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Transport Mode Choice by Tourists Transferring from a Peripheral High-Speed Rail Station to Their Destinations: Empirical Evidence from Costa Daurada

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Abstract: This article analyses the factors that determine the mode of transport (bus, taxi or private car) chosen by tourists for transfers from a peripherally located high-speed rail station to their final destination. The study is based on a survey completed by tourists who used high-speed rail services to travel to the Costa Daurada, a tourism area on the Mediterranean coast of Southern Catalonia, Spain. The results of this study show that variables associated with the characteristics of the stay had a more decisive influence upon the decisions made by the travellers than the socio-demographic profiles of the tourists surveyed. The availability of direct public transport services for transfers from the station to the final destinations was a much more relevant factor than the cost and duration of the resulting trip. This study provides empirical evidence of the importance of accessibility for peripheral stations. In these cases, good connections via public transport apparently play a key role in both improving tourism development and promoting more sustainable mobility within the region.

Keywords: high-speed rail; peripheral railway station; tourism mobility; public transport; Costa Daurada

1. Introduction

Over the past two decades, Europe has seen an important extension of its high-speed rail (HSR) network. In 2018, Europe had a network of over 9000 km of HSR track in service and almost a further 1700 km under construction. The number of passengers carried has also grown significantly in recent years. In 1990, a total of 15,000 million passenger-kilometres were travelled by HSR passengers in Europe (pkm is the ratio obtained by combining the number of HSR passengers per annum with the lengths of their trips). By 2016, this number had risen to 124,000 million [1]. Within this context, Spain is the European state that has opted for the most expansive HSR policy and is second only to China in terms of the total number of kilometres of HSR track in service, and the first in terms of kilometres of HSR per inhabitant. In contrast, the ratio of travellers per kilometre in Spain is lower than in other European states. The social profitability and territorial logic of the radial structure of its HSR network have been widely questioned [2,3]. Within this context, several studies have examined the influence of the extension of Spain's HSR network on the development of its tourism activity (see Delaplace et al. [4] and Gutiérrez & Ortuño [5] for a review). Even so, this literature still remains rather limited and is particularly lacking in ex post studies that allow us to calibrate the real impact of this process. The results currently available are highly varied and therefore this subject continues to cause controversy. By way of an example, Albalate [6] used data on the volume of overnight stays in Spanish cities served by HSR during the period 1998–2013 to show that the impact of the arrival of HSR on

tourism had been modest, and even non-existent in some cases. In contrast, Chen and Hayes [7], using data for the period 1999–2010, showed that Chinese cities connected by HSR experienced 20% to 25% greater growth in the volume of international tourists that they received than similar cities that were not connected to the HSR network. In short, the existing literature contains significantly different results that may reflect the varied situation that could be found in different territorial contexts [8,9].

One of the particularities of the Spanish HSR network is the existence of stations located on urban peripheries, with a total of 9 stations located at distances of between 5 and 19 km from the main urban centres to which they provide services. This type of station is commonly found in association with small and medium-sized cities within the national HSR network. They have made it possible to connect these territories to the HSR network without increasing the journey time required to access the urban centre [10]. After France (with 16), Spain is the European state with the greatest number of peripherally located HSR stations (hereinafter "peripheral stations") [11]. In the rest of the Europe, the most habitual practice has been to introduce new HSR services at traditional centrally located stations [12]. The literature which has studied the implications that derive from the construction of this type of station coincides in stressing the fact that accessibility remains the main obstacle to be overcome [13–15]. The location of HSR stations outside the main urban centres implies that these peripheral stations are not served by the dense public transport networks which tend to connect central railway stations to their respective cities and surroundings [16]. This increases the time required to access peripheral stations and also considerably limits intermodality. In fact, existing studies show a preference for the use of private vehicles to access these stations. In contrast, public transport and walking are more habitual choices when accessing centrally located stations [5,17].

The accessibility of the station is a topic of interest in studies of both transportation and sustainable mobility. It has a direct influence on the total travel time [18] and also on the comfort [19], satisfaction [20,21] and competitiveness of rail travel as opposed to use of private vehicles [22,23]. The construction of peripheral stations also poses important challenges for local planners. These include planning the area around the station, organising accesses, and the need to review models of urban and regional mobility; indeed, the latter have had to be reconfigured as a result of the new, strategic territorial centralities generated by this infrastructure [24–26].

From the point of view of tourism management and the promotion of sustainable transportation, appropriately integrating HSR stations into regional transport networks is an important consideration. Indeed, the introduction of HSR services has provided many destinations with a new mode of transport that has reinforced their connectivity and capacity to attract new visitors and/or to increase the number of repeat visits that they receive. Even so, it should be underlined that the potentially positive aspects largely depend on accessibility and the ease of getting from the station to the final destination; indeed, access to the station has an important influence upon the whole trip [18]. On the other hand, the promotion of more sustainable and less car-dependent tourist mobility at the destination requires adequate connections between HSR stations and the main tourism hot spots. To the best of the authors' knowledge, no previously published studies have analysed the role of accessibility to railway stations in the context of tourism or, as a consequence, the specific case of accessibility associated with peripheral stations.

