costs in terms of congestion and the effects of tense traffic conditions such as accidents and stress. In addition, this mobility is continual, steady and extends over longer periods of time (graphically illustrated by two gentle curves) and translates as more presence on the streets and a greater degree of safety in public spaces. It should be noted that the occupational mobility group is smaller. Revealing this more daily and calm form of mobility which has less impact than occupational mobility, is one of the lessons learned from this survey, and offers a whole range of clues as to mobility policies in Catalan cities linked to managing time in the city / territory.

The strong presence of private transport. A significant feature of this survey is that the data reveals the low level use of public transport in the functional areas of the Terres de Ponent. This deficit corresponds to the area of public transport networks and services, which is also related to the population layout of the territory and the lack of larger urban nuclei.

Another question illustrated by this survey is the major importance of non-motorised mobility, even in worker or student itineraries, and a significantly higher use of bicycles than in the rest of Catalonia. Although their numbers are small compared to total mobility figures, they differ significantly from Catalonia as a whole and are a significant feature in the Terres de Ponent. This form of mobility, in numbers a little lower than for the rest of Catalonia, is concentrated but "shorter" on weekdays and implies longer distances on weekends. It is as if the strong presence of non-motorised proximity mobility, evident on weekdays, either walking or using a bicycle, is juxtaposed against longer distance mobility on weekends. We must once again insist on the fact that the lack of an extensive general public transport system in the functional area of the Terres de Ponent, shapes its mobility. Along these lines we would like to cite by way of an example of good mobility practice, the creation of the Consorci del Transport Públic de Lleida (Lleida Public Transport Consortium), set up between the DPTOP of the Generalitat de Catalunya (Catalan Autonomous Government) and the town councils in the Lleida area, which has provided solutions to some of the mobility problems discussed earlier and provides a measure of cohesion in the space/time mobility of the citizens living in and around the city of Lleida. This Consortium is an exemplary instrument for improving public transport mobility in the functional areas of the Terres de Ponent.

1 These figures applicable to 95.8% of the journeys made by those who do not drive as an integral part of their job (i.e. lorry drivers, taxi drivers, public transport drivers, etc.), given that those who do represent 4.2% of the journeys in the Terres de Ponent who make an average of 16.43 journeys per day.

2 This relationship of combining journeys, one of them being returning home from a journey motivated by personal reasons, is a very relevant feature in the comparative relationships between the Regió Metropolitana de Barcelona and the Terres de Ponent, as is explained later on.

DAILY MOBILITY IN ALT PIRINEU I ARAN

Antoni F. Tulla
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Introduction

Alt Pirineu i Aran show some extreme characteristics compared to the other Catalan regions. Covering 5,775.6 km^2, it represents 17.99% of the area of Catalonia, while the population of 69,325 inhabitants of Alt Pirineu i Aran, in 2006, corresponds to only 1.01% of the total for the country. When it comes to the subject of mobility, this situation establishes a strong contrast between a very extensive mountainous region and a population that is dispersed throughout it but at the same time concentrated in small towns and villages along the main valleys and the communication routes that run along them. The volume of weekly journeys (1.8 million), although small in absolute terms, is more than 15% higher than it would be if it corresponded to the region's total population compared to Catalonia as a whole. The situation is the same with the number of journeys per person per week. The average for Catalonia is 22.62 journeys pers./week, while in Alt Pirineu i Aran it rises to 25.45 (23.70/21.64 without mobility professionals), representing 12.5% more.

We therefore find a very extensive territorial area with low population density (12 in./km^2) where settlement is concentrated on the county capitals and larger towns and villages. Of the 77 municipalities in the region, in 2006 only one had more than 10,000 in. (la Seu d'Urgell, 12,533 in.) representing 18.08% of the total, and three had between 5 and 10 thousand inhabitants, containing 28.13% of the population. There are 3 municipalities of 2 to 5 thousand (10.98%), 8 of 1 to 2 thousand (16.73 %) and 10 of 500 to 1,000 in.(11.43 %). These 25 municipalities of more than 500 in., with a total of 59,154 in., together currently represent 85.33% of the total population. The trend towards the concentration of the population has particularly increased since the second half of the 20th century. So, 50 years ago, the 25 municipalities with more than 500 inhabitants in Alt Pirineu i Aran —without the aggregations of the decade 1970-79— represented 50% of the population (Tulla, 1993). In the same way, the 52 municipalities with less than 500 in. currently only concentrate 14.67% of the total population. We can see the distribution on figure 1.

