PAPERS 45 INDUSTRIAL ESTATES: LOCATION TRENDS AND ACCESSIBILITY

PRESENTATION

From an academic perspective, as well as from the point of view of professionals, governments and economic agents involved, there is a general consensus regarding structure and location of economic activities as the objects of great changes in recent years. The so-called *industrial estates*, seen as areas of functional specialization, have been and still are the ones in which these territorial changes of the economic-productive system arise most clearly. Understanding them and thinking on their characteristics, on the activities that settle in them in an intensive manner, and on how to plan, design and manage them, becomes essential to develop urban and territorial planning policies and economic strategies.

The publication of the four articles included in this 45th issue of the PAPERS magazine can be regarded as an attempt to contribute to this necessary reflection focusing on the 1.750 industrial estates located in Catalonia (according to the *Census of Industrial Estates in Catalonia 2005-2006*, developed by the Institut d'Estudis Regionals i Metropolitans de Barcelona).

The location of these economic areas, the variety of situations resulting from their size, site and land availability, as well as the prospect of floor demand, are the subjects analyzed by Carme Miralles-Guasch and Carles Donat at the opening of this monograph. This first article unravels the results obtained by two quantitative sources created in order to overcome the lack of information about local industrial estates: the aforementioned Census (which includes location, delimitation, size and occupation data) and the *Sample of Industrial Estates in Catalonia 2005-2006*, which informs of the activities that can be found at those estates. The analysis of offer/demand dialectics here is based both on these quantitative data and systematic, qualitative information gathered in in-depth interviews to relevant experts in the field.

The second article, by Àngel Cebollada, is about the unresolved matter of the accessibility to industrial estates. Given the acknowledgement that the relocation of industries to the urban periphery has occurred without taking into account the workers' accessibility needs, a resulting situation characterized by a severe shortage of collective transport offer, in which the car appears as the most effective mean, is outlined. As a way to correct or straighten it, the author points out the implementation of the Catalan Mobility Law instruments, particularly the Mobility Plans for industrial estates and the figure of the Mobility Manager.

In the third article, Margarida Castañer and Antoni Ferran review the conclusions of the 3rd Conference on Territorial and Urban Planning Environmental Assessment. The Conference goals were to come up with effective ways to apply the European Union Directive 2001/1452/EC to the conception of new areas of economic activity, to establish environmental and landscaping criterion to guide the selection and design of their site and, lastly, to launch the challenge of collaboration between different Administration levels in order to enable the development of supramunicipal economic areas.

The issue is closed by a fourth article in which Juli Esteban reflects about the capacity, the tools and the ways in which physical planning can influence the dynamics of location of industrial estates. Starting with the definition of a set of guiding principles that seek to promote coexistence with other activities and to rationalize their settlement, the author refers the spatial and temporal difficulties that arise when a range of territorial plans attempt to establish guidelines for the choice of sites, sizes and mixed-used patterns, as well as to impose an urban model of concentration and proximity. In order to go beyond these difficulties he proposes some *planning techniques*, such as the regulation of the spatial distribution of both already-known processes and unexpected opportunities for the siting of new activities.

INDUSTRIAL ESTATES IN CATALONIA: AN ANALYSIS OF SUPPLY AND DEMAND

Carme Miralles-Guasch
Carles Donat

Introduction

With the passing of time, the location of economic activities has been governed by various lines of reasoning and circumstances. At present, and for quite some time now, town and city councils have been trying to situate these businesses in industrial estates in suburban areas, often isolated from the traditional urban fabric and set aside for exclusive uses. Nevertheless, and despite the fact that this has been a general trend, to date we have little information about where these industrial estates are located, how many there are, the area they cover in hectares and how much of this land area is available. Similarly, there has been little in-depth research into what we know about the kinds of businesses located in these areas beyond merely classifying them along with industry.

The following article is an attempt to reflect the current situation concerning the deficit of information on these issues from the analytical perspective of supply and demand of industrial estates in Catalonia[1]. This study starts from the basis of three hypotheses shared by the academic world, institutions and social representatives. The first hypothesis is that these spaces can no longer simply be identified as industrial areas because they also include logistics and commercial enterprises and services in general. Therefore, throughout this article we will use the term industrial estate in its broadest sense, that is as an area where business enterprises are located on land classified as industrial, tertiary or mixed. The second hypothesis, which follows from the first, refers to the fact that the characteristics of these economic activities are no longer incompatible with residential uses; in consequence, the ideal situation of locating them in industrial estates segregated from urban fabrics has to be re-thought, above all taking into account that this location increases competition for land use and may make difficult the siting of other businesses that do need to be located in these areas. Finally, the third hypothesis states that the distribution of industrial estates in Catalonia is, generally speaking, overly dispersed and fragmented, the outcome of a lack of coordination between municipalities, which poses difficulties when it comes to siting businesses that require a large areas of land.

