the global rural tourism was \$102.7 billion. From 2023 to 2033, it is forecast to have 6.8% compound annual growth rate (CAGR), potentially reaching a value of around \$198.3 billion by the end of that period [9].

In 2023, Romania's whole tourism sector represented 4.19% of the country's gross domestic product (GDP) and it is projected to increase to an estimated 5.71% by 2028, a rise of 1.5 percentage points [29]. This suggests that future growth may be quite gradual [29]. With this slow increase of only 1.5%, it can be concluded that there is significant room for improvement and development, especially in the current context, the era of rapid digitalization and accelerated global communication.

In Romania, in the pandemic years, 2020-2023, rural tourism sector received particular attention but as early as 2015, the Ministry of Agriculture and Rural Development recognized its importance and highlighted in the publication "România Rurală - Rețeaua

Națională de Dezvoltare Rurală" (The National Network of Rural Development) that Romanian rural tourism has been steadily gaining popularity, both among domestic tourists and foreign visitors [23]. This trend indicates the need for higher focus on rural sector so that it can maximize its potential. Rural tourism is a form of tourism activity that focuses on providing visitors with experiences in non-urban areas, situated in the plains, hilly and mountain of a rare beauty of the landscapes [19], involving a variety of nature-based activities, agricultural interactions and cultural exchanges. It promotes local economic growth, contributes to job creation and encourages the dispersal of tourist demand across different times and regions, helping to reduce seasonality [33]. Rural tourism in Romania has significant potential due to its ability to attract tourists through specific motivations such as contact with nature and culture (The Carpathian Mountains, Danube Delta, Transylvania due to its picturesque landscape or Bucovina known for its painted monasteries, such as Voronet Monastery and Moldovița Monastery) or the desire for tranquillity,

making it a growing alternative to conventional tourism. This form of tourism contributes also to the preservation of local traditions, environmental sustainability and offers tourists a unique connection to the past while enjoying modern comforts. With a rural area of 208,068 km², representing approximately 87% of the territory and a population of 9.08 million in 2022, the rural space is a vital resource for tourism development, holding significant potential [24]. In the same report, it is mentioned that studies indicate that over 80% of Romanian communes have medium or high tourism potential, many of which have access to unique natural resources and important historical sites [24]. Another important aspect is related to what a strategic document developed through a collaboration between the central public authority responsible for tourism development (at that time, the Ministry of Tourism), the General Secretariat of the Government (SGG) and the World Bank (WB) says. The document identifies nature and adventure tourism, including ecotourism and rural tourism, as one of the four main segments that can attract more spending from foreign tourists and result in a longer average duration of their stays (holidays, trips, journeys etc.) [25].

Rural tourism can also contribute to job creation and incomes as it has the potential to generate significant employment in Romania, particularly in regions that have limited economic opportunities.

A key consequence of permanent emigration and rural-to-urban migration in Romania is the increasing age of the population and the isolation of rural communities, largely due to a lack of employment opportunities and widespread underemployment [10].

Promotion of local products and crafts could be an answer to support local business and preserve traditional crafts and practices. According to a study made in 2021, many tourists are drawn to experiencing local products during their travels, whether it's sampling dishes made from regional ingredients or buying packaged versions to take home as special souvenirs. Food-based attractions that highlight traditional and

regional flavours have become popular, often serving as a key reason for visiting these areas [12].

The development of rural tourism in Romania is sustained by a continuous growth in the number of tourist and agri-tourist guesthouses [4, 5] and the support offered by European specific programmes [16].

To have an even more advantageous promotion of rural tourism in Romania, it is necessary to keep pace with the rapid advancements in emerging technologies. We have to swiftly adapt to and adopt the digital transition that happens all over the world in order to keep Romania competitive on the global tourism market. Among the emerging technologies, virtual reality demonstrates significant potential for introducing innovative and diverse features in the tourism industry that can bring benefits to both tourists as well as businesses [32, 20, 11, 3].

As innovative formats gain popularity, new economic models are taking shape. The travel experiences of the future will likely blend both online and offline elements [22]. Rather than choosing between virtual or physical experiences, it is highly probable to see an increase in hybrid offerings where virtual events, educational entertainment (edutainment) and sources of inspiration seamlessly integrate with visits to physical destinations [22]. Virtual reality is highly connected with metaverse, augmented reality and artificial intelligence [6] and it has gained quite a lot of attention due to Covid 19 period [18]. In a highly cited paper (with over 1,000 citations) titled Virtual Reality: Applications and Implications for Tourism, the author, Daniel A. Guttentag, defines virtual reality as a computer-generated, three-dimensional environment in which users can navigate and engage within a simulated environment, even activating our senses [14].

Virtual reality (VR) technology and tourism, translated in virtual tourism, can simulate real travel experiences or environments, offering exploration and interaction with destinations worldwide in a remote manner but in the same time, creating the sense of presence and reality. One important factor is that this combination of virtual reality and tourism can

be used in different sectors that are connected with tourism industry, including marketing, logistic, education, heritage preservation and can be seen, not necessary as a replacement of real travel but rather, an alternative that can be on hand in various circumstances in which physical travel is not possible [14].

More than this, a research firm states that the global virtual tour market, valued at \$0.96 billion in 2023, is projected to grow at a CAGR of 27.9%, reaching \$17.88 billion by 2035 [1]. This financial forecast shows that virtual reality technology has a lot of promise in tourism market, creating more likely new patterns in terms of businesses, tourist options and technologies.

In this context, one of the main challenges that can be seen as a global issue is the fact that it is an unequal internet distribution and access, particularly in isolated areas which most of the time are rural areas. In this regard however there are a few studies [36, 30, 21,17] which showcase the ongoing bottlenecks in rural internet connectivity and the ways these gaps can be filled.