So, in this part of the Pyrenees we find some very large municipalities, as is the case of Tremp (302.8 km^2), and other very small ones, such as la Seu d'Urgell (15.4 km^2). Given this territorial diversity it is difficult to establish comparisons. Considering everything, two general characteristics must be taken into account in these mountainous areas with very closed valleys: (a) regardless of whether the municipal area is very large, almost all the population is concentrated into the main centre, and (b) when the municipality is very small, part of the population of contiguous municipalities is located on the edge of the more populated municipality. These facts corroborate the concentrated structure of the population in the main valleys.

1. Daily mobility in Alt Pirineu i Aran within Catalonia

Mobility in Alt Pirineu i Aran is the highest, in a relative sense, of any of the seven regions of Catalonia, together with Camp de Tarragona, despite the high rate of aging of the population and the fact that the activity rate is one of the lowest in Catalonia. Although the population of Alt Pirineu i Aran represents only 1.01% of Catalonia, it accounts for 1.11% of the daily mobility —1.08% on working days and 1.19% at weekends and on public holidays. This means the percentage of journeys in relation to the total for Catalonia is 9% higher than would correspond to its percentage of the population.

The activity rate in 2001 in Alt Pirineu i Aran was only 55.71%, while in Catalonia it was 58.38%. However, in 2006 the unemployment rate was 8.32% in Catalonia and only 4.44% in Alt Pirineu i Aran. The female activity rate for the same year in Alt Pirineu i Aran was 45.68% and in Catalonia 48.33%. The population aged over 65 in Catalonia in 2005 was 16.57%, while in Alt Pirineu i Aran it rises to 19.49%. The female population aged over 65 in Catalonia in the same year, compared to the entire female population, increases to 19.04% but is still higher in Alt Pirineu i Aran, with 21.98%.

The *percentage of intra-municipal journeys (self-containment)* in Alt Pirineu i Aran (73.5%) is slightly greater than the average for Catalonia (71.3%), both on working days and at weekends/on public holidays (70.4% and 64.2% respectively). This greater self-containment in Alt Pirineu i Aran is explained by the strong concentration of the population into few municipalities, which, in turn, determines lower average times for intra-municipal journeys in Alt Pirineu i Aran compared to the average times for intra-municipal journeys in Catalonia as a whole, both on working days (11.94 and 15 minutes respectively) and at weekends and on public holidays (16.60 and 17.87 minutes). By contrast, the times for inter-municipal

journeys are greater for Alt Pirineu i Aran than for Catalonia (33.58 and 31.53 minutes on working days; and 40.96 and 37.70 minutes at weekends and on public holidays). The reason can be jobs or tourist attractions being further away, as in many cases there are long distances between the small centres and the county capitals.

The *usage structure of means of transport* in Alt Pirineu i Aran is very different to that for Catalonia as a whole:

a. While in Catalonia multi-modal journeys reach 6.2% on working days, in Alt Pirineu i Aran they amount to only 2.4%. At weekends and on public holidays the difference is also maintained, with percentages of 4.4% and 2.4%, respectively.

b. Use of non-motorised means of transport —walking or cycling— is very high in Alt Pirineu i Aran (49.9%), while it is only 45.5% in Catalonia, and 42.7% in the Comarques Gironines. The weekly distribution of motorised transport is more homogeneous in Alt Pirineu i Aran (49.8% working days and 50.5% weekends/holidays) than in Catalonia (45.9% and 43.9% respectively). Bicycle use is slightly higher in Alt Pirineu i Aran (1 %) than in Catalonia (0.9 %).