Taking this context into account, the main objective of this paper was to analyse the factors that determine the choice of mode of transport made by tourists when transferring from a peripheral HSR station to their final destination. The scope of the research was defined with relation to two fundamental, evidence-based premises which stem from previous literature. The first was that access to a peripheral railway station is a critical variable in the choice of this mode of transport. In contrast with central stations, the impact on total travel time and the limited options for transfers from such stations mean that this accessibility needs to be planned in advance. Secondly, HSR passengers travelling as tourists tend to exhibit a number of specific characteristics that differentiate them from habitual HSR passengers (such as commuters or those whose mobility is associated with professional needs). Most importantly, in this second case, the choice of the trip format and mode of transport is not subject to

the restrictions placed upon habitual HSR users. As a result, if the service provided is not deemed satisfactory, tourist travellers will probably look for alternative means of transport or may even choose a different tourist destination.

This study was based on a survey of tourists visiting the Costa Daurada (a mature coastal destination in Southern Catalonia), who arrived at the Camp de Tarragona HSR station. The survey was conducted in the summer of 2014. The station is on the Madrid–Barcelona–French border HSR line. Camp de Tarragona is a peripheral station located more than 15 km from the nearest major cities in the area (Tarragona and Reus) and over 20 km from the main coastal tourist destinations. It was there that we carried out the current study, which incorporates an econometric analysis, with the aim of analysing the influence of different variables (the profiles of the tourists and their stays) and the characteristics of the transfers made from the station to the final destinations (time, cost, and the possibility of using a direct route) on the choice of the mode of transport used to cover the trajectory. This highlighted the profiles of the types of passenger who were most inclined to use private vehicles or public transport and which trip characteristics were most likely to determine changes in the mode of transport used when travelling from the station.

After the introduction, the second section of the article introduces the study area. The third section explains how the data were obtained. The fourth section presents the descriptive statistics. The fifth section explains and justifies the specifications of the econometric model. The results obtained from the model are then presented and discussed in the sixth section. Finally, we present our concluding remarks in the seventh section.

2. Study Area

The Costa Daurada (Figure 1) is one of the most important tourism areas in Catalonia. This area is well-connected with both Spain's Mediterranean territories and the central part of the country via toll motorways and also has good air transport connections. The HSR station came into service in December 2006 and forms part of the HSR line which connects Madrid and Barcelona to the French border. Camp de Tarragona is a peripheral HSR station, located 20 km from the main touristic municipalities on the Costa Daurada, only has a limited offer of public transport and this is a handicap in terms of accessibility [27]. Despite this, in 2014, Camp de Tarragona station received over 750,000 travellers, making this the eighth busiest station in Spain in terms of passengers using the HSR network. The annual distribution of passengers who use this station shows a marked increase during summer months. This contrasts with the flow patterns observed at the majority of Spain's HSR stations. It is a direct consequence of the Costa Daurada being an important destination for summer tourism.

When the survey was conducted, in 2014, the Costa Daurada received more than 4.5 million tourists staying in regulated accommodation, 57% of whom were Spaniards. Of the Spanish tourists, 75% arrived by private car, 9% by train, 8% by bus, 7% by plane and 1% by other modes of transport [28]. Of the Spanish tourists who arrived by train, 45% used HSR and this use has continuously grown since 2006.

As with other peripheral HSR stations in Spain and France [10,15,25], the main challenge is the accessibility [29]. As in the case of other peripheral stations, one possible solution has been to provide direct bus services between the HSR station and the main tourist destinations in the surrounding area. However, in this case, the sprawling, polycentric, regional settlement structure has made it difficult to provide adequate public transport services. The dispersion of the demand makes it impossible to connect many of the urban settlements of the region with the HSR station by means of direct public transportation.