Nevertheless, in an era of digital connectivity, these gaps can actually become opportunities for further and faster development and in the same time, inclusion for technology access.

It is necessary for Romania to develop at fast pace, the infrastructure to support the integration of rural populations into the digital ecosystem, especially because half of Romania's population (9 million people) is living in rural areas [24]. Realising that, Romania can assure competitiveness in sectors like tourism, agriculture, nature conservation, positioning itself as a strong competitor on European and global markets.

In this context, the paper aimed to analyze the evolution of rural tourism in Romania from 2013 to 2023, regarding accommodation capacity in tourist and agro-tourist guesthouses, its fluctuations over the Covid-19 period and also to quantify how the emerging technologies, such as virtual reality or 360-degree videos, could enhance the sustainable development of this type of tourism.

MATERIALS AND METHODS

The study employed quantitative and qualitative methods to analyse the evolution of rural tourism in Romania from 2013 to 2023. For the quantitative data, we used the National Institute of Statistics Tempo Online Datasets. [26]. A time-series analysis was conducted to observe and compare rural tourism growth trends. The collected data were processed and visualized in the form of tables and graphs to identify trends, patterns and correlations. The figures illustrate the dynamics of tourist arrivals, overnight stays, accommodation capacities, providing a clearer visualization of the rural tourism landscape in Romania.

The qualitative approach was made through examining global emerging technologies platforms, mainly virtual reality and 360-degree videos (surround video), to identify their potential for enhancing rural tourism experiences, focusing on accessibility, sustainability and cultural preservation. The integration of qualitative findings from VR technology studies was used to support the discussion on future applications in Romania's rural tourism sector.

RESULTS AND DISCUSSIONS

Dynamics of rural accommodations in Romania over a decade (2013-2023)

Table 1 shows the situation of tourist and agro-tourist accommodation classification in Romania over the period from 2013 to 2023. Tourist guesthouses increased from 1,335 in 2013 to 1,642 in 2023, representing a growth of 23%. In particular, 3-star tourist guesthouses consistently maintained the largest share, rising from 737 in 2013 to 1,007 in 2023, representing 36.6% increase with 270 more accommodations over ten years.

On the other side, agro-tourist guesthouses saw important growth, with the total number rising from 1,598 in 2013 to 3,498 in 2023, reaching 118.8% increase. Agro-tourist guesthouses saw increases at almost all categories, for example, 2 daisies, from 597 accommodations in 2013 to 832 accommodations, resulting 235 more accommodations over a decade and 5 daisies, from 15 to 90 accommodations from 2013 to

2023, resulting 75 more accommodations for the same period (Table 1).

Table 1. Rural tourist accommodation facilities categorized by types and comfort levels, Romania (2013-2023)

Type of accommodation	Comfort category	Years										
		2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
		Number										
Tourist guesthouses	Total	1,335	1,323	1,527	1,310	1,666	1,709	1,669	1,729	1,745	1,696	1,642
	5-star	14	11	15	15	22	22	20	17	20	24	24
	Weight %	1.1	0.8	1.0	1.0	1.3	1.3	1.2	1.0	1.2	1.4	1.5
	4-star	131	136	181	192	205	202	199	201	247	257	297
	Weight %	9.8	10.3	10.5	12.6	12.3	11.8	11.9	11.6	14.2	15.2	12.6
	3-star	737	748	893	894	984	1,001	997	1,044	1,043	973	1,007
	Weight %	55.2	56.5	58.5	58.4	59.1	58.6	59.7	60.4	59.8	57.4	61.3
	2-star	394	368	404	377	417	443	411	427	393	404	373
	Weight %	29.5	27.8	26.5	24.6	25	25.9	24.6	24.7	22.5	23.8	22.7
	1-star	58	57	52	50	36	36	42	37	39	36	29
	Weight %	3.6	3.4	2.7	2.5	1.4	1.3	1.5	1.2	1.1	1	0.8
	Not rated by stars	1	3	2	2	2	5	-	3	2	2	2
Agro-tourist guesthouses	Total	1,598	1,665	1,918	2,038	2,556	2,821	2,800	3,022	3,460	3,484	3,498
	5-daisy	17	20	19	19	26	35	35	49	49	55	90
	Weight %	0.9	1.2	1	0.9	1	1.2	1.3	1.6	1.4	1.6	2.6
	4-daisy	159	177	234	229	261	298	293	318	368	389	428
	Weight %	9.9	10.6	11.2	11.3	10.2	10.6	10.5	10.5	10.6	11.2	12.2
	3-daisy	769	837	1,021	1,129	1,478	1,627	1,648	1,794	2,081	2,093	2,097
	Weight %	48.1	50.3	53.2	55.7	57.5	57.7	58.9	59.4	60.1	60.1	59.9
	2-daisy	597	579	607	598	745	801	767	859	902	887	832
	Weight %	37.4	34.8	31.6	29.5	29.1	28.4	27.4	28.8	26.1	25.5	23.8
	1-daisy	58	52	57	53	56	60	37	52	60	60	51
	Weight %	3.6	3.1	3	2.6	2.2	2.1	2	1.7	1.7	1.7	1.5

Source: Calculation based on data from NIS Tempo Online, TUR101B [26].

These results indicate that there are positive signs of the strengthening of rural tourism infrastructure in Romania over the last decade, despite challenging times like Covid-19 pandemic (2020-2023). The increases may also reflect growing investments in rural infrastructure and a shift in tourist preferences towards more comfortable and quality-driven rural tourism experiences.