c. By contrast, public transport use is much lower in Alt Pirineu i Aran (3.8% working days, 1.9% weekends/holidays and 3.4 % for the whole week) than in Catalonia (15.6%, 9.0% and 14.2%, respectively). The Regió Metropolitana de Barcelona (RMB), with the 20.3% on working days and 11.9 % at weekends and on public holidays, is the region with the highest use of public transport as well as for multimodal journeys (7.3% on working days and 4.6% at weekends and on public holidays).

d..Private transport is used in Alt Pirineu i Aran on 46.7% of weekly journeys, while in Catalonia the figure is 40.3 %, only reaching 35.6% in the RMB. The situation on working days is still more extreme —46.4% in Alt Pirineu i Aran, 38.4% in Catalonia and 33.6% in the RMB. By contrast, at weekends and on public holidays behaviour is more similar: 47.6% in Alt Pirineu i Aran, 47.2% in Catalonia and 42.9% in the RMB.

e. The occupation of private vehicles is lower in Alt Pirineu i Aran (1.20 passengers on working days and 1.35 at weekends and on public holidays) than in Catalonia (1.22 and 1.40, respectively).

The features of mobility in Alt Pirineu i Aran described here confirm greater atomisation of routes because of the low population density, but also the lack of an effective public transport system, requiring greater use of private transport. On the other hand, the smaller size of population centres and their concentration in the main valleys facilitates mobility with non-motorised means of transport.

The *reason for journeys* also shows some different features in Alt Pirineu:

a. Occupational mobility is 21.7% for weekly journeys in Alt Pirineu i Aran, while in Catalonia it is 20.1%. However, on working days it is 25.9% and 24.6% and at weekends/on public holidays it is 7.9 % and 4.1 %, respectively, a situation showing greater working activity in Alt Pirineu i Aran at weekends. This situation contrasts to that in the RMB where the 20.1% of weekly journeys for employment reasons rises to 24.7% on working days and falls to 3.7% at weekends and on public holidays.

b. Personal mobility is more homogeneous between working days and weekends/ holidays. In Alt Pirineu i Aran, 33.1% of weekly journeys are for this reason, falling to 29.1% on working days and rising to 46.1% at weekends and on public holidays, basically for leisure/fun, going for a walk, everyday shopping or to visit friends and family. In Catalonia this reason accounts for 34.0% of weekly journeys, falling to 29.9% on working days and rising to 48.7% at weekends and on public holidays. Overall, then, personal mobility is lower than in Catalonia as a whole.

c. Returning home is almost exactly the same. In Alt Pirineu i Aran it represents 45.3% of weekly journeys and in Catalonia 45.9%. The difference is that returns home in Alt Pirineu for occupational reasons are higher (17.6 %) than in Catalonia (16.7 %).

The *time distribution of journeys* is very similar to that in Catalonia as a whole. However, it shows some rural peculiarities, such as a greater concentration in time of leaving work. It must be remembered that the average intra-municipal journey time —the majority type of journey on working days— is lower in Alt Pirineu i Aran (11.9 minutes) than in Catalonia as a whole (15 minutes) and in the RMB (16.3 minutes), and people have lunch at home more often, among other significant features.

Mobility depending on gender and means of transport shows us greater use of non-motorised modes by women in Alt Pirineu both on working days (57.06% of journeys) and at weekends/on public holidays (54.03%), above the Catalan average (50.9% and 44.8%, respectively). The same thing happens with public transport on working days, on which women in Alt Pirineu i Aran make 3.83% of journeys while men make only 3.62%. In Catalonia the figures are 16.3% and 12.2%, respectively. By contrast, the pattern is different at weekends and on public holidays in Alt Pirineu i Aran, when women make only 1.79% of journeys on public transport and men 2.13%. This situation contrasts with that in Catalonia as a whole (9.6% women and 7.3% men). The private vehicle is used more by men in Alt Pirineu, both on working days (54.54 %) and at weekends/on public holidays (52.49 %), than by women (39.10% and 44.19%, respectively). However, it must be noted that women use it more at weekends and on public holidays than on working days. In Catalonia as a whole, by contrast, although men also use it more, the difference is the same both on working days and at weekends/on public holidays.