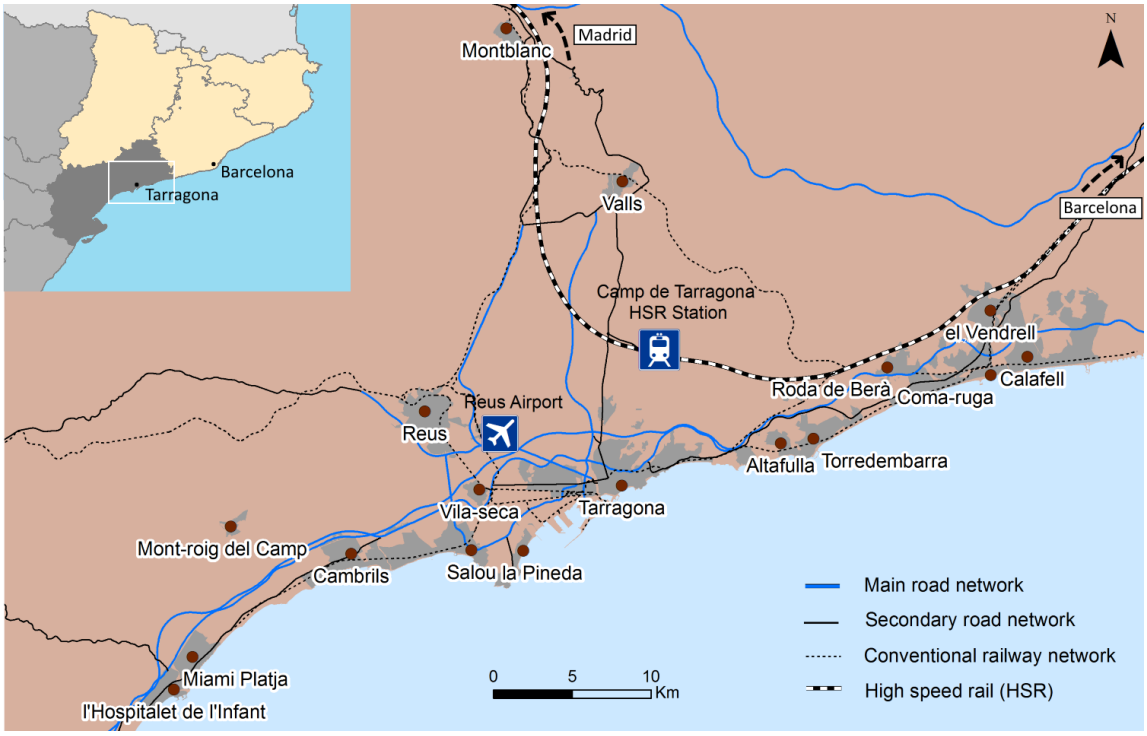

Figure 1. Study area. Source: Authors' elaboration.

3. Data

3.1. Traveller Survey

The study data were obtained from a survey of travellers using the Camp de Tarragona HSR station who were interviewed in the passenger boarding area while waiting to board trains. It was carried out between 13th July and 24th August 2014. In total 1225 surveys were completed. Based on passenger numbers facilitated by RENFE. A total of 556 travellers (45.4% of the total) were Spanish tourists returning to their respective places of origin having spent their holidays on the Costa Daurada. The survey included a wide range of socio-demographic questions and also questions about the characteristics of their trips and stays. The latter asked about the type of transfer from the station to the final destination on the Costa Daurada. The three most common replies (from 545 of the tourists surveyed: 98%) were: by private vehicle belonging to friends or relatives, by taxi, and by regular bus service. The data used in this study were therefore based on the answers provided by these 545 tourists plus those relating to the transfer distance, time and cost of the trips from the station to the final destinations. This survey had previously been used for other studies measuring the influence of the station on destination choice [30], and also segmenting this influence between first-time and repeat tourists [31] and according to the different points of origin of the passengers [32].

3.2. Transfer from the Station

As well as the characteristics of the traveller and the stay, the choice of the mode of transport chosen to make the transfer from the HSR station to the destination was also influenced by the characteristics of the trip to be made. As a result, the variables that had to be taken into consideration were the duration of the trip from the HSR station, the perceived monetary cost, and the existence, or absence, of a direct trajectory without the need for transfers. These three factors had different values for each mode of transport and depended on the final destination where each tourist was staying. In the survey conducted with tourists arriving by HSR, 81% of respondents reported staying at 16 different destinations. The three municipalities in the central part of the Costa Daurada (i.e., Cambrils, Salou and La Pineda–Vila-seca) and the city of Tarragona were the main destinations involved, respectively

receiving 51% and 15%, respectively. Another 12 destinations received a further 15% (Altafulla, Calafell, Coma-ruga, Creixell, Miami Platja, Montblanc, Mont-roig del Camp, Reus, Roda de Berà, Sant Jaume dels Domenys, Torredembarra, and l'Hospitalet de l'Infant). The rest of those surveyed (19%) stated that they had travelled to "the rest of the province of Tarragona" (a closed reply used to group together the less popular options). In order to include these observations in the model and avoid any potential sample selection bias, this final group was allocated to another specifically selected location. This was done by applying a gravitational model limited to the urban settlements which, according to data obtained from the Catalan Institute of Statistics, have the greatest volume of floating or seasonal population associated with tourism. This implied the exclusion of places that did not have the capacity to attract overnight stays, which eliminated any potential noise that could have been caused by the overrepresentation of places without a tourism profile. Besides, the destinations which were reported by the respondents and thus, which not belonged to the category "rest of the province of Tarragona" were also excluded from the calculation.