Analysing the data on overnight stays in 2013 versus 2023 (Table 2), it can be observed that the highest percentage growth occurred in 5-star tourist guesthouses, from 13,065 tourists in 2013 to 37,429 in 2023, growth of 186.4%, although in terms of absolute numbers, 3-star guesthouses experienced the largest increase in 2023, reflecting a preference for more affordable yet comfortable accommodations. Agro-tourist guesthouses also showed substantial growth, particularly in the 5-daisy category, with an increase of 422.8%, while 4-daisies increased by 217.3% among Romanian tourists, indicating a significant rise in demand for high-comfort rural tourism. Conversely, lower

comfort categories, such as 1-star tourist guesthouses and 1-daisy agro-tourist guesthouses, saw declines. For example, foreign tourists in 1-star guesthouses experienced an 81.4% decrease, suggesting a shift in preferences towards higher-quality rural accommodations over the decade (Table 2). One of the most notable components of the table is the "Not rated by stars" category for Romanian tourists in tourist guesthouses, which has seen a significant growth rate of 1,934.82%, growing from just 402 tourists in 2013 to 8,178 in 2023. This increase could suggest that a significant number of tourists are now choosing accommodations that are not formally rated, which could indicate a growing demand for more informal or unconventional accommodations, such as family-owned guesthouses or boutique rural stays that do not conform to standard star rating systems (Table 2).

Table 2. Growth rate of overnight stays (2013 vs 2023) by accommodation type, comfort level and tourist category, Romania

Type of accommodation	Comfort category	Type of tourists	Year		Growth rate 2013 vs 2023 (%)
			2013	2023	
			Number		
Tourist guesthouses	5-star	Romanian	13,068	37,429	186.40
	-	Foreign	5,937	5,745	-3.23
	4-star	Romanian	139,860	359,242	156.85
	-	Foreign	34,599	31,340	-9.41
	3-star	Romanian	636,455	1,040,883	63.54
	-	Foreign	79,298	90,345	13.93
	2-star	Romanian	233,610	227,745	-2.51
	-	Foreign	23,099	17,936	-22.35
	1-star	Romanian	29,792	16,240	-45.48
	-	Foreign	1,059	197	-81.40
Agro-tourist guesthouses	Not rated by stars	Romanian	402	8,178	1,934.32
	-	Foreign	21	1,769	8,323.80
	5-daisy	Romanian	18,368	96,033	422.82
	-	Foreign	2,524	4,280	69.57
	4-daisy	Romanian	152,392	483,490	217.26
	-	Foreign	17,886	16,953	-5.21
	3-daisy	Romanian	476,854	1,493,494	213.19
	-	Foreign	40,708	69,718	71.26
	2-daisy	Romanian	241,086	314,648	30.51
	-	Foreign	23,113	32,967	42.63
1 daisy	Romanian	21,433	16,033	-25.19	
-	Foreign	2,111	1,436	-31.97	

Source: Calculation based on data from NIS Tempo Online, TUR105B [26].

Overall number of places increased by 41.79%, from 305,707 in 2013 to 433,487 in 2023. Tourist guesthouses saw a 24.17% rise,

reaching 33,930 places in 2023, up from 27,325 in 2013 (Table 3).

Table 3 Number of places in rural guesthouses, Romania (2013-2023)

Year	Total number of places in Romania	Total number of places in tourist guesthouses - Romania	Total number of places in agro-tourism guesthouses - Romania
2013	305,707	27,325	28,775
2014	311,288	27,295	30,480
2015	328,313	32,051	35,188
2016	328,888	32,602	37,394
2017	343,720	34,816	44,499
2018	353,835	35,823	48,574
2019	356,562	35,198	49,053
2020	358,119	35,312	52,389
2021	410,291	35,387	55,778
2022	422,114	34,587	56,850
2023	433,487	33,930	58,086
Growth rate 2013 vs 2023 (%)	41.79	24.17	101.86

Source: Calculation based on data from NIS Tempo Online, TUR102C [26].

From 28,775 in 2013 to 58,086 in 2023, a growth of 101.86%, is related to the number of places in agro-tourist guesthouses. This can be seen as a positive indicator that agro-tourism became more popular over the analysed ten years.

As seen in Figure 1, the portion attributed to tourist guesthouses has declined over the analysed decade; from 8.94% in 2013 to 7.83% in 2023 though in the timeframe 2015-2020 had fluctuations between 9% and 10% showing promising to develop more, once Covid-19 pandemic period started, the decrease went to under 8%. On the other hand, the share of agro-tourist guesthouses shows a clear upward trend, rising from 9.41% in 2013 to 13.4% in both 2022 and 2023, noticing though that in 2020, when Covid-19 started, there was a peak of 14.63%. While tourist guesthouses have become a slightly smaller portion of the overall accommodation options, agro-tourist guesthouses have seen increased prominence, potentially reflecting growing demand for rural tourism experiences. The steady rise in agro-tourist guesthouses, particularly after 2016, highlights the increasing preference for

rural stays, thus reaching 14.63% in 2020 and going a little bit down in 2023, to 13.4% (Figure 1).

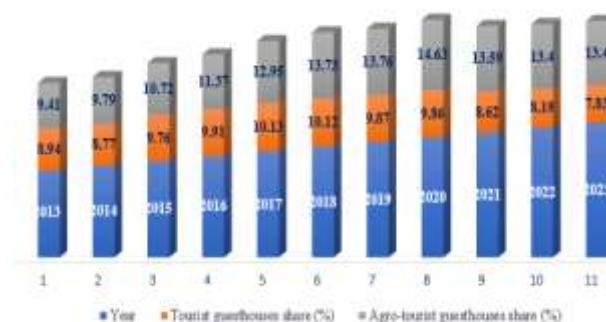


Fig. 1. Share of accommodation places in tourist and agro-tourist guesthouses as a percentage of the total accommodation capacity in Romania, 2013-2023.