Reasons for mobility in relation to gender show a similar structure in Alt Pirineu to that in Catalonia as a whole. On working days, Pyrenean women make 20.93% of journeys for employment reasons compared to a figure of 20.6% for Catalonia. Men make 30.43% and 28.7% of journeys, respectively, for occupational mobility reasons. Personal mobility is even more similar; in Alt Pirineu i Aran it accounts for 33.85% of women's journeys and 24.71% of men's. In Catalonia the figures are 33.9% and 25.7%, respectively. It is only different at weekends and on public holidays, when journeys for work in the Pyrenees make up 6.75% of the total for women and 8.87% for men, while in Catalonia the figure falls to 3.5 % and 4.6 %, respectively. This corroborates greater daily mobility for employment reasons at weekends and on public holidays in Alt Pirineu i Aran than in Catalonia as a whole.

Municipal self-containment depending on place of residence. We will first deal with the situation in Alt Pirineu i Aran in relation to the other regions (figure 2) and then the situation in the various counties in the Pyrenean region (figure 3).

On working days, of the seven regions in Catalonia, two (Comarques Centrals with 65.5% and Comarques Gironines with 67%) show the lowest level of self-containment. Two more, the RMB, with 71.7%, and the Camp de Tarragona, with 72.5% stand at around the Catalan average (71.2%). The other three, Alt Pirineu i Aran (73.5%), Ponent (75.4%) and Terres de l'Ebre (77.3%) show the highest level of containment. At weekends and on public holidays, municipal self-containment in Catalonia as a whole falls to 64.2%. By regions, Comarques Centrals (54.9%) and Comarques Gironines (57.3%) continue to show the lowest self-containment. By contrast, Alt Pirineu i Aran (70.4%) and Terres de l'Ebre (69.4%) show the highest self-containment. Two a degree, two extreme models of lower fluidity of mobility between municipalities are defined, located in the "most marginal" reasons —Alt Pirineu i Aran, and Terres de l'Ebre.

At county level in Alt Pirineu i Aran we see, on working days, that municipal self-containment is very high in the counties of Alta Ribagorça (78.1%) and Alt Urgell (78%). It is not clear whether cross-border

flows have been taken into account. Meanwhile, the least self-contained counties are Pallars Sobirà (60.2%) and Cerdanya (65.8%). Around the average (71.6 %), are Val d'Aran (71.1%) and Pallars Jussà (72.7%). At weekends and on public holidays the average is lower (57%) and the county self-containment structure changes. Pallars Sobirà (48.7%) and Cerdanya (52.4%) continue to be least self-contained, while Alt Urgell (60.6%) and Pallars Jussà (60%) show greatest self-containment. Around the average (58.9%), are Val d'Aran (58.9%) and Pallars Jussà (59.1%). It can be considered that this is the result of the combination of two main variables: on one hand, the concentration of the population into few municipalities, as is the case with la Seu d'Urgell, fragmenting self-containment, and, on the other hand, the importance of the tourist factor, which in counties like Cerdanya or Pallars Sobirà, particularly at weekends and on public holidays, would reduce self-containment.

2. The characteristics of daily mobility in Alt Pirineu i Aran

It must be borne in mind that the greater daily mobility in Alt Pirineu i Aran takes place on communications infrastructures with very different characteristics from urban ones and with very scarce public transport services. As for the characteristics of the infrastructures in Alt Pirineu i Aran, we can summarise them considering that the majority of the Pyrenean region has fewer urban communication routes and more rural and forest ones than the average for Catalan territory. In general, they are long-distance routes compared to the normal urban ones in towns and cities. Distances are large, not only compared to the country's big urban concentrations, but also between the towns and villages of Alt Pirineu i Aran itself. The communication network is less developed and is fundamentally structured depending on the conditions on the ground, with the main communication routes found along the bottoms of the main valleys, following the natural courses of rivers. In the case of communication between valleys, the roads cross mountain passes.