Once our 17 reference points had been identified, we calculated the values attributable to the three variables related to the transfer from the HSR station (i.e., duration of trip, travel cost, and availability of a direct trip without the need for transfers) and to each of the three possible modes of transport (private vehicle, taxi and bus). The construction of these variables was based on a number of different procedures. The data relating to the trip time using a private vehicle or taxi were taken from the route planner search engine on the Via Michelin web page (https://www.viamichelin.com/). In the case of public transport, we used the results provided by "Mou-te", the official public transport route search engine of the Government of Catalonia (https://mou-te.gencat.cat). Waiting time, which was not applicable in the case of private vehicles, had to be taken into account for taxi trips and, above all, bus journeys. Field work conducted at Camp de Tarragona station has shown that waiting times for taxis tend to be quite short (averaging less than 3 min). This time was then added to that required for the taxi trip. Waiting times for buses depended on their timetables and on any possible transfers required to reach the final destinations. The waiting time was calculated supposing traveller arrival at the station at noon (12.00 pm). For the majority of trips, the waiting time was around 10 min. This was added to the time taken for the bus trip. Certain other suppositions were also made when calculating the travel cost. In the case of using private vehicles, the cost of petrol and road tolls on both the outward and return trips also had to be taken into consideration. These were also calculated using the Via Michelin web site (https://www.viamichelin.com/) route planner. Other travellers had to be picked up by friends or family in order to be taken to and from the station. This justified attributing the resulting cost to the driver of the vehicle used. As a result, the cost of both trips (going and returning) was computed. In this case, only the direct costs of these trips (in terms of petrol and tolls) were included, but not the indirect ones (such as the wear and tear on the vehicle, its maintenance, insurance and parking expenses). This was done because drivers tend to underestimate the costs associated with the use of private vehicles [33]. In the case of taxi trips, we asked the taxi drivers operating at the Camp de Tarragona station about their fares. In the case of public transport, the cost of a single ticket for each destination was applied; in that of transfers, the trips were direct when using private vehicles or taxis. On the other hand, in the case of bus trips, users had to make transfers on some trips, and this increased their negative perception [34]. Table 1 lists the descriptive statistics for time, travel cost and the availability of direct trips for the entire sample. The statistical values were computed with the assumption that each visitor surveyed had three options to reach his destination (i.e., private vehicle, public transport and taxi); thus, each visitor has a travel time, a travel cost and an indicator variable for direct trips to his destination for each transfer option, regardless of his ultimate choice. This assures comparability between of modes, since all destinations are equally represented for each mode of transport.

Table 1. Time, cost and availability of direct trips for journeys from the HSR station to the destinations according to the mode of transport employed (for the whole sample).

		Mean	St. Dev.	Min	Max
Time duration (minutes)	Private vehicle	29.0	10.0	14.0	46.0
	Bus	100.6	45.9	37.0	193.0
	Taxi	32.0	10.0	17.0	49.0
Travel cost (€)	Private vehicle	8.5	5.9	3.1	19.7
	Bus	5.9	2.2	2.0	9.3
	Taxi	49.7	21.2	25.5	88.4
Direct trips [1]	Private vehicle	1.0	0.0	1.0	1.0
	Bus	0.7	0.5	0.0	1.0
	Taxi	1.0	0.0	1.0	1.0

[1] Indicator variable; its value equals 1 if the trip is direct, and 0 otherwise.

4. Descriptive Statistics

Table 2 presents the descriptive statistics for the variables relating to the characteristics of the travellers who used the HSR station. These variables include the mode of transport that they used to make their transfer from the Camp de Tarragona station to their final destination, the point of origin of their journey, their sex, age and education, their type of accommodation, the duration of their stay, whether they had organised their trip through an agency, their final destination, the structure of their travel party, whether they had previously used the station, and whether they had previously visited the study area. The measurements of the different variables relate to the percentages of the people surveyed who gave affirmative responses to each specific question in the questionnaire.

The data in column (1) of the table refer to the whole of the sample. Here, 66% of the tourists questioned travelled to their destinations by private vehicle, as they were picked up from the station; 18% chose to travel by taxi; and the remaining 16% travelled by bus. Private transport was therefore the predominant mode of transport chosen for the trips made from this station. The most frequent point of origin of the tourists who were surveyed was the Community of Madrid. Among those who arrived by HSR, there was a greater number of women than men. Those with university studies outnumbered the ones who cited other levels of studies. The most populous age group was that including tourists aged from 26 to 40 years old (both inclusive). The most commonly chosen type of accommodation was spending the night at the home of a friend or relative. In this study, 70% of the stays lasted one week or less. The destinations of the tourists were mainly concentrated in the tourism settlements of the central part of the Costa Daurada (i.e., Cambrils, Salou and Vila-seca). The majority of the travellers said that they had organised their trips using their own means. It should also be highlighted that 50% of those surveyed had made the train journey travelling alone. Finally, 58% of the travellers said that they were previous users of the Camp de Tarragona HSR station.

Table 2. Descriptive statistics.