Source: Author's analysis using data from the NIS, Tempo Online Database, TUR102C [26].

Table 4 highlights an uptrend in tourist arrivals in all accommodation types in Romania between 2013 and 2023.

For instance, Romanian tourist arrivals in all accommodation types rose from 6.2 million in 2013 to nearly 11.8 million in 2023, showing substantial increase.

A similar trend can be observed for foreign tourists, with arrivals climbing from 1.7 million in 2013 to 2.1 million in 2023. In tourist guesthouses specifically, the number of Romanian tourists increased from 590,069 in 2013 to 961,547 in 2023, reflecting a growth of over 60%, peaking at 1,133,674 tourist arrivals in 2019.

Agro-tourist guesthouses saw even higher growth, with Romanian tourist arrivals more than doubling from 463,563 in 2013 to 1,245,163 in 2023, the highest growth. Foreign tourists, though a smaller share, also showed significant increases in both types of rural accommodations.

This overall rise in tourist arrivals, particularly in rural guesthouses, underscores a growing interest in rural tourism over the analysed decade.

Table 5 shows that Romanian tourist arrivals in tourist guesthouses grew by 62.95%, from 590,069 in 2013 to 961,547 in 2023. In agro-tourist guesthouses, Romanian arrivals have risen by 168.6%, from 463,563 to 1,245,163. Foreign tourist arrivals in agro-tourist accommodations have grown 61.11%.

Table 4. Yearly tourist arrivals all accommodation types versus rural guesthouses, Romania (2013-2023)

Year	Type of tourists	Tourist arrivals in all accommodation types	Tourist arrivals in tourist guesthouses	Tourist arrivals in agro-tourist guesthouses
2013	Romanian	6,225,798	590,069	463,563
	Foreign	1,717,355	63,395	38,183
2014	Romanian	6,551,339	635,182	507,868
	Foreign	1,914,570	68,947	41,434
2015	Romanian	7,681,896	806,696	622,187
	Foreign	2,239,978	92,798	50,569
2016	Romanian	8,521,698	912,982	748,320
	Foreign	2,480,824	107,624	65,134
2017	Romanian	9,383,266	1,035,214	917,213
	Foreign	2,760,080	122,451	87,187
2018	Romanian	10,108,509	1,114,622	1,083,662
	Foreign	2,796,622	119,673	89,793
2019	Romanian	10,691,195	1,133,674	1,171,790
	Foreign	2,683,748	120,802	101,088
2020	Romanian	5,944,775	636,920	745,535
	Foreign	453,867	17,477	9,901
2021	Romanian	9,326,348	858,062	1,061,917
	Foreign	878,974	35,797	25,410
2022	Romanian	10,914,023	917,722	1,139,724
	Foreign	1,674,310	59,972	41,975
2023	Romanian	11,790,888	961,547	1,245,163
	Foreign	2,120,068	75,928	61,520

Source: NIS Tempo Online, TUR104B [26].

Table 5. Tourist arrivals at Romanian tourist and agro-tourist guesthouses: comparison between 2013 and 2023 (%)

Tourist arrivals	2013	2023	Growth rate 2013 vs 2023 %
Romanian - Tourist Guesthouses	590,069	961,547	62.95
Foreign - Tourist Guesthouses	63,395	75,928	19.76
Romanian - Agro-Tourist Guesthouses	463,563	1,245,163	168.60
Foreign - Agro-Tourist Guesthouses	38,183	61,520	61.11
Total - Tourist Guesthouses	653,464	1,037,475	58.76
Total - Agro-Tourist Guesthouses	501,746	1,306,683	160.42

Source: Calculation based on data from NIS Tempo Online, TUR104B [26].

There is a significant rise in tourist arrivals in all accommodation types between 2013 and 2023 (Figure 2), particularly among Romanian tourists. In 2013, there were 6,225,798 Romanian tourist arrivals, which surged by nearly 89% to reach 11,790,888 in 2023. Foreign tourist arrivals also grew, although at a slower rate, increasing by about 23%, from 1,717,355 in 2013 to 2,120,068 in 2023. When focusing on guesthouses, Romanian tourist arrivals rose by 63%, from 590,069 in 2013 to 961,547 in 2023, with a peak of 1,133,674 in 2019. An interesting

aspect is that for the years 2013 and 2023, the percentage of tourist arrivals in guesthouses compared to all accommodation types shows a slight decrease, in 2013, 9.48% of tourist arrivals were in guesthouses though in 2023, this percentage went down to 8.16%. A smaller proportion of tourists in 2023 have chosen guesthouses compared to 2013, despite the overall increase in tourist arrivals. A more modest increase of around 20%, was seen in foreign tourist arrivals in guesthouses from 63,395 to 75,928 in the same period. These figures highlight a growing domestic tourism market, with Romanians showing a particularly strong preference for guesthouse stays, while foreign interest, though growing, remains smaller (Figure 2).

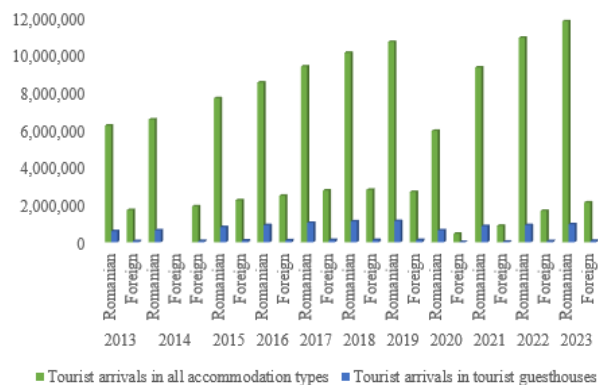


Fig. 2. Tourist arrivals in all accommodation types versus tourist guesthouses, by tourist type, Romania (2013-2023)

Source: Author's analysis using data from NIS Tempo Online, TUR104B [26].