This regional structure, on one hand, and the dispersed urban network, in which there are no towns with more than 15,000 inhabitants, the fact that 2/3 of municipalities have fewer than 500 inhabitants, added to a situation where the big urban concentrations with services are more than two hours away from the majority of Pyrenean territory, are the main causes why greater mobility is generally recorded among the population of Alt Pirineu i Aran and also among mobility professionals.

Another important and significantly different factor from the country as a whole is that an important part of the employed population works in sectors linked to tourism (hotels, catering, commerce and construction). So, the services sector in Alt Pirineu i Aran employees more people than in Catalonia as a whole, as does construction. By contrast, the agricultural sector is much bigger in relative terms, but this is a sector that employees only a small part of the active population. It is therefore in the sector of tourism-related activities where we would find the greatest population mobility, which would be increased by the tendency for there to be long distances between population centres and from these to the main tourist facilities, particularly ski stations.

2.1. General features of the mobility of the general resident population

The 69,325 people resident in Alt Pirineu i Aran aged over 4 make 1.6 million journeys a week (1.8 including mobility professionals, see table 5), representing 23.70 journeys per person per week (25.45 including mobility professionals). On working days, the average journey per person and per day is 3.94 journeys per person and, at weekends/on public holidays, it is 2.87 journeys/person.

2.2. Number of journeys depending on sex, age and professional situation

The specific features involved in having mountains as the main socio-geographical feature of Alt Pirineu i Aran are particularly reflected in the mobility differences shown by the population depending on sex, age and professional situation. The low population densities and eminently rural nature of most of the Pyrenean region, as well as the broken relief and high altitudes, are aspects that determine more markedly differentiated behaviour between segments of the population than in more urban areas. The contradiction is that, although this is a region where the population has become increasingly concentrated in few centres, urban infrastructures and services have not been created. We might consider that the urban element —understood as a concentration of population, infrastructures and services— has much less of a presence than the natural element (areas used for forest and crops), so that it becomes peripheral with respect to the great urban centre of Catalonia. This condition would also determine a lower level of confidence by the population in its services, both public and private, and this would be experienced in different ways depending on socio-economic characteristics and, therefore, behaviour of each segment of the population, depending on sex, age and professional situation.

So, in Alt Pirineu i Aran, an important difference can be observed in the number of journeys depending on sex, with men having an above-average level: an average of 3.65 journeys on working days compared to 3.63 journeys as an overall average, and 2.82 journeys at weekends and on public holidays compared to 2.78 overall average journeys.

The comparison between sexes shows a greater difference in the number of journeys in the week and at weekends among women than among men. So, women's mobility is even lower, compared to men's, at weekends than it is during the week. At the same time, mobility behaviour is very different between the sexes depending on age. Despite the lower general mobility of women compared to men, during the week all age groups of women have an above-average number of journeys except the oldest group of women, which is the group with the lowest number of journeys of all. This fact would be explained by the lower availability of driving licences and cars to women aged 65 and over. In addition, the difference in ways of life according to gender roles, which are much more differentiated in older generations, must be borne in mind. By contrast, at weekends and on public holidays all age groups of women have a below-average total number of journeys a day except those aged between 16 and 19, which could correspond to paid work outside the home at weekends.

So, women make fewer journeys than men in the youngest age group; 4 to 15; women aged 16 to 19 make more journeys than men (4.01 compared to 3.90), as happens in the 30 to 64 age group (3.91 compared to 3.72). This fact would probably be explained firstly, concerning women aged from 16 to 19, by the greater tendency of women to go into higher education and secondly, and for the group of women between 30 and 64, by the general role of the female group in taking responsibility for bringing up children and managing the home, a fact that would require around three journeys a day more than men (trips to schools, shopping and various errands). By contrast, women of 65 and over have a notably lower number of journeys: 2.42 compared to men of the same age group with 3.02.