		Whole Sample	Transfer Picked up (car)	Transfer Bus	Transfer Taxi
		(1) Mean N = 545	(2) Mean N = 359	(3) Mean N = 86	(4) Mean N = 100
Transfer-Bus	Transfer: Bus	0.16			
Transfer-Pick up	Transfer: Picked up from the HSR station	0.66			
Transfer-Taxi	Transfer: Taxi	0.18			
Origin-Cat	Origin: Catalonia	0.09	0.11	0.05	0.09
Origin-Aragon	Origin: Aragon	0.21	0.23	0.26	0.13
Origin-BC	Origin: Basque Country, Navarra and La Rioja	0.16	0.11	0.24	0.30
Origin-Mad	Origin: Madrid	0.37	0.42	0.24	0.30
Origin-Rest	Origin: Rest of Spain	0.16	0.14	0.21	0.18
Sex-Male	Sex: Male	0.42	0.42	0.43	0.41
Age-25	Age: 18–25	0.15	0.16	0.20	0.10
Age-40	Age: 26–40	0.38	0.41	0.34	0.33
Age-60	Age: 41–60	0.35	0.33	0.31	0.46
Age-older	Age: >60	0.11	0.10	0.15	0.11
Educ-Primary	Education: Primary education	0.14	0.12	0.19	0.15
Educ-Secondary	Education: Secondary education	0.19	0.14	0.27	0.28
Educ-Tertiary	Education: Tertiary education	0.64	0.70	0.52	0.55
Educ-Unknown	Education: No education reported	0.03	0.04	0.02	0.02
Accom-Hotel	Accommodation: Hotel	0.24	0.06	0.47	0.67
Accom-2resid	Accommodation: Second residence	0.20	0.24	0.17	0.08
Accom-Famfriends	Accommodation: Staying with family or friends	0.42	0.57	0.20	0.05
Accom-Rent	Accommodation: Renting an apartment	0.08	0.06	0.09	0.17
Accom-Other	Accommodation: Other options	0.06	0.07	0.07	0.03
Length-Long	Length of stay: More than a week	0.30	0.32	0.24	0.29
Trav-Agency	Trip contracted through a travel agency	0.12	0.06	0.16	0.30
Dest-CD	Destination: Touristic destinations in the Central Costa Daurada	0.51	0.37	0.71	0.84
Dest-Tarragona	Destination: Tarragona	0.15	0.15	0.21	0.07
Dest-Rest	Destination: Other destinations in Tarragona province	0.34	0.48	0.08	0.09
Who-Alone	Accompanied by: Visiting alone	0.50	0.63	0.37	0.17
Who-Friends	Accompanied by: Friends	0.10	0.06	0.20	0.16
Who-Adultfam	Accompanied by: Adult family members	0.20	0.19	0.21	0.21
Who-Childfam	Accompanied by: Family trip with children	0.20	0.12	0.22	0.46
Rep-Dest&HS	Repeat: Having previously visited the area and used the HSR station	0.58	0.66	0.41	0.44
Rep-Dest	Repeat: Having previously visited the area but not used the HSR station	0.31	0.26	0.44	0.36
Rep-first time	Repeat: First time in the area	0.11	0.08	0.15	0.20

Columns (2), (3) and (4) group together statistics according to the mode of transport chosen for the transfer to the final destination; they respectively relate to travellers who were transported by private vehicle, bus and taxi. The data show that travellers from relatively nearby areas—that is, from the autonomous community of Catalonia—showed a lower than average tendency to use buses. It is also possible to note differences by age band, with bus use being greater amongst the youngest and oldest age groups. The table also reflects the fact that travellers with tertiary level studies were the ones who most used private vehicles for their transfers. With regard to accommodation, the greatest use of the taxi was by tourists staying at hotels and in holiday apartments. In contrast, bus travel was most popular among tourists staying at hotels. Stays for one week or more were associated with a lower than average use of bus transfers. Trips organised through travel agencies seemed to result in a relatively high demand for bus transfers and an even greater use of taxi services. Stays in the central part of the Costa Daurada were associated higher percentages of the use of public transport and, above all, of taxi services. However, in the case of the city of Tarragona, this tendency was only true for the use of bus services. Across the rest of the study area, a higher percentage of travellers tended to use private vehicles for transfers. Finally, the use of private vehicles was greater when tourists travelled alone and when they had previously used the Camp de Tarragona station.

5. Method

Individuals travelling to the Costa Daurada by HSR have to choose the mode of transport that will take them to their final destination. This decision can be modelled as follows:

$$U_i = X_{ij}\beta + u_{ij} \tag{1}$$

Here, U_{ij} refers to the utility that a visitor i obtains from using a mode of transport j. According to this formula, each individual reveals their particular preference when they select the mode of transport that provides them with the greatest expected level of utility, even though the expected level of utility may not be that finally delivered. The expected level of utility depends on X_{ij}, a term which represents a set of covariates that captures the characteristics of the different options, j, that are available to an individual i. β refers to a vector of coefficients, and u_{ij} represents the error term.

The multinomial logit is a well-known econometric specification used to fit models based on a discrete choice of unordered options. However, the multinomial logit does not suitably adapt to situations in which explanatory variables have different values that depend on the possible alternatives. In contrast, the specification of the conditional logit proposed by McFadden [35] allows an unordered, discrete choice among different alternatives which depends on both the characteristics of the options that the individual must choose between and the characteristics of the individual who takes the decision. The probability of an individual i choosing mode of transport j for a transfer from the HSR station to their final destination can therefore be expressed as:

$$P_{ij} = \frac{\exp\left(x_{ij} \propto\right)}{\sum_{k=1}^{J} \exp(x_{ik} \propto)} \tag{2}$$

The estimation of this model implies a fundamental restriction: according to McFadden [35], the disturbance term u_{ij} must be independently and identically distributed with an extreme value distribution. The main drawback of the conditional logit model stems from the previously mentioned requirement, as the independence of irrelevant alternatives assumption means that the choice between two alternatives must be independent from the rest of the alternatives.