In agro-tourist guesthouses, Romanian tourist arrivals were rising from 463,563 in 2013 to 1.2 million in 2023, an increase of 168%. Foreign tourist arrivals also grew, from 38,183 in 2013 to 61,520 in 2023, a rise of about 61%. Pre-pandemic, the peak year for agro-tourist guesthouses was 2019. There were registered 1.17 million Romanian arrivals and 101,088 foreign arrivals.

In 2021, Romanian tourists' arrivals in agro-tourist guesthouses reached 1,061,917, from 745,535 in 2020, but after 2021, the growth was moderate, 1,139,724 in 2022 and 1,245,163 in 2023 (Figure 3).

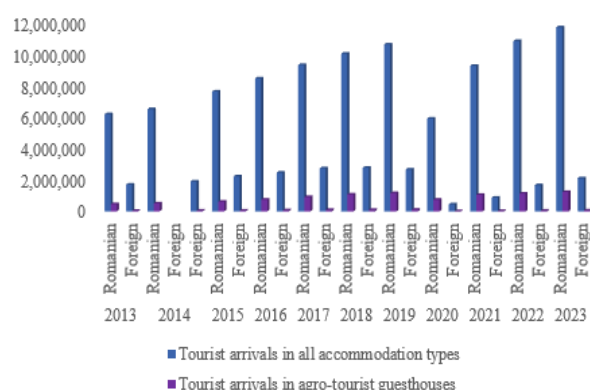


Fig. 3. Tourist arrivals in all accommodation types vs. agro-tourist guesthouses, by tourist type, Romania (2013-2023)

Source: Author's analysis using data from NIS, Tempo Online, TUR104B [26].

Table 6. Yearly overnight stays across all accommodation types versus tourist and agro-tourist guesthouses, Romania (2013-2023)

Year	Type of tourists	Overnight stays in all accommodation types	Overnight stays in tourist guesthouses	Overnight stays in agro-tourist guesthouses
2013	Romanian	15,884,817	1,053,187	910,133
	Foreign	3,477,854	144,013	86,342
2014	Romanian	16,511,937	1,128,686	990,179
	Foreign	3,768,104	144,428	91,342
2015	Romanian	19,047,701	1,454,948	1,256,092
	Foreign	4,471,639	209,585	112,900
2016	Romanian	20,609,141	1,640,386	1,457,163
	Foreign	4,831,816	241,364	140,776
2017	Romanian	21,801,487	1,855,827	1,750,354
	Foreign	5,291,036	257,693	178,131
2018	Romanian	23,315,138	1,995,894	2,068,888
	Foreign	5,329,604	233,569	186,398
2019	Romanian	24,795,253	2,087,156	2,318,252
	Foreign	5,290,838	237,061	200,353
2020	Romanian	13,581,775	1,162,688	1,494,216
	Foreign	997,365	39,009	21,089
2021	Romanian	20,823,029	1,537,893	2,041,720
	Foreign	1,924,533	67,873	48,061
2022	Romanian	23,377,839	1,638,934	2,183,949
	Foreign	3,666,533	115,454	81,684
2023	Romanian	25,186,916	1,689,717	2,403,698
	Foreign	4,504,676	147,332	125,354

Source: NIS Tempo Online, TUR105D [26].

Romanian tourists saw a steady increase in overnight stays, with numbers rising from 15,884,817 in 2013 to 25,196,116 in 2023. In tourist guesthouses, overnight stays increased from 1,053,187 in 2013 to 1,689,717 in 2023. In agro-tourist guesthouses, the same years, the numbers grew from 910,133 to 2,403,698. Foreign tourists overnight in agro-tourist

guesthouses went from 86,342 to 125,354, indicating a growing preference for rural accommodation in the time frame of 2013-2023 (Table 6).

The most significant increase is seen among Romanian tourists staying in agro-tourist guesthouses, where overnight stays rose by 164.10%, from 910,133 in 2013 to 2,403,698 in 2023. Tourist guesthouses also saw substantial growth for Romanian visitors, with a 60.43% increase, reaching 1,689,717 in 2023. Although foreign tourists showed a smaller growth in tourist guesthouses, agro-tourist guesthouses had an increase of 45.18% (Table 7).

Table 7. Growth in tourist overnight stays at Romanian tourist and agro-tourist guesthouses: a comparison between 2013 and 2023 (%)

Tourist overnight stays	2013	2023	Growth rate 2013 vs 2023 %
Romanian - Tourist Guesthouses	1,053,187	1,689,717	60.43
Foreign - Tourist Guesthouses	144,013	147,332	2.30
Romanian - Agro-Tourist Guesthouses	910,133	2,403,698	164.10
Foreign - Agro-Tourist Guesthouses	86,342	125,354	45.18
Total - Tourist Guesthouses	1,197,200	1,837,049	53.44
Total - Agro-Tourist Guesthouses	996,475	2,529,052	153.79

Source: Calculation based on data from NIS Tempo Online, TUR105D [26].