Concerning the different number of journeys depending on professional situation, the figures show rather predictable behaviour. The school pupil and student group is the one making the largest number of journeys: 3.93 during the week and 2.98 at weekends. In second place in terms of number of journeys a day comes the active employed group; 3.88 and 2.99 respectively; in third place is the group devoted to unpaid domestic work, with 3.22 and 2.34 respectively. Finally, pensioners and retired people make the lowest number of journeys a day; 2.76 in the week and 1.98 at weekends in the first case and 2.88 in the week and 2.41 at weekends in the second. Another outstanding feature of these professional situations is the fact that people devoted to unpaid domestic work make fewest journeys of all groups at weekends.

2.3. Reasons and principal means of transport

Table 5 shows the reasons and means of transport at weekends and on public holidays and indicates that: firstly, motorised transport is more important than non-motorised, as it is during the week. Secondly, personal reasons create more journeys: 46.1% and returns are personal; 39.3% than occupational ones; 7.9% and returns, occupational; 6.7%.

2.4. Territorial relationships

Alt Pirineu i Aran has the greatest mobility flows at regional level firstly with the RMB (9.200 in thousands of journeys on working days and 25,800 at weekends and on public holidays) and, secondly, with contiguous regions, like Ponent (7,400 and 12,400, respectively), Comarques Centrals (3,500 and 7,200) and, at weekends/on public holidays, with Comarques Gironines (2,900). This strong link with the RMB should be noted, particularly at weekends and on public holidays (figure 4).

County relationships in the Alt Pirineu i Aran region show the high level on county self-containment, on one hand, and the tendency to have little relationship with other Pyrenean counties, with only counties bordering the county of origin being the second destination for journeys.

If we now look at movements between counties in Alt Pirineu i Aran, a stronger link can be seen between pairs of counties. Alt Urgell and Cerdanya (1,800 journeys on working days and 1,700 at weekends and on public holidays), Pallars Jussà and Pallars Sobirà (1,800 and 2,400 respectively) and Alta Ribagorça and Val d'Aran (800 and 2,600). Other relationships are much less important, although the central position of La Seu d'Urgell is most notable, with journeys on working days from Pallars Jussà (200) and Pallars Sobirà (200) increasing to 1,400 journeys at weekends and on public holidays.

Mobility relationships with neighbouring counties, although slight, occur in all cases between pairs of counties. Except for Val d'Aran and Alta Ribagorça, connected by the Vielha Tunnel since 1959, the remaining pairs of counties are communicated by valleys, following the natural courses of rivers: Pallars Sobirà with Pallars Jussà and vice-versa, and Cerdanya with Alt Urgell and vice-versa. At weekends and on public holidays, journeys between counties increase and destinations broaden to second neighbouring counties, as is the case with Alt Urgell, which incorporates movements with Pallars Sobirà, with movements with Cerdanya having increased from during the week (tables 6 and 7).

On working days, the counties with greatest county self-containment, above the average - 89.9% - are Pallars Jussà, Val d'Aran and Cerdanya, which are the peripheral counties in the Alt Pirineu i Aran region, which broadly coincide with the counties that are most popular for tourism.

By contrast, at weekends and on public holidays, the greatest county self-containment is in the counties that are least popular with tourists.

Municipal self-containment (see tables 6 and 7) compared with county self-containment (see tables 8 and 9) shows a lower level of self-containment at municipal level and coincides, both on working days and at weekends/on public holidays, in the fact that the three counties with the lowest level of municipal self-containment are the most attractive to tourists; Cerdanya, Val d'Aran and Pallars Sobirà.

Inter-county journeys in Alt Pirineu i Aran occur, as has already been mentioned, basically in pairs of counties, with the strongest relationships between Alt Urgell and Cerdanya and Pallars Sobirà and Pallars Jussà. At weekends and on public holidays the number of inter-county journeys increases only on the big communication routes along which most tourists arrive: la Noguera Ribagorçana and la Noguera Pallaresa. The Llobregat route via the Cadí tunnel is excluded from the analysis because it arrives directly in Cerdanya. In addition, at weekends journeys are extended beyond the normal pairs of counties.

