Article

Factors Influencing the Accommodation Prices of Romanian Rural Tourism

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Abstract: The hedonic pricing model posits that the price of a given product or service is an aggregate of several distinct characteristics that define it. In the context of tourism, this approach can be used to assess the prices of accommodations in a given area or market. This study explores the main determinants of tourism prices in the Brașov area of central Romania, a county that ranked as the second most visited area in Romania in 2021 based on the number of arrivals according to the ordinary least squares regression model on a sample of 398 accommodation units of different types. The main finding of this research paper is that prices are strongly influenced by luxury amenities and that prices tend to rise in lower-population-density areas, which we associate with rural areas. As previously noted in the literature, monetary values can be assigned to incremental changes in the independent variables, with the most significant changes deriving from the inclusion of spa, sauna and restaurant services in the tourism offer of accommodation units.

Keywords: rural tourism; hedonic pricing; OLS regression; pricing in tourism

1. Introduction

1.1. Rural Tourism and Agritourism

Rural tourism is defined by the UNWTO as activities that "take place in non-urban (rural) areas with the following characteristics: (i) low population density, (ii) landscape and land-use dominated by agriculture and forestry and (iii) traditional social structure and lifestyle" [1].

Agritourism can be construed as a form of rural tourism, which implies "the existence of two main activities: the agricultural one practiced by the tourists' hosts and the tourist one" [2]. This form of tourism is performed by "agricultural entrepreneurs and their family members that must remain connected to farming activities" [3]. The main types of activities organised by farmers are "educational, recreational and leisure activities for visitors" [4].

In the case of Romania, approximately 46% of the population lives in rural areas [5]. This has been the case for three decades, as the large influx of people seeking better living conditions and work opportunities moving from rural to urban areas ended with the fall of communism, being replaced with some urban–rural movements and, more significantly, by migration outside of the Romanian borders [6,7]. Compared to other European Union member countries, Romania has one of the highest percentages of people living in rural areas, comparable to the Slovak Republic (46% in 2021), Slovenia (45% in 2021), Croatia (42% in 2021), Austria (41% in 2021) and Poland (40% in 2021) and much higher than the 25% European Union weighted average [5]. Furthermore, population density in rural Romania was reported to be much lower than in rural areas, with one study based on the data collected by the Romanian National Institute for Statistics finding that the average population density in the rural areas of Romania was 48 inhabitants/km^2, compared to 340 inhabitants/km^2 in urban areas, with a weighted average of 84 inhabitants/km^2 [8].

Considering this discrepancy, it is possible that some of the appeal of rural tourism can be justified by the desire of city residents to "withdraw from the city" and "return to nature" [9]. Farms, forests and spaces dominated by nature are suitable areas for recreational activities, relaxation and education and are of particular interest for people living in urban areas, as they do not have easy access to such areas. This, in turn, serves as a motivation to practice rural tourism or its subcategory, agritourism [10].

On the other hand, rural areas can be associated with impaired access to essential services and goods, such as health care [11,12], sanitation and waste disposal [13], education [14] or basic food security [15]. Rural development and the development of rural tourism are important factors that can alleviate these issues and reduce the income and quality-of-life gaps between rural and urban areas [16,17].

The second characteristic highlighted by the UNWTO as being of primary interest to rural tourism, the land usage of agriculture and forestry, can be directly assessed by analysing the effective land usage allotted to those sectors of the economy. Moreover, the intensity of economic activities, expressed as a percentage of the GDP, can also be of interest. In the case of Romania, a 2018 estimate of land usage divides its land area into the following percentages: 60.7% agricultural land, composed of 39.1% arable land, 1.9% permanent crops and 19.7% permanent pastures; 28.7% forests; and 10.6% other (human settlements, infrastructure, etc.) [18]. As of 2020, the percentage of agricultural land in Romania dropped to 59.1%, whereas the percentage of forests rose to 30.1%, with land usage for other purposes reaching 10.8% [19]. Those values place Romania as the third country in the European Union ranked by the percentage of land allocated to agriculture, preceded by Denmark and Ireland, both at 65.5% of total land area.

In the case of the percentage of GDP generated by agriculture and forestry, Romania is ranked the first in descending order in the European Union, at 4.3%, and is followed by Latvia, with 4%, and Greece, with 3.9% [20].

By assuming that agriculture and forestry are activities that are specific to the inhabitants of rural areas and by analysing the situation described in Table 1 regarding land usage, rural population, employment in agriculture and GDP generated from agriculture, forestry and fishing, as well as tourism, we can posit that Romania has the potential to further develop rural tourism and agritourism by utilising a part of the human capital already invested in agriculture towards tourism. In doing so, Romanian farmers can diversify their sources of income, as "the most direct effect of rural tourism development is to increase farmer's income", in addition to boosting GDP per capita and employment at regional and county levels [21,22].

Table 1. Summary of land usage, population living in rural areas, employment in agriculture and GDP generated from agriculture, forestry and fishing. Source: World Bank.

Country	Agricultural Land % (2020)	Forest % (2020)	Population in Rural Areas % (2021)	Employment in Agriculture % (2021)	GDP from Agriculture, Forestry and Fishing % (2021)	GDP from Travel and Tourism % (2021)
Romania	59.1%	30.1%	46%	21%	4.3%	3.8%
Slovakia	39.2%	40.1%	46%	3%	1.8%	3.8%
Slovenia	30.3%	61.5%	45%	4%	1.8%	7.7%
Croatia	26.9%	34.7%	42%	6%	3.1%	16.1%
Austria	32.1%	47.3%	41%	4%	1.1%	7.1%
Poland	47.2%	31.0%	40%	9%	2.4%	2.8%
EU average	41.0%	39.8%	25%	4%	1.6%	
Hungary	53.7%	22.5%	28%	5%	3.3%	4.6%
Bulgaria	46.5%	35.9%	24%	7%	3.7%	4.9%

Tourism plays a role in the development of rural areas, assuring economic benefits for rural entrepreneurs who own rural tourism and agritourism businesses, for tourism agencies that promote and sell travel packages and for the local community through the multiplier effect of tourism on the economy [23]. Therefore, rural tourism is an important component from the perspective of sustainable development, as well as from the perspective

of agriculture and tourism and their mutual compatibility. The sources of income for people living in rural areas can be diversified by renting out unused rooms in their own homes, with this element being complemented by the provision of related services, food or leisure [24]. Online booking platforms are ways in which some barriers to entry in the hospitality industry are removed for individuals wishing to rent out unused spaces, as some platforms (e.g., Airbnb) have been geared towards this type of activity since their inception, whereas other platforms (e.g., Booking.com) have recently started catering to such business initiatives [25].

The diversification of Income sources is also a factor of stability for farmers and their families, providing a safety net in the event that the farm is affected by natural disasters such as floods or drought or that prices of agricultural products drop drastically [26]. This outlook can also be of interest to individuals living in rural areas that do not have agriculture as their primary source of income. Agritourism and rural tourism are advantageous because farmers and rural entrepreneurs do not have to undertake great efforts from an investment point of view, especially if the housing space allows for some minimal changes in order to provide a decent and sustainable foundation for tourism [27].