There was a steady increase in overnight stays in all accommodation types for Romanian tourists, rising from 15.8 million in 2013 to 25.1 million in 2023, an increase of around 59%. In tourist guesthouses, overnight stays by Romanian tourists grew from 1.05 million in 2013 to 1.69 million in 2023, a 60% rise. Foreign tourists had a more moderate growth, with overnight stays in all accommodation types increasing by 30%, from 3.47 million in 2013 to 4.5 million in 2023. However, their stays in tourist guesthouses remained relatively stable, with only a 2.3% rise from 144,013 in 2013 to 147,332 in 2023. This suggests that while Romanian tourists increasingly opt for both types of accommodation, foreign tourists show slower growth in choosing tourist guesthouses (Figure 4).

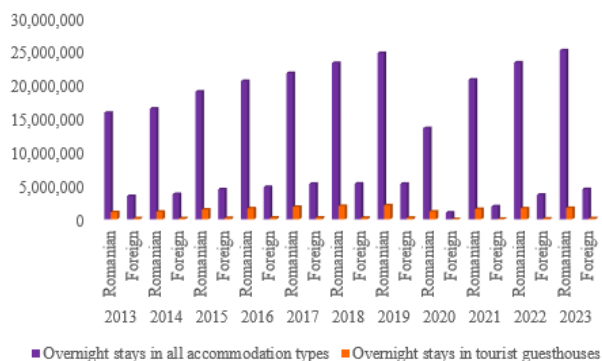


Fig. 4. Comparison of tourist overnight stays in all accommodation types versus tourist guesthouses, categorized by tourist type, Romania (2013-2023)
Source: Author's analysis using data from NIS, Tempo Online, TUR105D [26].

The examination of overnight stays from 2013 to 2023 across all accommodation types and tourist guesthouses reveals significant trends throughout the decade. In 2019, the total number of overnight stays reached its peak across all accommodations before the pandemic period (Covid-19), with 24,795,253 for Romanian tourists, showing a 6.3% increase from 2018. Similarly, tourist guesthouses also saw their peak in 2019, reaching 2,318,252 Romanian overnight stays, up from 2,068,888 in 2018. The foreign overnight stays in all accommodations saw a peak of 5,329,604 in 2018, while in tourist guesthouses, the peak was in 2019 with 200,353 foreign overnight stays, slightly higher than the 2018 figure of 186,398. However, the year 2020 reflected a sharp decline due to the pandemic, with Romanian overnight stays in all accommodations dropping to 13,581,775 and in tourist guesthouses to 1,494,216, considering that the last two previous years, 2019 and 2018, the Romanian tourist overnights spend in agro-tourist guesthouses was more than two million stays. The decrease was most probably caused by the travel restrictions imposed by Covid-19 pandemic. In 2023, the recovery started to be seen; 25,186,916 overnight stays - Romanian tourists in all accommodations and 2,403,698 in agro-tourist accommodations, suggesting that tourism demand is returning to pre-pandemic levels, in domestic rural tourism (Figure 5).

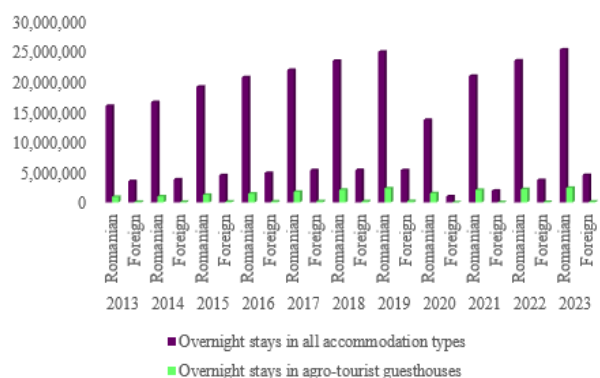


Fig. 5. Tourist overnight stays in all accommodation types vs. agro-tourist guesthouses, by tourist type, Romania (2013-2023)
Source: Author's analysis using data from NIS, Tempo Online, TUR105D [26].

Table 8. Rural tourist reception structures by ownership type and tourist numbers, Romania, 2013-2021

Types of tourist reception structures	Forms of ownership	Years									
		2013	2014	2015	2016	2017	2018	2019	2020	2021	
		Number of people									
Tourist guesthouses	Total	653,464	704,129	899,494	1,020,606	1,157,661	1,234,295	1,234,476	654,397	893,859	
	Integral state property	543	356	337	162	283	399	591	410	779	
	Majority state property	-	-	-	-	-	-	180	104	85	
	Mostly private property	801	669	475	665	287	308	536	1,348	2,669	
	Entirely private property	627,577	682,318	875,761	996,692	1,134,130	1,210,116	1,230,862	641,370	873,172	
	Cooperative property	1,317	1,189	1,368	3,151	2,165	2,941	1,878	547	229	
	Public property	1,303	364	498	774	819	391	72	-	-	
	Entirely foreign property	20,405	18,396	19,069	15,049	18,012	17,779	18,643	19,368	16,337	
	Public property of national and local interest	1,518	867	1,766	2,113	1,978	2,433	1,743	650	585	
Agro-tourist guesthouses	Total	501,746	548,302	672,756	813,454	1,004,406	1,175,435	1,272,878	755,436	1,087,327	
	Integral state property	1,571	1,798	2,742	3,237	2,766	4,668	6,956	2,401	3,697	
	Majority state property	-	361	684	794	569	648	424	366	-	
	Mostly private property	562	306	94	-	-	-	-	-	-	
	Entirely private property	477,991	524,711	649,167	789,385	971,939	1,137,317	1,230,497	732,821	1,053,236	
	Cooperative property	6,496	9,345	5,763	5,266	4,738	5,276	5,303	1,264	860	
	Public property	1,337	1,870	1,822	1,297	1,385	1,696	1,689	636	1,347	
	Entirely foreign property	12,974	10,342	11,385	12,164	21,681	22,912	26,492	17,218	27,369	
	Public property of national and local interest	815	769	1,099	1,311	1,522	1,338	1,517	730	1,018	

Source: NIS Tempo Online, TUR104A [26].