However, empirical evidence has tended to limit the impact of not taking this assumption into account. Several authors have compared the results provided by the standard conditional logit with other more sophisticated models in multiple fields of research: locational choice [36], labour market [37] and migration [38], without noticing anything other than exiguous differences between the resulting

coefficients. As a result, some researchers support the view that the violation of the independence of irrelevant alternatives assumption is not sufficient to justify the use of more complex models [38–40]. In fact, Train [41] holds that conditional logit is a suitable estimation strategy when research seeks to discover the average preferences of individuals. Moreover, Christiadi and Cushing [38] argue that the risk of dependence upon irrelevant alternatives should diminish when the number of alternatives is low.

6. Results

The results of the estimations for three versions of the model are presented in Table 3. To begin, model (1) considers the travel cost and time duration linearly; since both presented right-skewed distributions, we estimated two additional models that address the hypothetical non-linear impacts of time and cost. By contrast, model (2) considers the squared values of time and travel cost in addition to their non-exponential values. Last, model (3) introduces the natural logarithmical value of time and travel cost. At the bottom of the table, both the Akaike information criterion (AIC) and the Bayesian information criterion (BIC) highlight that including the quadratic and logarithmical values of time and cost elicited better specifications than those achieved with model (1). Comparing the AIC and BIC in models (2) and (3) revealed that both criteria indicate that introducing the exponential values can provide more accurate results. The independent variables include both those which vary across modes of transport and those which are mode-invariant. Traveller destination has been removed from the model specification, as it captures only part of the impact of the variables whose values vary across the different transport alternatives. In fact, an alternative model (available upon request), which includes the location of the stay, distorts the results attached to the mode-varying variables.

Both models (2) and (3) indicate that the choice of the transport mode to reach the tourist destination from the HSR station is boosted by higher transport fees. Though this result could initially appear as counter-intuitive, it is in fact completely logical as the odds ratio is capturing the underlying tourists' willingness to spend more money to travel with their preferred mode of transport. Some characteristics of the trip could make the private vehicle and the taxi more attractive for the tourists compared to the public transport. Two of them have been included in the model: time and the availability of direct trip.

Concerning the time that it takes tourists to reach their destinations, according to model (1) and as expected, the effect of that time diminishes the odds that a visitor will opt for a certain mode. However, the significance of its impact vanishes in models (2) and (3). That result contrasts the strong positive and significant impact associated with direct trips, which is consistent in all models, even though the magnitude of the impact declines considerably in models (2) and (3). This highlights the fact that travellers feel less comfortable with the inconveniences caused by having to change to another mode of public transport than with the total time required for their trip. As a result, the time spent waiting for transport connections would prove more annoying to travellers than the time they actually spend on board. It is also interesting to note that an alternative specification of the models which does not include the indicator variable "direct trips" yields much higher odds ratios associated to the cost of the trip / results available upon request). It is confirmed thus, that the positive incidence of the cost is accounted for the tourists' willingness to pay to satisfy certain preferences. In this sense, it reinforces that tourists are reluctant to make additional transport changes to reach their destination. Other subjective values traditionally associated with the private vehicle and the taxi (independence, comfortability) could also influence.

Table 3. Conditional logit estimates for choice of the mode of transport.