The third part of the definition offered by the UNWTO refers to the social and cultural dimension of rurality, stressing the need to upkeep and preserve traditions, heritage, traditional social structures and lifestyles. The integrity of those components can be viewed as essential for the development of rural tourism, as they maintain authenticity and, in turn, generate guest satisfaction with tourism experiences [28]. Furthermore, the very concept of authenticity in the research field of tourism and hospitality has been described as "practically indispensable and theoretically mischievous" due to a lack of a broad consensus regarding what it actually constitutes [29]. Some frameworks for analysis of authenticity refer to it as a "reciprocal relationship" between host and guest and as a process of continuous "negotiation of (social) relationships that embed them within a society and culture" [30]. The concept of heritage is equally divisive, as a postmodern approach can impose a dialectic frame as a cycle of continuous creation and replacement of values and physical features [31]. This interpretation is at odds with the expectations of immovability and preservation associated with the more traditional approach to heritage, as the very act of preservation might imply some changes to the historical sites and architecture present in a given area [32]. This seems to be the case of rural tourism, especially agritourism. An instance in which the old blends with the new is the case of farmhouses being converted into bed and breakfasts, therefore diverging towards the hospitality sector while keeping the rural aesthetic and ambiance as marketing elements [33]. This approach can be seen as a "healthy alternative" to a total loss of authenticity and an opportunity for sustainable rural development [34]. As such, rural areas become points of tension between "continuity and discontinuity", and their study should not be limited to the direct impact of agriculture and instead should be focused on an integrative approach addressing, for instance, craftsmanship as a vector of identity specific to Romanian rurality [35].

Some classifications expressly differentiate between staged (working farm, direct contact, staged agritourism) and authentic (working farm, direct contact, authentic agritourism) forms of agritourism, with the former being used to refer to model farms, farm tours and purpose-built attractions, whereas the later consists of farms with "pick your own facilities" or volunteer programs for farm work [36]. Some authors include other activities in the scope of rural and agritourism, such as trips for hunting or fishing, as well as visits with the aim of observing and admiring the local flora and fauna in the natural rural landscape [37]. The aforementioned landscapes can be considered multifunctional, as they provide food and public amenities such as "biodiversity conservation" and "preservation of historic resources" [38].

Considering these characteristics, agritourism and rural tourism can benefit from very high visibility in the context of the promotion of products and services that have a sustainable character. Moreover, agritourism has been described as one of the oldest forms

of sustainable tourism, together with ecotourism, with great potential to contribute to the rural economy [39].

Through digitalisation and increased promotion through online booking platforms and social networks, rural tourism accommodation businesses can reach more potential consumers [40] while, at the same time, providing valuable information for researchers specialized in sustainable development and rural tourism. Communication in the context of social networks and some platforms on which reservations are made is bidirectional, taking place between the guest and the host and vice versa [41,42].

Finally, some difficulties that undermine the development of rural tourism identified in the literature result from the inability of rural entrepreneurs in tourism to fully satisfy the demands of tourists [43] or from insufficient training in hospitality [44]. These shortcomings can be alleviated through the application of analytic decision-making methods [45], implying the willingness of rural entrepreneurs to pursue an organised and scientific approach to the decision-making process.

1.2. Brașov County—A Representative Destination for Both Rural and Urban Tourism

Brașov County is located in the Central Development Region of Romania in the southeastern part of Transylvania. It covers 5363 km² of the national area and is surrounded by Mureș, Harghita, Covasna, Prahova, Dâmbovița and Argeș counties (Figure 1).
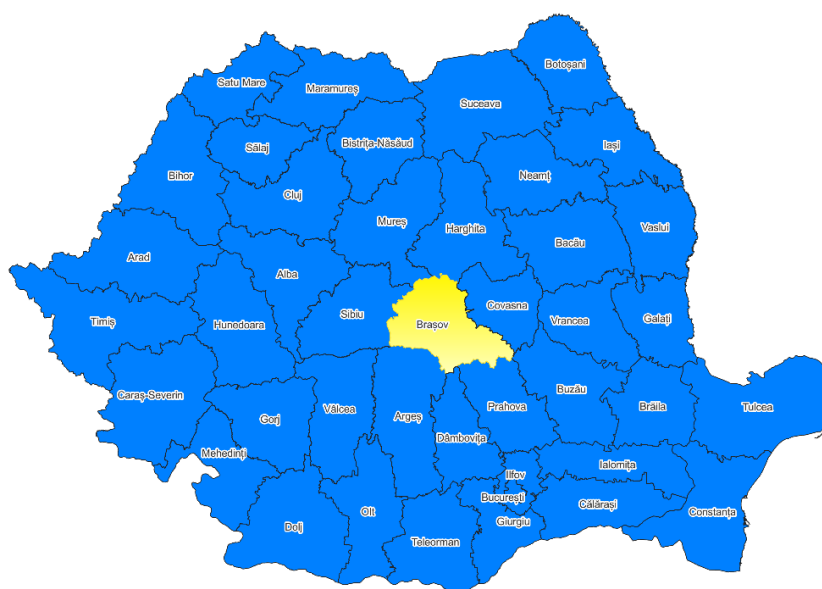

Figure 1. The location of Brașov County in Romania (source: own elaboration in QGIS based on shapefiles provided by the Romanian Institute of Statistics).

Tourism is an important part of the economy of Brașov County, as it is the second most visited area in Romania after Constanța, which is located on the seaside of the Black Sea and is a traditional "sun-sea-sand" tourism hotspot, followed closely by București, the national capital. Brașov county accounted for 10.97% of all touristic arrivals in 2021 [46]. Both urban and rural areas contribute to the touristic potential of this area, with villages such as Bran, Moeciu and Viscri being significant attraction points.

An important note in this regard is that some areas that are rural or periurban are included in the statistics of urban areas, as some villages with important touristic contributions (such as Poiana Brașov, an important ski and winter sports resort) are not self-administered but are component villages of larger urban areas. Accordingly, we interpret Table 2 as being influenced by the underrepresentation of rural areas in the total number of touristic arrivals. We can posit that rural tourism plays an even more significant role than what official statistics would suggest. As such, one of the aims of this research

article is to underline the importance of rural areas for sustainable development at the regional level.

Table 2. Distribution of touristic arrivals in the Brașov area by type of administrative unit.

Type of Administrative Unit	Touristic Arrivals (2021, Compared to County Total)
Urban	71.95%
Rural	28.05%

Another issue with the urban–rural dichotomy in this situation is the fact that some relatively small (by population size) administrative units are considered urban areas by the state administration, as is the case of Predeal and Ghimbav, both with a population of less than 5000 people (Figure 2). Predeal alone accounted for 17.53% of touristic arrivals in 2021 at the county level.
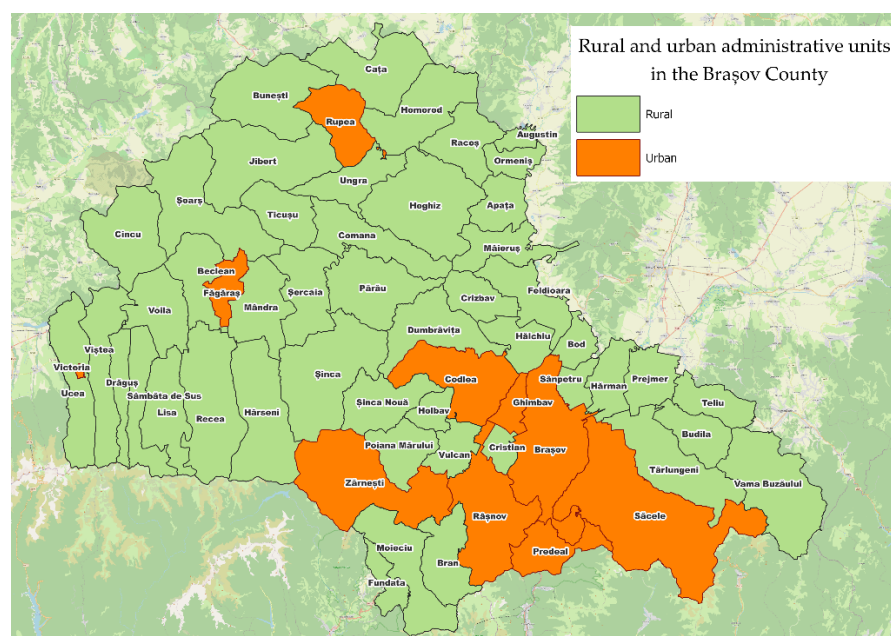

Figure 2. The distribution of rural and urban administrative units in Brașov County (source: own elaboration in QGIS based on shapefiles provided by the Romanian Institute of Statistics).