Table 8 presents the overall number of tourist guesthouses which increased from 653,464 in 2013 to 893,859 in 2021. Guesthouses owned entirely by private entities saw a significant increase, growing from 627,577 tourists in 2013 to 873,172 in 2021, with peaks in 2017, 2018, 2019, over 1 million people, highlighting the dominance of private ownership in the sector. Meanwhile, foreign-owned tourist guesthouses experienced fluctuations but overall stable numbers - 20,405 tourists in 2013, marking the biggest number of people for 2013-2021 timeframe. Agro-tourist guesthouses also proved growth, with total number of tourists rising from 501,746 in 2013 to 1,087,327 in 2021. The most substantial increase was seen in entirely private-owned agro-tourist guesthouses, which attracted 477,991 tourists in 2013 and surged to 1,053,236 tourists by 2021, indicating strong growth in rural tourism under private ownership. These patterns suggest a clear positive trend toward the privatization of rural tourist accommodation facilities.

Preliminary conclusions

Based on the analysis utilizing data from the National Institute of Statistics' Tempo Online Database, though in some aspects the numbers are encouraging, especially in domestic rural tourism, it can be said that there is plenty of space to become more competitive on the international rural tourism market and be even more attractive for foreign tourists.

Romania has spectacular places in all parts of the country, Maramureș, Dobrogea, Bucovina, Transilvania, that can not only bring more foreign tourists and prolong their stays but can also improve the life quality of locals and rural communities. In this sense, it is imperative to start aligning rural tourism, including here, farm tourism, eco-tourism, nature-based tourism, community tourism with the emerging and advanced technologies such as virtual reality, augmented reality, mixed reality, artificial intelligence, blockchain, for a sustainable rural tourism development and a top place on the rural tourism global arena. If Romania does not start now, it will not be able to keep pace with

the fast development of technology and will lose momentum in the global tourism market. In this context, rural tourism requires innovation and adaptation to new technologies.

Virtual reality (VR) has proven to be a transformative tool in tourism by breaking barriers and offering immersive experiences to potential travellers. While the primary function of VR is to offer immersive, borderless travel, the applications and benefits for rural tourism can be viewed through various lenses.

Below, we explore five key benefits that VR can bring to rural tourism in Romania, supported by global examples of successful VR projects.

Integrating emerging technologies in rural tourism: 5 important takeaways from active 360-Degree and virtual reality projects

Based on a simple search made on October 2, 2024, using the key words “virtual tourism” in the Web of Science database, it could have been noticed that virtual reality started to gain significant attention in the tourism industry starting with 2010, with a notable increase in research and application from around 2015 onwards. Though there are not many scientific papers at the intersection of virtual tourism and rural tourism [13, 31], this is understandable due to the fact that the infrastructure of virtual reality technology is still in early-stage of development.

Taking all these conditions, we can analyse some successful global examples that could serve as inspiration for Romania's rural tourism. The objective is to identify five key insights that could support the sustainable growth of rural tourism in Romania, both domestically and internationally, through the integration of virtual reality and 360-degree videos to attract more tourists and enhance their experiences.

Takeaway 1: Creating immersive rural and nature-based experiences for tourists to pre-view destinations

Yosemite National Park, located in California, United States of America. Virtual Yosemite is a well-integrated virtual reality project that allows users to explore over 400 different

locations within Yosemite National Park and its surrounding areas through interactive 360° tours (Photo 1). Created by virtual reality photographer Scott Highton, the project offers high-resolution panoramas that enable users to zoom in and pan around to explore details, providing an immersive experience for online visitors, offering detailed and accessible views of famous locations like Half Dome, Yosemite Falls, Mariposa Grove of Giant Sequoias, as well as less known places [34]. This infrastructure can be an important resource for people that want to see the travel destination before physically visiting it.



Photo 1. Yosemite National Park
Source: VirtualYosemite.org,
<https://www.virtualyosemite.org/virtual-tour/#node52>
[34].

Using virtual reality technology, Romania can create digital platforms to present traditional villages, countryside, natural parks, creating a teaser for potential visitors who want to explore Romania's landscapes.

Piatra Craiului National Park, could benefit from virtual tours. Virtual reality could offer immersive 360-degree virtual tours of the Piatra Craiului Mountains, showcasing its sharp limestone ridges and unique biodiversity [27], similar to how Virtual Yosemite allows users to explore its sites. Virtual stops can be made so that remote visitors can learn and gain a comprehensive understanding of a location. This can include exploring historical background, geographical features, natural resources, cultural significance, thus offering a multifaceted perspective that encompasses past and present. Adopting virtual reality technology in this early-stage, Romania would be able to

position itself as a forward-thinking destination.

Takeaway 2: Promoting education via tourism and digital accessibility

Subjects like history or geography can become more attractive to students and tourist if lessons are made virtually interactive. Through this tool, rural Romania can become even more accessible to a global audience in manners that the traditional tourism cannot. ExpeditionsPro [7] is a UK-based platform created by Simon Fretwell, designed to continue the legacy of Google Expeditions after its discontinuation in 2021 (Photo 2). It was built with education in mind, enabling users to access the content on mobile devices or dedicated VR headsets. It has the possibility of creating personal virtual tours but also to choose from the existing library thus making it even more fast-accessible [28].



Photo 2. Create your own virtual tour
Source: <https://expeditionspro.com/#/up> [7].