	Model (1)				**Model (2)**				**Model (3)**			
	Odds Ratio		**St. Errors**		**Odds Ratio**		**St. Errors**		**Odds Ratio**		**St. Errors**	
Travel cost	0.982		(0.01)		1.231		(0.08) ***					
Travel cost^2					0.998		(0) ***					
Time duration	0.990		(0) **		1.037		(0.03)					
Time duration^2					1.000		(0)					
Ln(travel cost)									4.682		(2.25) ***	
Ln(time duration)									0.550		(0.3)	
Direct trip	5.670		(2.8) ***		2.350		(1.12) *		3.815		(1.92) ***	
	Bus vs private vehicle		Taxi vs private vehicle		Bus vs private vehicle		Taxi vs private vehicle		Bus vs private vehicle		Taxi vs private vehicle	
	Odds ratio	St. errors	Odds ratio	St. errors	Odds ratio	St. errors	Odds ratio	St. errors	Odds ratio	St. errors	Odds ratio	St. errors
Intercept	1.220	(1.11)	1.432	(1.24)	0.495	(0.51)	0.014	(0.02) ***	2.068	(2.36)	0.040	(0.05) **
Origin-Cat						Reference category						
Origin-Aragon	4.159	(2.55) **	0.613	(0.37)	3.748	(2.44) **	0.555	(0.35)	3.403	(2.22) *	0.565	(0.34)
Origin-BC	6.418	(4.1) ***	1.612	(0.94)	5.582	(3.77) **	1.276	(0.76)	4.898	(3.35) **	1.582	(0.93)
Origin-Mad	1.761	(1.06)	0.488	(0.27)	1.319	(0.82)	0.385	(0.22) *	1.333	(0.85)	0.471	(0.26)
Origin-Rest	3.863	(2.53) **	0.765	(0.47)	3.220	(2.22) *	0.682	(0.43)	3.171	(2.2) *	0.717	(0.45)
Sex-man	0.835	(0.26)	0.738	(0.23)	0.778	(0.24)	0.750	(0.24)	0.830	(0.26)	0.744	(0.24)
Age-25	1.169	(0.49)	0.779	(0.39)	1.134	(0.48)	0.796	(0.4)	1.169	(0.49)	0.752	(0.38)
Age-40						Reference category						
Age-60	0.768	(0.29)	0.833	(0.32)	0.751	(0.29)	0.764	(0.3)	0.774	(0.3)	0.842	(0.33)
Age-older	2.282	(1.13) *	1.356	(0.78)	2.325	(1.16) *	1.290	(0.76)	2.321	(1.14) *	1.352	(0.77)
Educ-Primary						Reference category						
Educ-Secondary	1.383	(0.71)	2.370	(1.26)	1.156	(0.59)	2.022	(1.09)	1.324	(0.67)	2.381	(1.27)
Educ-Tertiary	0.727	(0.33)	1.405	(0.63)	0.665	(0.29)	1.260	(0.58)	0.758	(0.33)	1.422	(0.63)
Educ-Unknown	0.982	(0.83)	0.840	(0.66)	1.001	(0.86)	0.917	(0.7)	0.900	(0.75)	0.825	(0.64)
Accom-Hotel						Reference category						
Accom-2resid	0.151	(0.08) ***	0.034	(0.02) ***	0.134	(0.07) ***	0.029	(0.02) ***	0.126	(0.06) ***	0.033	(0.02) ***
Accom-Famfriends	0.075	(0.03) ***	0.011	(0.01) ***	0.087	(0.04) ***	0.012	(0.01) ***	0.080	(0.04) ***	0.011	(0.01) ***
Accom-Rent	0.203	(0.11) ***	0.339	(0.18) **	0.167	(0.1) ***	0.279	(0.14) **	0.159	(0.09) ***	0.306	(0.16) **
Accom-Other	0.257	(0.17) **	0.044	(0.03) ***	0.251	(0.17) **	0.051	(0.04) ***	0.258	(0.17) **	0.046	(0.03) ***
Length-Long	0.934	(0.33)	1.674	(0.59)	0.918	(0.32)	1.731	(0.61)	0.902	(0.31)	1.737	(0.61)
Trav-Agency	1.730	(0.83)	1.952	(0.96)	1.862	(1.01)	2.007	(1.16)	1.503	(0.75)	1.986	(0.99)
Who-Alone						Reference category						
Who-Friends	2.437	(1.27) *	4.128	(2.13) ***	2.517	(1.39) *	3.964	(2.22) **	2.399	(1.24) *	4.207	(2.21) ***
Who-Adultfam	0.988	(0.39)	1.999	(0.91)	1.059	(0.43)	2.182	(1.01) *	1.014	(0.4)	2.022	(0.92)
Who-Childfam	1.103	(0.43)	4.016	(1.78) ***	0.987	(0.39)	3.357	(1.51) ***	1.015	(0.4)	3.845	(1.72) ***
Rep-Dest&HS	0.880	(0.29)	2.341	(0.91) **	0.855	(0.29)	2.099	(0.83) *	0.899	(0.29)	2.340	(0.92) **
Rep-Dest						Reference category						
Rep-first time	1.105	(0.61)	1.420	(0.76)	0.971	(0.53)	1.187	(0.63)	1.039	(0.56)	1.359	(0.73)
AIC	722.7451				703.1094				718.3381			
BIC	987.3156				978.4787				982.9086			

Robust standard errors within parenthesis. * Significant at 10%, ** significant at 5%, *** significant at 1%.

The empirical evidence obtained indicates that the type of accommodation arises as the most determining factor of the mode of transport chosen. As expected, when hotel accommodation was the reference category, there was a much greater tendency for travellers staying with family or friends to be picked up from the Camp de Tarragona HSR station than for them to use public bus services or taxis to reach their final destinations. Similar conclusions could also be drawn with respect to second residences and, albeit to a lesser extent, to rented accommodation. These results again reveal the impact of personal connections between the tourists surveyed and those who were already staying, or who lived at the destination. The table also shows that the odds ratios attached to tourists staying at their family's or friends' homes, or second residences, were lower when the taxi was the preferred mode of transport as opposed to the private car, rather than when the bus was chosen, as opposed to the private car. In contrast, they were higher for those using taxis in the case of tourists using rented accommodation. To a certain extent, this probably reflects the heterogeneity of traveller budgets, as the most affordable types of accommodation were linked to the most affordable modes of transport.

Travelling alone is the reference category for the variable relating to the party structure. The ratio that compares the probability of using a taxi service with the probability of using a private vehicle reached 4 when tourists travelled with a friend or relative. The odds ratio for families travelling with children was greater than 3. This suggests that individuals travelling on their own were highly likely to meet a friend or relative once they arrived in the Camp de Tarragona area and that, as a result, they were more likely to be picked up by private car. On the other hand, taxis were more popular when tourists were traveling with friends, as the fare was more likely to be shared. Taxi transfers were also preferred by families who were travelling with children, as this mode provides a greater degree of comfort. When bus transfers were compared to those involving private cars, the only significant category was that of travelling with friends. Evidence related to travelling with adult family members is mixed, since the odds ratio is only significant in model (2). When the public transport is compared to the private vehicle, the only category that yields a significant impact is travelling with friends. On the other hand, no significant impacts arise for the length of the stay, nor whether the holiday has been contracted through a travel agency.