Considering the administrative classification of the territory of Brasov, this county is characterised by its high percentage of people living in urban areas, amounting to 69.72% of the total population in 2021.

We consider that this classification is somewhat biased and does not take into account the demographic, economic and aesthetic traits that define rural spaces, as underlined previously with reference to the UNWTO definition.

Alternative approaches for defining rural and urban areas can take into consideration population density, the percentage of agrarian economic activities, landscape and architecture. For the purpose of this study, we decided to address population density as a way of determining whether there are differences between the official classification of urban and rural and the actual situation, as seen in Figure 3.

Some discrepancies between population density and the urban status of some administrative units can be noted, as we suggested before. Some areas that are considered urban seem to have relatively low population density. Even in the case of the county capital, there seem to be areas that are more in line with the characteristics of rural areas.
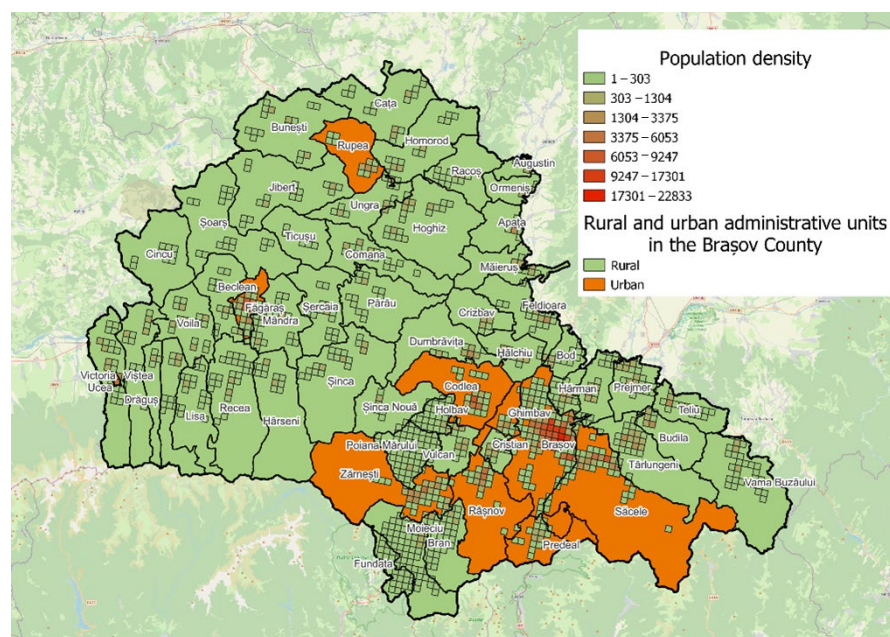
Figure 3. Population density in Brașov County superimposed on the previous map of rural and urban administrative units (source: own elaboration in QGIS based on shapefiles provided by the Romanian Institute of Statistics).

It should be noted that the share of GPD obtained through agriculture, animal husbandry and forestry could also be an important indicator for determining the rurality of a given area. Unfortunately, a cohesive database for GDP at the LAU (local administrative unit) level was not available, as reporting is aggregated at the NUTS-3, NUTS-2 and NUTS-1 levels (counties, regions and macroregions, respectively). This can be an avenue for further research, as we suggest that a more nuanced approach to rural economics would be beneficial in terms of the accuracy of official reporting and would improve the quality of future studies.

1.3. Pricing, Revenue Management in Tourism and the Hedonic Price Model

The main aim of this research article is to examine the factors influencing the pricing of accommodation units located in both the urban and rural areas of Brașov County. This is a subject of interest for entrepreneurs, as price is "the only marketing mix element that produces revenue" [47]. As such, a thorough understanding of which attributes and features are generally associated with a higher room price in a given area would allow the management of rural hotels and other lodging establishments to react accordingly, both by setting competitive room prices and by prioritizing investments in the areas that can positively impact profitability and the general financial performance of the organisation they manage [48].

Several methods for determining prices are highlighted in the marketing literature, such as markup pricing, target rate-of-return pricing, economic-value-to-customer pricing, competitive pricing and auction pricing [49]. Hedonic pricing models are therefore influenced by competitive pricing methods, as both are based on aggregating and analysing data regarding prices, whereas the former includes functional characteristics of the goods and services on the market in the dataset. Therefore, a hotel room can be considered to act as a "basket of attributes, against which the price can be derived" [50]. As such, it is possible to observe patterns and to estimate the value of each studied characteristic by utilising marked data. This is generally achieved through the use of regression analysis by considering prices as dependent variables and the characteristics of goods and services as independent variables [51]. Generally, regression models are linear or linearized (e.g., by utilising natural logarithm transformation of the dependent variable or, in some cases, of the independent

variables [52]). Natural logarithms are utilised owing to their direct interpretability to estimate "proportional differences", in turn possibly correcting for heteroscedasticity [53].

An example of a regression model in which the dependent value is transformed by the use of the natural logarithm is Equation (1), which is derived from a study of the "hedonic price model for rental prices of Airbnb accommodation" [54]:

$$\ln P_i = \alpha + \beta X_{ij} + \varepsilon_i, \tag{1}$$

where $\ln P_i$ is the natural logarithm of the rental price, X_{ij} is a vector of attributes, α is the intercept and ε_i is the error term. The coefficient β reports the implicit prices for the attributes.

This equation can be expressed in a non-vectorized form, as seen in Equation (2).

$$\ln P_i = \alpha + \beta_1 X_{1j} + \beta_2 X_{2i} + \ldots + \beta_k X_{kj} + \varepsilon_i \tag{2}$$

Regarding the assumptions inherent to OLS multiple linear regression analysis, the statistics and econometrics literature state that the following assumptions need to be satisfied in order to apply parametric multiple linear regression: a linear relationship between dependent and independent variables, multivariate normality of the residuals, no multicollinearity (the independent variables are not highly correlated with each other; therefore, the variables are not redundant), no autocorrelation and homoscedasticity ("variance of error are similar across the values of the independent variable") [55].

A more statistically robust method of regression analysis when confronted with non-normal sample distributions that cannot be easily normalised is the quantile regression method [56]. Whereas this approach is less prone to being influenced by outliers or extreme data points due to the statistical properties of the median value (and other quantiles) compared to those of the mean value, some concerns regarding the efficiency of the quantile regression method also need to be addressed, which should translate in practical terms as a need for larger sample sizes [57].

Another approach proposed by some authors is to include a spatial dimension in the study of prices, both as autocorrelation indices, such as Moran's I (an adaptation of the correlation matrix) and by geographic weights assigned to the regression [58].