3. Measures to improve daily mobility in Alt Pirineu i Aran

The specific geographical features of this region largely condition the possibilities of making improvements for the daily mobility of people and to make better use of opportunities for regional development and, if they can be lasting ones, for this area of Catalonia. In order to improve the conditions of the current mobility model, the specific features of this mountain environment must firstly be recognised (Ganyet, 1993) and, secondly, the appropriate proposals must be applied there —measures often opposed to those of urban concentration (Dómbriz, 2007).

Alt Pirineu i Aran is a territorially fragmented region with considerable land relief barriers, which, in turn, has led to the concentration of facilities and services in a few centres (Aldomà, 2003). So, the physical environment divides Alt Pirineu i Aran into three core areas, with a dynamic independent force between one another: Val d'Aran and Alta Ribagorça, Pallars Sobirà and Pallars Jussà, and Cerdanya and Alt Urgell (Vilagrassa, 2003). At the same time, Alt Pirineu i Aran are in a position far from the main urban agglomerations and communication routes in Catalonia (Serratosa, 2005). This distance from the big urban centres determines that the access time to the most socio-economically dynamic axes and nodes is much greater than the average for Catalonia (Avellaneda, 2005). This last element is, as we understand it, the most important aspect of the specific features of mountain mobility in the sense that it is the one that most reinforces the regional imbalances of this area compared to better connected areas. In this way, the former economic specialisation in the agricultural sector, particularly in stock and milk production (Tulla, 1993) has been moving towards the services sector, without there having been a true previous industrialisation process in these counties. This increase in activities and, therefore, economic flows of the services sector has, therefore, had to be achieved without the existence of infrastructures and public communication services of societies and territories which are or which have been clearly industrial (Pallarès-Barberà et al, 2004a; Pallarès-Barberà et al, 2004b; Pallarès-Barberà et al, 2003a). This handicap acts as a brake on development and local innovation in Alt Pirineu i Aran, both in relation to other regions and in the Pyrenean region itself (Pallarès-Blanch et al 2007 and 2006).

In the area of territorial relationships, Alt Pirineu i Aran has some contiguous areas with special features. It is a border region, with three connections, two with France —the Val d'Aran and Cerdanya— and that of Alt Urgell with Andorra which increasingly generates an important cross-border flow (Tulla et al, 2008; Pallarès-White, 2005). In addition, the counties in the valleys of the Noguera Ribagorçana, the Garonne and the Noguera Pallaresa have a greater relationship with the Ponent region, while the counties crosses by the River Segre show a greater link with Comarques Centrals.

So, in Alt Pirineu i Aran, there are three mobility patterns superimposed in the same region. Firstly, mobility generated within the region itself; secondly, mobility at weekends and on public holidays with origin or destination outside the region and, thirdly, passing mobility characterised by the fact that the origin and destination are outside Alt Pirineu i Aran. This last type of mobility in Alt Pirineu i Aran would not be shown in the Survey of Daily Mobility, but can be extrapolated from traffic flows. The communications infrastructures of Alt Pirineu i Aran must, then, meet three objectives: (a) daily mobility within the region; (b) mobility to and from contiguous areas, particularly Andorra, the urban areas of Barcelona and the Catalan coast, where at weekends and on public holidays it is almost 35% of total journeys, while on working days it is 12%; to an extent the reverse of what happens in the Regió Metropolitana de Barcelona (RMB) and (c) passing flows, without origin or destination in Alt Pirineu i Aran, use the three big communication axes (Llobregat, Segre and Nogueres).