In the cases of the rest of the variables, no significant impacts emerge either for gender or for the level of education; although a higher probability of using the public transport is observed for eldest travellers. With regard to travellers' origin, further distances foster public transport demand, with the only exception of the Madrid area. Model (2) also suggests that travellers arriving from Madrid had a much lower probability of taking a taxi than using a private vehicle. Finally, the likelihood of taking a taxi grew for travellers who had previously used the Camp de Tarragona HSR station. In contrast, no significant differences in the probability ratio derived from travellers making their first visit to this HSR station.

7. Discussion

HSR services are expected to facilitate the global transition to more sustainable transport systems that will reduce road and air transport [42]. In the case of medium-distance trips, in which HSR competes with private car, the door-to-door travel time, comfort and reliability of the whole trip are key factors of which mode is preferred [18] and are especially critical in the case of peripheral rail stations. For one, the total travel time could be significantly increased depending on the availability of efficient services for transfers from stations to final destinations. Moreover, the convenience of entire trips can suffer from the need to use different modes of transport. As a result, previous studies have underscored that the time required to access rail stations could play a more critical role than time spent aboard trains [22]. The case of the Camp de Tarragona HSR station is a clear example of how station-to-station travel time might not be the most important variable for travellers, since the station's isolated location reduces its attractiveness for tourists travelling for leisure to coastal destinations at Costa Daurada. Furthermore, previous studies have demonstrated that this station has gained a moderate capacity to attract tourists who might otherwise use other modes of transport [30–32].

Previous studies, based on ex ante evaluations, have pointed to the determinant role that public transport connections play in structuring the relationship between a peripheral station and the area to which it must provide services [11,15,24,29]. Our work provides new empirical evidence which makes it possible to compare and contrast the key role played by the availability of direct shuttle services running between a peripheral station and various final destinations in a neighbouring tourist area. Not only that, results also pinpoint that visitors are willing to choose more expensive options if they can obtain more pleasant connections from the HSR station.

The results of our study provide empirical evidence of the convenience of incorporating peripheral stations into regional public transport networks. Such findings are more important for the Spanish context, in which HSR and conventional rail networks operate separately from each other [10,14]. Our results also show that such connections are required to maximise the positive impact of the stations for tourism activity. The potential impulse that comes with a rapid, quality connection, such as the introduction of the Spanish HSR network, is limited by the time required for transfers between the station and the final destinations [18]. In this sense, it would also be interesting if the transport operators themselves and the tourism companies operating in the local area could collaborate to facilitate the arrival of tourists via HSR and to improve connections between the HSR station and their destinations, particularly during the high season period.

8. Conclusions

Our study has made it possible to analyse the factors that determine the choice of mode of transport by tourists travelling between a peripheral HSR station and their final destination. The empirical evidence obtained and presented here shows that variables associated with the characteristics of the stay play a more decisive role in decision making than those linked to the socio-demographic profiles of the tourists themselves. In our study, tourists who travelled in large groups were most likely to use a taxi, while those travelling alone tend to use a private car. On the other hand, travellers who stayed at hotels exhibited a greater propensity to use taxis or public transport services. In contrast, those who stayed in their own second residences, or with friends or relatives, showed the greatest tendency to use private vehicles for their transfers. This no doubt happened precisely because these were the people with the readiest access to this mode of transport. All of these indicators point to one really relevant factor: the importance of the availability (or lack thereof) of an efficient way of accessing HSR stations other than using a private vehicle. In fact, the results derived from the model suggest that the availability of a direct bus service was a key variable in the choice of this mode of transport, with this being more important than the travel cost or duration of the trip.

Those findings contribute new evidence about the relationships between peripheral stations and their regional context. Whereas previous studies [11,13–15] focused on the connectivity of stations and their accessibility for local residents, we took a complementary approach to examine transfers from such stations by another target group: tourists vacationing in the region. Several studies have highlighted the growing use of HSR services for tourism and leisure travels in Europe and Asia [5]. Within that context, the study of how to promote more efficient modes of transport for tourists arriving at destinations by means of HSR services should be a topic to be considered in the framework of sustainable transportation policies.

The results of this work open the doors to new lines of research which should be pursued in future studies. It would be particularly interesting to survey travellers arriving via other modes of transport (and particularly those who arrive by private vehicle). It would then be possible to examine to what extent they would use HSR instead if transfers between the railway station and their final destinations were better resolved. It would also be appropriate to replicate this study within other territorial contexts, focusing on both peripheral and central stations, in order to compare and contrast the role of local transport networks in different cases. Finally, it would be pertinent to replicate this work in the same study area but outside the high season period (this study only relates to the summer months). In this region, tourism outside the summer tends to be concentrated in the cities of Tarragona

and Reus, which offer attractions of cultural interest. The city of Tarragona has a direct public transport connection with the HSR station. The results may be significantly different from those observed in the summer. Even so, it is necessary to underline that the majority of tourists who arrive in this region do so in the summer months [28].

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