Advanced models combine hedonic price models with geographically weighted regression analysis, allowing for a thorough assessment of the consistency of the regression model across a wider area, such as between localities, counties or countries, as well as to determine the spatial autocorrelation of the dependent variable [59]. Furthermore, by utilising geographically weighted regression analysis and GIS (geographical information system), the spatial distribution of some independent variables, such as proximity to tourism attractions, could improve the predictive power of the model.

It should be noted that some methodological considerations and possible limitations should be taken under advisement if the second approach is selected by considering the proximity of touristic attractions as an independent variable. Namely, the relationship between the spatially distributed independent variable and the dependent variable can be subject to a distance decay function [60]. For example, it is reasonable to assume that attractions that are closer to a hotel should have a higher impact on prices, willingness to pay for hotel services, occupancy rates or total number of guests; however, the exact nature of the relationship can be difficult to accurately represent. Several theoretical approaches are feasible, such the application of a variation of the inverse square law and modelling of the interaction between the variables in this way [61]. Another possible way to address this is to add cut-off values after which the spatial interaction between variables becomes equal to zero and to assume that the relationship is otherwise linear or that it can be linearized. A possible criticism of the latter approach is that it violates the first part of Tobler's first law of geography, which states that "everything is related to everything else, but near things are more related than distant things" [62]. Whereas this can be a valid criticism and should be acknowledged as a possible research limitation, practical considerations with respect to

the nature of tourism should also be considered. As such, measuring the willingness of tourists to travel from the lodging unit that they stay at towards attractions is a topic of interest for future research. It should be possible to classify and analyse the aforementioned attractions in order to generate popularity scores and examine the way this value interacts with distance and willingness to travel. Again, this is a suitable avenue for further research, as including advanced modelling of the impact of tourist attractions can play a significant role in obtaining improved models.

Modern GIS software can easily allow for the creation of isochrone or isodistance maps [63] around points of interest, and readily available computational power and map data of road infrastructure and traffic condition should make distance calculations in large data tables a relatively easy task to accomplish.

The construction of a large database that includes the location of hotels and other types of lodging units can be achieved by utilising online geocoding services based on addresses [64].

Some variables included in other studies utilising the hedonic price model are mentioned in Table 3. In those cases, the types of variables are either numeric or dummy variables.

Dummy variables are synonymous with binary variables. As such, the only values that they can take are 1 or 0, signifying the presence or absence of a characteristic [65]. In the case of hedonic price models applied to the tourism industry, dummy variables underline qualitative differences between lodging units, such the inclusion of a complimentary breakfast in the room price, internet access, access to private bathrooms, free parking, ownership by a private person or by an organisation, etc. Furthermore, other variables can be recoded as dummy variables, especially if they belong to ordinal discrete categories of data. In this context, the star rating of establishments can be recoded as luxury establishments (five-star and possibly four-star hotels), medium establishments (three stars) and budget establishments (one star). This can allow for classification of distinct lodging unit types according to their own classification criteria, enabling a more parsimonious model. A more in-depth comparison between the classification criteria and the extent to which accommodation units respect them would also be of interest. However, this approach is outside the scope of the present research. In our case, because the classification of hotel units and bed and breakfast units both utilise a scale of one to five, we consider that the underlying differences between the raking of lodging units practically underline the same amenities and service patterns as those underlined in the previous example of recodification.

Whereas most of those variables carry a positive sign in the regression analysis, it should be noted that in some cases, the relationship between the independent and the dependent variables is negative; for example, the authors of a previous study reported that if a lodging unit is pet-friendly, then, on average, the price for the room tended to be slightly reduced, with a cited value of EUR -18.13 [51].

The size of the hotel is a divisive topic in the literature, as several studies found positive effects, whereas another study reported negative effects [58].

Table 3. Examples of variables and types of variables used in research papers utilising hedonic regression models for hotel room prices.

Variable	Variable Type	Observations and Examples	Previous Results Reported in the Literature
Price	Continuous numeric	As natural logarithm	
Sustainability certification	Dummy variable	Externally verified (EMAS)	Positive but not significant [66]
Type of accommodation establishment	Dummy variable	Hotel (coded as 1) or aparthotel (coded as 0)	Negative and not significant [66]
Number of stars	Dummy variables	5 stars (coded with 1 or 0) 4 stars (id.)	Positive and significant [51,66,67]
Review rating	Discrete or continuous numeric	Review rating on Tripadvisor or Booking.com	Positive and significant [51] Positive and significant [68] No effect [51,66]
Size of establishment (number of rooms)	Discrete numeric	Number of rooms or apartments	Significant and positive effects [69,70] Significant and negative effects [58]
Distance to the beach	Continuous numeric	Distance in km to the nearest beach	Negative and significant [66]
Distance to the city centre	Continuous numeric	Distance in km to the city centre	Negative and significant [51,71]
Location in the city centre	Dummy variable	1 if the lodging unit is located in the city centre	Positive and significant [72] Negative but not significant [51]
Distance to the nearest competitor	Continuous numeric	Distance in km to the nearest lodging unit competitor	Negative and significant [71]
Distance to the airport	Continuous numeric	Distance in km to the nearest airport	Positive and significant [71]
Accommodation regime (all-inclusive, breakfast and half board)	Dummy variables	Three dummy variables corresponding to the food regimes	Positive and significant in the case of all-inclusive [66]
Food quality	Discrete numeric	Additional price for breakfast is treated as a proxy for food quality	Positive and significant [67]
Spoken languages	Dummy variable	Variable coded with 1 if English is spoken at the lodging unit and 0 otherwise	Positive and significant [67]
Fruit-growing farm	Dummy variable	1 if fruits are grown on the farm and 0 otherwise	No effect [67]
Organic farm	Dummy variable	1 if the farm practices organic agriculture and 0 otherwise	Positive and significant [67]
Livestock farm	Dummy variable	1 if livestock is raised on the farm and 0 otherwise	Negative and significant [67]
Chain hotel	Dummy variable	1 if the hotel is part of a chain and 0 otherwise	
Room size	Continuous numeric	Room size in metres^2	Positive and significant [72]
Bathroom with both bath and shower	Dummy variable	1 if the room bathroom is equipped with both a bath and a shower and 0 otherwise	Positive but not significant [72]
LED TV in room	Dummy variable	1 if the room is equipped with an LED TV and 0 otherwise	Positive and significant [72]
Internet access	Dummy variable	1 if the hotel offers internet access and 0 otherwise	Positive and significant [67] Positive but mixed results between models used [72]
Air conditioning in room	Dummy variable	1 if the room is equipped with air conditioning and 0 otherwise	Negative and significant [51]
Shuttle bus available in hotel	Dummy variable	Variable coded with 1 if the hotel has a shuttle bus available to guests and 0 otherwise	Positive and significant [51]
Swimming pool available in hotel	Dummy variable	Variable coded with 1 if the hotel is equipped with a swimming pool and 0 otherwise	Positive but not significant [51]
Spa/wellness area	Dummy variable	Variable coded with 1 if the hotel has a spa or wellness area and 0 otherwise	Positive and significant [67]
Style	Dummy variables	Tripadvisor-style tag (e.g., all-inclusive, best value, mid-range, romantic, etc.)	Significant and positive for all-inclusive, best value and boutique; negative and significant for family-friendly, mid-range and quiet [51]

Some studies include simplified geographical features, such as the distance of the accommodation unit to the beach, city centre, nearest competitor and airport [51,71].