Advantage should therefore be taken, at an initial level, of these advantages of "passing mobility" to establish agreements with the neighbouring countries (France and Andorra) with two purposes: on one hand facilitating the extension and improvement of transport infrastructures and, on the other, encouraging economic, commercial, personal and service flows between European regions within the framework of the Pyrenean Employment Commission (Giménez, 2007a and 2007b; Pallarès-White, 2005). The priority actions that must be undertaken to move forward in this direction are: in the first place, the improvement of rail routes (achieving European gauge, incorporating technical improvements in communication infrastructures and transport services and facilitating the connection with France, complemented with the link between Pobla de Segur, la Seu d'Urgell and Puigcerdà, with a light rail branch to Andorra). Secondly, the construction of airports and heliports and an improvement in the basic north-south and east-west road links are also fundamental for improving inter-connectivity with other regions.

In addition, journeys with origin or destination in the region, apart from the use of inter-county infrastructures, should be complemented with good communication routes to the towns and facilities that mobilise most tourism. At this level of mobility there should be an easy, efficient "modal change" between means of transport. The only way of reducing the use of private transport is for the main routes by train, taxi or bus to be combined with other modes without great loss of time, facilitating door-to-door transport (Jiménez, 2007). So, for example, an improvement in public transport between the RMB and Alt Pirineu i Aran would reduce congestion on the C-1411 and E-9.

At a third level, internal journeys require a complete road infrastructure in good condition. However, an improvement in rail transport and heliports to link distant points within Alt Pirineu i Aran should not be left to one side. The use of private transport must be reduced and this will only be possible with good, sufficient and frequent public transport, as a greater range of public transport would incentivise demand, while the reverse is also true —an insufficient range inhibits demand. In this sense, it must also be borne in mind that an investment in public transport and other services for collective mobility requires a good information campaign, as the population has its journeys very well structured according to the means of transport available and, in the case of Alt Pirineu i Aran, these usually show very little change over time.

Distinction should be made between two spheres of mobility within the region: on one hand that carried out along the main communication routes which often coincide with those developed for the first and second levels; and, on the other hand, movements along the lateral valleys where there are a few important towns, basically involving a dispersed rural population.

The means of transport to be used need to facilitate daily mobility on working days, ensuring the existence of public transport at peak times with a frequency that makes it attractive. In the Seu d'Urgell area, for example, the area of greatest population concentration in the whole region, there is still no urban bus which could be used if a route was planned between contiguous towns related to mobility to and from Andorra.

Specific action must also be taken in the high mountain areas where, as with coastal areas, there are large flows of tourists very concentrated in space and time, but here in adverse climate and weather conditions. Various actions can be applied to prevent the formation of bottlenecks; as well as providing more specific services; limiting the entry and impact of private transport on population centres, limits on parking on the most fluid communication routes, distinguishing useful mobility from mobility for pleasure, among others, all taking other mountainous European areas as a reference (Varlet, 2007).

Often, the small mobility flows generated in the most rural areas are not sufficient to establish conventional public transport services there. So, in the more rural area for this third level of mobility, apart from the "modal change" already put forward, work must be done in two directions: firstly, amending the legislation to unify specific transport (school, post, milk lorry, etc.); and, secondly, on systems like "on-demand transport", which have shown their virtues in Alt Urgell (Gurrera, 1988). Along the same lines, bearing in mind the needs of the population depending on sex, age and professional situation, segments could contribute towards offering more efficient and economical solutions (Pallarès-Barberà et al, 2003).

Other systems such as car sharing or mobility exchanges should be explored. One of the objectives for improving the territorial distribution of the population in Alt Pirineu i Aran would be to strengthen the settlement of the small centres. The key element is improving the quality of life of the population and being able to access services and facilities often located in large and medium-sized towns. To make it possible, a necessary condition is a good public transport system, although this must be complemented with other economic and social measures. The "shadow zones" without any public transport services must also be resolved, as in the rural world this can be crucial for the existence of a regularly inhabited village.

In any case, for these proposals to be carried out the involvement of local bodies and greater awareness from the autonomous community, State or communication administrations will be required, as well as private initiatives, concerning the particular features shown by rural and peripheral regions. It is not enough to improve infrastructures if this is not combined with the economic and social development of this region and if this is not reflected in regional and sectorial planning and town planning directives.