By combining education and virtual tours, Romania can boost rural tourism by developing 360-degree VR tours experiences for areas like Maramureș, Bucovina or Dobrogea, allowing users to explore local traditions, crafts and biodiversity. Of this instrument could also benefit the remote regions which are less accessible or less-known to global audiences. Being digitally accessible and more interactive and customisable, children or young adults can be attracted to learn, in an innovative manner, using their mobile phones, about Romania's rural landscapes and stories thus becoming more interested to explore them physically and, in the same time, to enrich their general culture.

Takeaway 3: Preserving and promoting cultural heritage through immersive virtual experiences

iHeritage, which focuses on augmented and virtual reality (AR/VR) experiences for UNESCO World Heritage sites offers immersive VR tours of famous cultural landmarks, such as Petra in Jordan (Photo 3), the Pyramids of Giza in Egypt, the Alhambra in Spain. These experiences provide a highly engaging way for users to explore cultural heritage through fully immersive, 3D virtual environments, enabling a deeper understanding of historical and cultural significance [15].



Photo 3. Petra, Jordan

Source: <https://www.iheritage.eu/unesco-world-heritage/jordan-petra/> [15].

In Romania, UNESCO World Heritage Sites like Wooden Churches of Maramureș, the Painted Monasteries of Bucovina, the Dacian Fortresses of the Orăștie Mountains can be found in rural areas, thus being both geographically remote and vulnerable to time and climate effects.

Usually, UNESCO heritages are locations that must be protected due to several reasons from which can be mentioned the distinct architectural styles and historical importance. This protection involves weather impact, mass-tourism, isolation but through immersive virtual reality (VR) experiences, like those provided by iHeritage, these sites can be digitally preserved. Beyond this aspect, the virtual preservation allows global audiences to explore them without the risk of affecting them. In Romania, this virtual preservation can be made in locations such as

Maramureș which is well known for its incredible wooden carvings and crafts. Similar to iHeritage platform, virtual reality platforms can be made so all these pieces of art to be digitally reconstructed, allowing visitors to see them virtually without the risk of physical deterioration. Integrating VR in rural tourism could also downsize the foot traffic in locations that are fragile thus supporting sustainable tourism and cultural access.

It would also enable the education of younger generations, teaching them about the cultural significance of these sites, ensuring that their heritage is passed down and appreciated.

Takeaway 4: Rural tourism through virtual reality for inclusion and accessibility

Wander platform offers both 360-degree immersive experiences and virtual reality (VR) functionality, allowing users to explore global locations using Oculus Quest headsets (Photo 4) thus moving it beyond just static 360-degree viewing [35].



Oculus Quest 2: Wander (Walk-through of How to use) and Virtually Travel with me!

Photo 4. Oculus Quest 2: Wander (Walk-through of How to use) and Virtually Travel with me!

Source: <https://www.youtube.com/watch?v=bERzOI7TgnU>, [2].

While it focuses on well-known sites, it could easily be adapted to feature rural tourism in Romania, showcasing remote villages, hiking trails, nature reserves in areas like Maramureș or Bucovina. Romania can leverage Wander-style VR to make rural destinations accessible to tourists with physical limitations or those living far away. It would offer broaden access tourism, making the country's hidden rural gems available to a broader audience.

Takeaway 5: Promoting agro-tourism through virtual reality

VR can offer immersive farm experiences, giving tourists the opportunity to explore rural farming environments, learn about agricultural practices, even participate in activities like virtual harvesting or animal care. This is particularly relevant for informing tourists on farm-to-table concepts, sustainability in agriculture or traditional farming methods. While there are not widely known VR platforms dedicated solely to agro-tourism yet, FarmVR [8] platform is an example that opens the path towards this concept. FarmVR (Photo 5) provides virtual reality services to businesses and individuals within the agriculture industry to help them promote their farms or agricultural practices. The platform offers tools such as 360-degree video production, virtual farm tours and interactive VR experiences that can be used for marketing, education or enhancing on-farm productivity [8].



Photo 5. Virtual Farm
Source: <https://farmvr.com/> [8].

Using the FarmVR model, Romania can integrate VR into its agro-tourism industry, allowing farms to digitally promote their offerings, educate the public and create new revenue streams. Traditional Romanian farms could highlight wine production, shepherding, organic farming practices through virtual tours, expanding their reach to a broader global audience interested in rural and eco-friendly travel. Also, Romanian farms could participate in global agricultural events, sharing best practices and attracting tourists interested in authentic, immersive experiences of rural life.

CONCLUSIONS

As shown by the analysis in this paper, using data from the National Institute of Statistics, for the period 2013-2023, Romania's rural tourism registered growth in accommodation facilities, bookings and overnight stays, with domestic tourists leading the way. One significant growth in rural tourism accommodations is the category of agro-tourist guesthouses accommodations, which saw 118.8% increase over the decade. Despite challenges such as the COVID-19 pandemic, rural tourism infrastructure has expanded, particularly in more comfortable, higher-quality accommodations. The demand for rural destinations, driven by the desire for cultural, nature-based and tranquil experiences, were most probably the key factors contributing to this growth. Rural tourism holds the potential to strengthen the local economy, preserve cultural heritage and even promote environmental sustainability in Romania's countryside. Furthermore, the integration of emerging technologies like virtual reality (VR) presents a valuable opportunity to enhance the appeal of rural tourism. VR could enable tourists to pre-experience the rural destinations from Romania, to support education, accessibility and cultural preservation.

By adopting emerging technologies, Romania can showcase its unique rural landscapes, traditions, cultural sites, to a broader international audience. Examples like iHeritage, which digitally preserves UNESCO sites and FarmVR, which promotes agro-tourism businesses in Australia, provide practical applications for Romania to follow. Therefore, the convergence of tourism growth trends and emerging technologies indicates substantial opportunities for Romanian rural tourism to achieve sustainable development and global competitiveness.

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