An interesting approach undertaken in some of the studies in the literature is the use of two regression models—one for weekday prices and one for prices reported on the weekend. In such a case, some differences were reported; in the case of hotel prices reported during the working week, internet access was a significant factor, whereas this was not the case during the weekend [72]. An explanation for this is that hotel managers expect that during the week, the majority or at least a significant number of guests are visiting the hotel for business purposes and that they would need internet access in order to work, whereas during the weekend, guests would be more interested in leisure activities. More recent developments with respect to consumer preferences and the widespread adoption of smartphones and other Internet-enabled devices might have changed this type of behaviour.

Another factor examined in the recent literature is the impact of online hotel ratings on hotel prices. Such approaches use all possible hotel ratings available on online platforms (cleanliness, comfort, location, facilities, staff, value for money) [68]. The cited research acknowledges the fact that there is a significant "halo effect" when guests leave online reviews, which means that at least some of the independent variables are highly correlated, as assessed using the variance inflation factor (VIF).

Temporal considerations are also noted in the literature, as prices fluctuate based on the booking window. As such, advance or last-minute booking effects have been observed, which can have a significant effect on the hedonic price model [73].

Finally, structural equation modelling (SEM) [74] is another alternative to regression analysis, although it is not commonly used in hedonic pricing models, especially in the context of tourism. Major advantages of this methodology include the way SEM "straight-forwardly handles" the technical problems plaguing regression analysis: multicollinearity, heteroscedasticity and autocorrelation [75]. It should also be noted that the edges (or the lines) between variables present in SEM models are based on regression and covariance matrices, representing unidirectional and bidirectional relationships, respectively.

In summary, the key concepts discussed in the literature are centred around the role and importance of the development of tourism from the perspective of ecological, economic and social sustainability, especially in a rural context. Furthermore, it has been shown that tourism can continue to play a significant role in the sustainable development of Romania and, more precisely. of the Brașov County area.

A salient element of the literature review is the contextualisation of official statistics related to the geography and administrative divisions present in the Brașov area, as we found that they tend to be biased towards the underrepresentation of rural areas. As such, some areas with features consistent with those exhibited by rural areas (e.g., low population density, aesthetics and architecture) were represented as urban areas.

Finally, an overview of quantitative methodologies used in previous research endeavours were examined, most notably the hedonic regression model. Whereas we propose some improvements of this model as underlined by the literature (geographically weighted regression, SEM and spatial autocorrelation indices), we decided to continue utilising this method, as the assumptions needed for it to be applied were met, as detailed in Section 2.

2. Materials and Methods

Due to the availability of large amounts of market data and the widespread adoption and ease of use of integrated data collection, processing, analysis and visualisation tools (in our case, the R programming language and the Posit software environment), we chose a quantitative approach, utilising an ordinary least squares multiple linear regression model. The underlying epistemological position that we adopted is, in essence most compatible with positivism as a research paradigm, whereas the statistical apparatus is most frequent in nature [76–78].

As we acknowledge Feyerabend's contributions to the philosophy of science (the supposed incommensurability of research paradigms and epistemological anarchism, summarised as his famous "Anything goes" dictum), we maintain that qualitative approaches to this research problem can be applied successfully, both as standalone methodologies and in conjunction with our proposed methodology (mixed methods) [79,80].

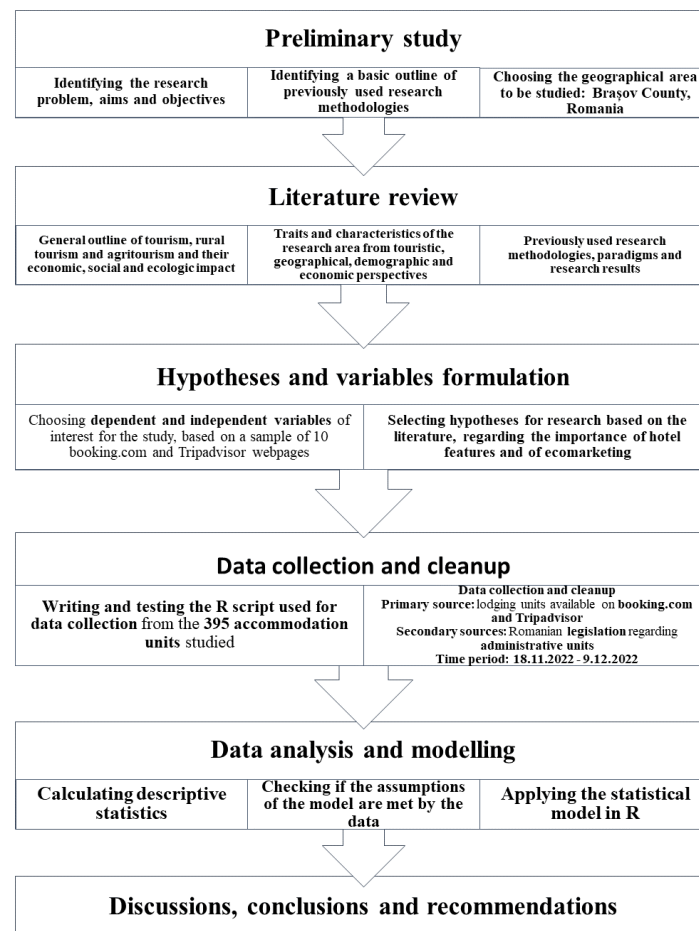Our research method can be summarised using the following diagram (Figure 4):

Figure 4. Diagram of research methodology used in the research.

A list of rural administrative subdivisions in Brașov County was obtained from the Romanian legislation, namely the 290/2018 Law, which defines administrative units in Romania. This resulted in the list presented in Table 4.

Table 4. Types and structure of administrative units in the Brașov area.

Type of Administrative Unit	Number
Municipalities	4
Cities	6
Component localities	15
Communes	48
Villages	149

This list was utilised in order to generate a list of search queries on Booking.com. Furthermore, data were compiled from the Tripadvisor website, which resulted in a list of 398 lodging units that were available for booking between 18 November 2022 and 9 December 2022. The time needed to collect and generate the database was 18 November 2022–19 November 2022. Such a period was selected as a result of the following considerations:

-    In order to mitigate the effect of missing data, average values for the cheapest available room of the same category were calculated per week. For each week and for every lodging unit, the difference between maximum and minimum values was examined. Outliers detected in this way were corrected, provided they were not caused by natural fluctuations in the price of rooms. As such, for each lodging unit, we considered only one type of room.
-    By selecting a period of three weeks, we expected stationary, stable conditions with respect to price, as seasonality is a known factor in tourism pricing and demand [81].
-    The data collection method utilised in this study does not allow for retroactive collection. Furthermore, by setting a more generous time span for the data could result in further distortions in the model, owing to the dynamic way in which managers can set prices; as such, the farther away from the present day the data were collected, the more likely it is that prices are either not updated or that they are not set at all.

The resulting data points, corresponding to lodging units studied in the Brașov County, are shown in Figure 5.
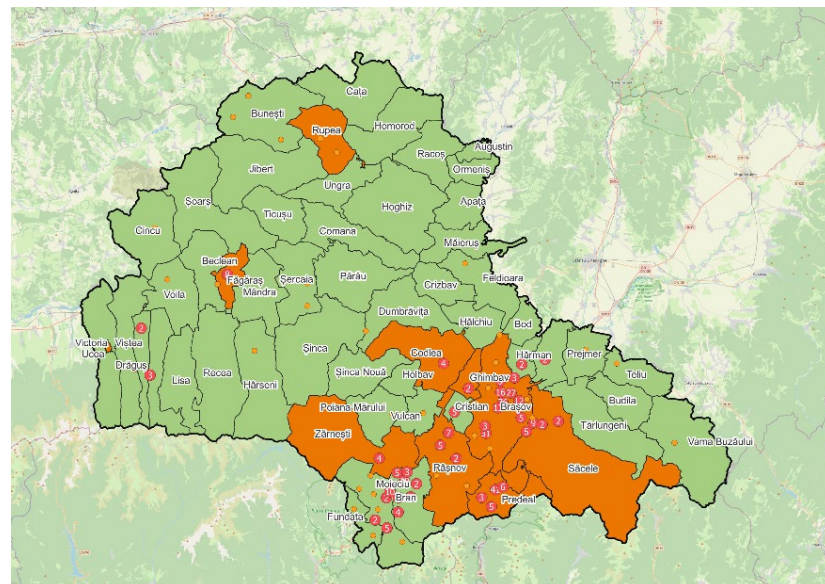

Figure 5. Point clusters of lodging units in Brașov County.

In order to automate the data collection process, we developed a data scraping script in R utilising the following R packages:

-    Polite: In order to satisfy basic ethical criteria in research, we used the "polite" package in order to verify that we are permitted to collect the data and to assess the time-out time between requests [82].
-    Rvest: Basic parsing of html, css and json, allowing for isolation of elements in a page source and imputation to a data frame [83].
-    Rselenium: Paired with Docker, this allowed headless integration of browsers and the processing of JavaScript elements in a webpage [84].

Owing to the limited availability of some hotel rooms during the investigated time period, we decided not to fit a weekday and a weekend model, as it would have affected the regression model due to the processing of missing data (both by imputation and removal of data) [85].

Furthermore, considering the likelihood that review scores for hotel features would be highly correlated with one another, as reported in previous studies, we decided to only include the overall review score [68].

Moreover, some of the other independent variables were scraped from the Booking.com website, as well as from Tripadvisor.com.

A full list of variables is presented in Table 5. Data clean-up at this stage consisted of removing lodgings that were closed to bookings at the time of the data scrape, in addition to making a note of other missing or discontinuous values in the dataset, which were then manually corrected if they were caused by errors in the script.

The research hypotheses examined in this paper are as follow:

H1. *The most significant drivers of hotel room prices are high-end features (luxury branding, sauna, spa, pool, air conditioning, flatscreen TV and room service).*

H2. *Lower population density, which is associated with rural areas, is a significant factor influencing hotel prices.*

H3. *A more detailed description of amenities is positively associated with higher prices.*

H4. *The sustainability badge positively impacts tourism prices.*

Following data collection and data clean-up, an OLS regression model was fitted to the data in the Posit programming environment, as the data were found to respect, within a margin of error, the assumptions of the classic ordinary multiple linear regression model, as seen in Figure 6. Heteroskedasticity was tested for using the Breusch–Pagan test, which resulted in a p value of 0.26. As such, the model does not violate the homoscedasticity assumption.
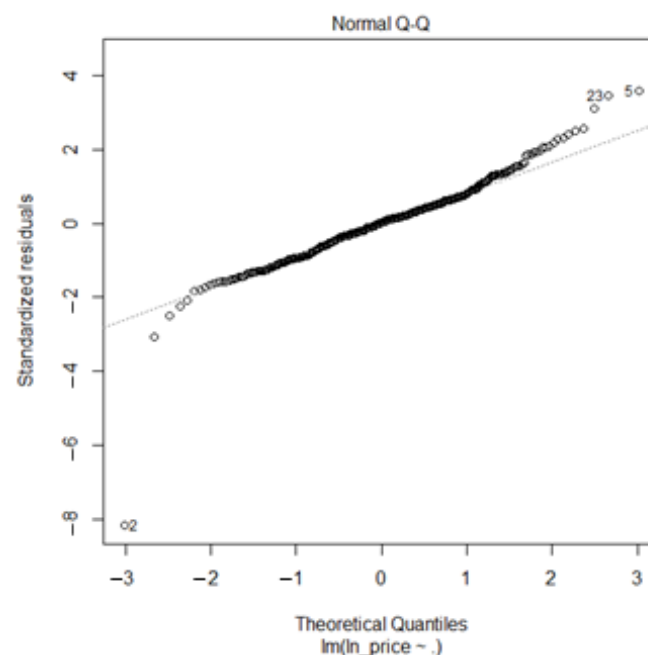

Figure 6. Q–Q plot for the fitted model, showing some small outlier values in the 5th and 23rd datapoints.

Table 5. Variables, units of measurement and description of variables in the dataset.

Variable	Unit of Measurement	Description of Variable
Price of double room	Discrete numeric (RON, Romanian Lei)	Average price for a double room
Ln of price of double room		Natural logarithm of the average price for a double room
Sustainability badge	1 or 0 (dummy)	Badge awarded by Booking.com for self-reported sustainable practices
Number of reviews	Discrete numeric	The number of reviews that the accommodation unit has at the time of data collection
Luxury branding	1 or 0 (dummy)	1 if the lodging unit received 4 or 5 stars.
Private host	1 or 0 (dummy)	1 for private host; 0 for company
Number of rooms	Continuous numeric	The number of rooms in the lodging unit
Restaurant	1 or 0 (dummy)	1 if the lodging unit has a restaurant
Flatscreen TV in room	1 or 0 (dummy)	1 if the room comes equipped with a flatscreen TV

Table 5. *Cont.*

Variable	Unit of Measurement	Description of Variable
Sauna	1 or 0 (dummy)	1 if the lodging unit has a sauna available
Spa	1 or 0 (dummy)	1 if the lodging unit has a spa available.
Room service	1 or 0 (dummy)	1 if the lodging unit has room service available
Bar	1 or 0 (dummy)	1 if the hotel is equipped with a functioning bar
Pool	1 or 0 (dummy)	1 if the hotel is equipped with a pool
Total amenities	Discrete numeric	The number of amenities reported on the Booking.com website
Free parking	1 or 0 (dummy)	The host provides free parking spaces to tourists
Air conditioning	1 or 0 (dummy)	Rooms come equipped with air conditioning
Wi-Fi availability	1 or 0 (dummy)	Internet is available either in shared spaces or in the room
Review score	Continuous numeric	The review score as reported by Booking.com
Lodging type	1 or 0 (dummy)	1 for B & B; 0 otherwise.
Population density	1 or 0 (dummy)	1 if population density is below 6053 in the 1 km square in which the accommodation unit is located; 0 otherwise

3. Results

The descriptive statistics (Table 6) suggest that a large number of the sampled hotel rooms (*n* = 398) in Brașov County come equipped with flatscreen TVs, provide free Wi-Fi access and parking and are located in areas that tend to have lower population densities. Even if the population density suggests that the lodging units are located in rural or periurban areas, they provide some luxuries that used to be reserved for higher classification ratings, which, in themselves, make up only 20.09% of the dataset.

Table 6. Descriptive statistics.

Variable	Expected Sign	Min	Max	Median	Mean or %
Price of double room	Dependent	89	992	480	403.2
Ln of price of double room	Dependent	4.48	6.89	6.17	5.99
Sustainability badge	+	0	1	/	21.2%
Number of reviews	−	0	4521	311	390.56
Luxury branding	+	0	1	/	20.09%
Private host	−	0	1	/	18.92%
Room number	+	2	261	11	26.17
Restaurant	+	0	1	/	32.04%
Flatscreen TV in room	+	0	1	/	80.35%
Spa	+	0	1	/	8.54%
Sauna	+	0	1	/	19.38%
Room service	+	0	1	/	22.44%
Bar	+	0	1	/	29.06%
Pool	+	0	1	/	8.92%
Total amenities	+	4	157	54	56.32
Free parking	+	0	1	/	79.5%
Air conditioning	+	0	1	/	45.9%
Wi-Fi availability	−/+	0	1	/	89.3%
Review score	+	5.9	10	9	8.92
Lodging type	+	0	1	/	39.4%
Population density	−/+	0	1	/	76.9%

Providing free parking seems not to be an issue for lodging unit owners, as they seem to be able to accommodate this request.

A relatively low number of lodging units provide spa, pool and sauna services, which can be an advantage for entrepreneurs looking for their business to stand out from the crowd. Another variable of interest is the sustainability badge, as only 21.2% of the sampled lodging units had reported that they implemented sustainable best practices into their organisation. It should also be noted that this descriptor is not necessarily a suitable proxy for actual sustainability, as it is self-reported and can actually be evidence of greenwashing [86]. In this context, greenwashing is the inclusion of environmental concerns

in the marketing approach of an organisation by claiming that there is an ongoing effort to reduce the environmental impact, pollution, carbon footprint or other such indicators inherent to the economic activity practiced. In addition, social responsibility or, precisely, its mimicking can sometimes be integrated into this framework.

Instead, consumers might be interested in ecolabels issued by external agencies, which would guarantee the actual interest of entrepreneurs towards sustainable practices, in addition to providing a viable marketing tool to businesspeople [87].

The regression model is described in Table 7.

Table 7. Estimated regression and RON and EUR values.

Variable	Coefficient	Sig.	RON Value	EUR Value
Sustainability badge	+0.093	***	37.49	7.62
Number of reviews	−0.002	*	−0.80	0.16
Luxury branding	+0.178	***	71.76	14.58
Private host	−0.087		−35.07	7.12
Room number	+0.187	**	75.39	15.32
Restaurant	+0.217	***	87.49	17.77
Flatscreen TV in room	+0.060		24.19	4.91
Spa	+0.325	**	131.04	26.62
Sauna	+0.182	**	73.38	14.91
Room service	+0.031		12.49	2.54
Bar	+0.089		35.88	7.29
Pool	+0.152	***	61.28	12.45
Total amenities	+0.125	***	50.4	10.24
Free parking	+0.008		3.22	0.65
Air conditioning	+0.090	*	36.28	7.37
Wi-Fi availability	−0.004		−1.61	0.33
Review score	+0.091	***	36.69	7.45
Lodging type	−0.084		−33.86	6.88
Population density	+0.110	**	44.35	7.37
Adjusted R^2 = 0.538				

The adjusted R^2 for the fitted model is 0.538. We interpret this value as acceptable in the social sciences, as human behaviour is generally difficult to accurately predict with parsimonious models. In this case, 53.8% of the variance in the dependent variable is explained by the independent variables. The asterisks in the sig. column represent *p* values reported in the regression model: "***" corresponds to a *p* value of ≤ 0.001, "**" to ≤ 0.01, "*" to ≤ 0.05. No asterisk denote a lack of statistical significance.

Following the model in the literature [51], we calculated RON and EUR correspondents to the regression coefficients. The most important factor for prices in Brașov County according to the model is the addition of spa services, which is associated with an increase in price of RON 131.04, followed by the availability of a restaurant, which corresponds to a price increase of RON 87.49, suggesting that tourists are willing to pay for integrated service packs, including food, relaxation and recreation activities. This is corroborated by the coefficient for saunas and pools, corresponding price increases of RON 73.38 and 61.28, respectively.

The total number of amenities and services advertised on Booking.com is a significant factor determining price in the Brașov area. This includes hotel amenities, room features, wellness attributes, languages spoken, etc. We posit that this relationship is caused by the level of attention to detail needed to fill out the forms detailing the property and that managers that are more hands-on in their approach to marketing would be most prone to receiving higher room prices.

Based on our distinct definition of rural spaces, i.e., spaces with lower population densities than urban areas, the sampled data suggest that accommodation prices are higher in the rural areas of Brașov. This can be explained by the existence of ski resorts, such as Poiana Brașov or of heritage historical sites, such as those found in Brad, Viscri or Prejmer.

The presence of the sustainability badge increased the lodging unit price by an average of RON 37.49. Whereas this shows that it does not necessarily have a large impact on the dependent variable, this change is nevertheless statistically significant.

The review score is highly significant in this model; a one-point increase in the review score (e.g., from eight to nine) is associated with an increase in price of RON 36.69.

Air conditioning seems to not matter as much with respect to the price of rooms, even if the availability of this service is still relatively limited, as fewer than a half of all rooms are equipped with AC units. Compared with flatscreen TVs, which are almost ubiquitous in the sample, it seems that providing this amenity would still improve the price of the room. Possible solutions to this are to charge an extra fee for the use of air conditioning or to utilise ecological solutions for cooling and heating by means of technological advancements [88].

The professionalisation of the host, as accounted by the private host independent variable, is not statistically significant in the model, suggesting that there is an informational symmetry in the market and that private hosts price their tourist offerings just as well as professional managers. The implications for this are varied and will be highlighted in Section 4.

Free parking also seems not to have a significant effect on prices, possibly indicating that street parking is free in the area around the lodging units and that managers do not have to invest in parking lots or other such amenities, which would, in turn, increase costs.

As such, we can examine our proposed hypotheses and conclude the following:

H1. *The hypothesis that the most significant drivers of hotel room prices are high-end features (luxury branding, sauna, spa, pool, air conditioning, flatscreen TV, room service) is partially true, extending only to the luxury branding, sauna, spa and pool amenities. Descriptive statistics indicate that most lodging units, including those belonging to the lower classification, tend to provide flatscreen TVs. Room service is not a statistically significant driver of hotel prices.*

H2. *We can accept the hypothesis that lower population density, which is associated with rural areas, is a significant factor influencing hotel prices. On average, prices in what we consider to be rural areas are higher than those in urban areas by RON 44.35, holding all other factors constant.*

H3. *We can accept the hypothesis that a more detailed description of amenities is positively associated with higher prices. In our study, we recoded this variable as a dummy, considering the upper quartile of the dataset in terms of the number of amenities advertised as a threshold. In this case, the upper quartile in terms of the number of amenities reported a higher price by RON 50.4.*

H4. *We also accept the hypothesis that the sustainability badge positively impacts tourism prices, by an average of RON 37.49. This result should be viewed in contrast with previous literature reports, which refer to sustainable tourism certification as not having a statistically significant effect on prices. This could be due to changes in managerial decisions between the studied intervals (2019 and 2022 in the present study) or between geographical areas studied (Tenerife and Central Romania) [66].*

4. Discussion

Rural development, in part through the growth of rural tourism, is an important factor defining the economic progress of the regional economy. Rural tourism and tourism in rural areas generate revenues for both the local community and the local and central government, providing economic benefits that would be difficult to achieve in other ways or that would imply other risks, such as pollution and destruction of heritage.

Brașov County is an important node in the touristic cycle of Romania, as it alone attracted roughly 10% of the total touristic arrivals in 2021. We consider that this research paper alleviates the gap in the literature regarding the hotel and accommodation industry of this region and that it also opens up new avenues for further research, both with respect to the application of more advanced spatial techniques and by analysing other areas in Romania or in central and eastern Europe in general. In this respect, other areas of possible interest for research are Maramureș and Caraș-Severin or even the entire country

if the research is limited to studying agritourism, ecotourism or other forms of so-called "adjectival tourism".

The main findings of our research are that luxury services are important drivers of price in the Brașov area, whereas the placement of accommodation units in areas with lower population density tends to have a positive effect on price.

A salient feature of our research paper, in contrast to the cited literature, is that marketing of hotel or accommodation units as sustainable does have a significant effect on prices. However, a difference in our case is that we studied a self-reported feature, whereas previous works studied an externally assigned sustainable tourism certification (EMAS). As such, a possible confounder for this result is a tendency to practice greenwashing, as described in the research results. This is also a sign that tourists are willing to pay in order to alleviate the economic, environmental and social impact of their touristic activities, as we suspect that our result is a market reaction to the demand of tourists for such measures. Overall, ecological branding has also been shown to have inconsistent results between destinations; as such, we expect different findings for different geographical areas [89].

Previous studies also reported inconsistent results regarding the importance of features such as wellness/spa areas or pools with respect to the pricing of accommodation units. We found significant evidence that these amenities are drivers of prices in the hospitality industry of the Brașov area. It should be noted that geographical and climate differences between the studied areas can account for these differences, as can the investigated time periods.

Our findings are consistent with previous research endeavours reporting that higher accommodation unit online review scores are associated with higher prices [68]. This is of significant interest for entrepreneurs should represent incentive for them to offer higher quality services that can garner higher ratings. In this case, online review aggregators and online travel agencies should pay significant attention to astroturfing, which consists of systematically leaving fake reviews that inflate (or, alternatively, lower) the review score of the targeted product [90].

As such, a great opportunity for investment is the revival of depopulated villages, as foreshadowed in the Introduction in our discussion of demographic trends. Therefore, the rural heritage characteristics of such villages could be preserved in a manner compatible with further development and economic value to be extracted from places that are for all intents or purposes abandoned or in the process of being abandoned. Furthermore, citizens living in the rural areas of Brașov should be even more incentivised to start up small businesses in the tourism and restaurant field, and travel agencies should also promote rural tourism, especially in from perspective of incoming tourism.

A limitation of this study is the method of data collection, which is time-consuming, as using the Polite package and Polite data scraping, in general, imply long waiting times between fetch requests; the use of Rselenium scripts also contributes to this, as some time is necessary to allow the web content to load.

However, the advantage of using market data far outweighs the difficulties inherent to writing the script and waiting for it to execute. Further refinement, such as by utilising asynchronous requests, could mitigate this issue, as would utilising a second environment for data collection. In this case, due diligence is needed in order to account for ethical considerations in the data collection process so as not to hamper the normal functionality of the website.

In the same vein, a longer period devoted to data scraping could also be beneficial, as it would account for seasonality and could reduce the uncertainty associated with data collection about future transactions that might be subject to change. In this case, the script should run at regular intervals and form several databases, which would need to be merged. This can become problematic due to the complexity of the dataset and due to changes in pricing for the same sampled date between data collection sessions.

Other limitations of this study are the use of only two data aggregating websites for the purpose of data collection—in this case, Booking.com and Tripadvisor.com. It may be of interest to analyse the differences between several platforms, both regarding price and

the approach that the accommodation units take to manage their online presence, such as the number of photos available, the total number and the structure of advertised amenities, the lodging unit description, etc. Tripadvisor is a platform that allows for links to those websites to be easily accessible, and local and regional websites can also be tracked down by researchers.

The proposed model can also possibly benefit from the inclusion of more independent variables, both qualitative and quantitative, in addition to the application of model selection algorithms. The lack of spatial features and variables related to the overall attractiveness of the touristic destination in which the studied lodging units are located is another limitation that can be addressed in future research.

The usage of hedonic price regression analysis proved to be a deeply insightful way to understand the pricing component of accommodation units located in the Brașov County area, with positive future prospects for the application of an even more fine-tuned methodology in different areas or on the same dataset.

5. Conclusions

In conclusion, analysis of pricing in the context of the hospitality industry continues to be an area of interest for research, especially in the context of the use of the hedonic pricing model. The widespread availability of data regarding prices and the factors that can influence them is one of the greatest strengths of this research model, especially in the context of easily deployable and automatized data collection procedures.

We recommend that future approaches and studies in this research area should include, where appropriate, other factors and methodologies, such as qualitative, psychometric data derived from social media, as well as other factors related to geographical or lodging-unit-based features or market-related values, acting as independent variables [91]. Another set of factors that influences prices in the hospitality industry is autocorrelative in nature, both temporal (seasonality) and spatial (clustering, spatial autocorrelation). The inclusion of those types of variables can benefit from a lengthier data collection procedure, possibly extending over several months or even years, in order to compile a database with a sufficient amount of observations. However, even if time constraints are not an issue, a major limitation to such a lengthy data collection process is missing data points, owing to the limited availability of hotel rooms during peak season, as well as changes in prices between different data collection times for the same studied time period (e.g., lodging units might offer early booking, last-minute or other types of offers that affect prices or might change prices based on their perceived market demand).

The use of structural equation modelling may be a more powerful approach, given the complexity of such a dataset, the interactions between independent variables and the possible violation of the regression model assumptions. Alternatively, network-based approaches to modelling can also be applied, as they are compatible with and can augment SEM by either modelling the directed relationship graphs between residuals of the structural equation or between the latent variables of the aforementioned model. However, it should be noted that the explanatory performance of such a model can possibly suffer from overfitting or that it can become quite difficult to transpose from its graphical and mathematical representation to natural language. On the other hand, strict network-based approaches might not be fully compatible with this type of research, as they tend to be based on partial correlation between all variables, whereas the studied topic implies the existence of one dependent variable, which is price, and one or more independent variables.

Other recommendations derived from our work are directed to other potential beneficiaries, such as the local or central government, the hospitality industry or the general public. Whereas the present study uncovered some significant findings regarding the determinants of accommodation industry pricing, these results should not necessarily be generalized to other areas. Instead, we propose that our results should be compared with the current and future literature, also taking into consideration other qualitative or quantitative factors that were not included, such as tourism destination image, economic

development, share of international tourists and the countries where those tourists originate from, government intervention in the form of hotel vouchers, etc. Furthermore, those variables are, in and of themselves, factors that motivate the continuation of research in this field, both from a geographical and a methodological perspective.

In the case of the local hospitality industry, we consider that investments in the features that are associated with higher room prices, such as spas, saunas and pools, should be made only after undertaking a cost–benefit analysis. Future results might vary from those reported in this research paper, as consumer perceptions and preferences might change, and other factors might become more important.

Ecological brand image seems to play a role in the pricing of accommodation units. As such, implementing measures that are sustainable in nature can provide a double benefit by allowing for a slight increase in price for available rooms while also reducing costs (e.g., asking guests to leave towels that need to be washed on the floor instead of cleaning towels in bulk or switching to alternative ways of heating or obtaining electricity, such as solar panels and heating pumps). Again, we stress the fact that some additional oversight on behalf of regulating authorities, both in the case of the sustainability badge and the inclusion of outside certification, as salient and visible marketing elements in the search window of online booking websites, can further cement the marketing orientation of accommodation units that have incorporated sustainable practices into their projected image and day-to-day operations.

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