When it comes to studying industrial estates, there is a lack of homogeneous and detailed information for Catalonia as a whole. In an attempt to address this, three sources of information have been devised: two of them quantitative, a census and a sample of industrial estates; and one qualitative, a corpus of in-depth interviews. The *Cens de polígons d'activitat de Catalunya 2005-2006 (Census of industrial and tertiary estates in Catalonia 2005-2006)* began with sending out a questionnaire with a map to those local councils with industrial, tertiary or

mixed land, so that they could identify and define their industrial estates. This approach provided satisfactory responses from 102 local councils. This data source was complemented and contrasted with others, the most important being the data base generated by the Pacte Industrial de la Regió Metropolitana de Barcelona, which was used for 104 municipalities. In other territorial areas where no second source was available, we made use of layouts of municipalities, databases from other local authorities (regional and local councils), institutions (Chambers of Commerce), and from the Institut Català del Sòl (*Catalan Land Institute*) -being the most important sources consulted. Taken as a whole, this group of data sources from local administrations and institutions was used for 367 municipalities, 78.9% of the total of the municipalities covered by the census. Urban planning ones were used for those areas not covered by these sources; this was the case for 81 municipalities, 17.4% of the total of the municipalities covered by the census. From these sources, those that were consulted most, in order of priority, were: planning sectors (46 municipalities), followed by general municipal planning (25 municipalities), and finally the Sistema d'Informació Territorial del Planejament Urbanístic (*Urban Planning Territorial Information System*) (10 municipalities). The information obtained from the planning sectors was contrasted against orthophotomaps. In cases where sectors are an extension of an already existing area of economic activity, the two areas have been grouped together to make one industrial estate. Finally, in the municipalities where none of the aforementioned sources were available, a morphological criterion was applied. Thus, industrial estates were located by means of applying visual photointerpretation techniques based on the 1:25.000 orthophotomaps by the Institut Cartogràfic de Catalunya (*Cartographic Institute of Catalonia*)[2]. This criterion was used for a total of 17 municipalities, 3.7% of the total of the municipalities covered by the census.

The second quantitative source, la *Mostra de polígons d'activitat de Catalunya 2005-2006* (*Sample of industrial estates in Catalonia*), allowed for gathering information about the different types of businesses found in industrial estates. Information was collected from the questionnaire sent to local councils in which they were asked to specify the percentage of land taken up by each of the following branches of business: industry, transport and warehousing, retailers, wholesalers, services for people, services provided for companies, and others.

In order to obtain a clearer idea of the supply of and demand for industrial estates in Catalonia, we deemed it appropriate to carry out in-depth interviews to provide a qualitative analysis based on the opinions of various qualified experts. These experts come from a variety of areas ranging from municipal management to the academic world, and including various institutions that study manufacturing sector dynamics in general and industry in particular. An in-depth interview is a qualitative social research technique that allows one to develop an in-depth dialogue with individuals who are an integral part of the population being studied. An interview is understood as a "communicative process" though which one can "extract" information from someone (in this case an expert on the topic under study). The aim is to generate a discourse on a specific line of argument (high degree of fluency and not pre-coded, as opposed to questionnaires), which allows the person being interviewed to give their opinions about the topic one wishes to analyse. As regards this study, the interview began from an initial minimal script on predefined topic areas with no pre-established order, through which the focus of this research was broached based on the personal experiences, opinions and expectations of the person being interviewed. These interviews were carried out between February and April 2006 and totalled 14 hours of recorded conversations. The transcriptions of these interviews have allowed us to analyse the most important issues related to the supply of and demand for industrial estates.

This article is divided into three sections and is a response to the information and analysis carried out for each of the three aforementioned sources, which are summarised and contrasted in the conclusions. In the first section, based on the data from the census, we analyse some of the principal factors associated with the supply side of industrial estates in Catalonia: location, dimensions, siting with respect to population centres and to the rest of the industrial estates, and finally, the degree of land availability. In the second, based on the information collected in the sample, we analyse what constitutes demand, placing particular emphasis on the consequences of changes in the structure of the economy *vis-à-vis* demand for space in industrial estates, and also on territorial differences. Finally, in the third section we present an analysis based on the in-depth interviews, which provides a complementary perspective to the previous two sections detailing pertinent factors according to the perceptions and opinions of the experts themselves.

1. Industrial estates in the territory: location, site and land availability

According to the data obtained in the census carried out during 2006, there are approximately 1,750 industrial estates in Catalonia. In this section their characteristics are analysed according to a breakdown of the place where they are found by territorial area[3], and also according to size and the surface area they cover. At the same time, for each area we explain the relationship between industrial estates and the territory based on three factors: location according to size, their site in relation to urban centres and other industrial estates and the level of land taken up. The relationship between the industrial estates and urban centres has lead us to consider a threshold of 200 metres distance between them so as to be able to differentiate between those which are segregated and those which, in contrast, are closer or could even be considered appended to or an integral part of an urban centre. Also the relationship between the industrial estates themselves has led us to consider them as territorial phenomena with a physical continuity and which can make up "business areas" or, alternatively, classify them as isolated if they are distributed in a fragmented manner. According to these characteristics one can speak of segregated, integrated, concentrated or isolated sites.

In 2006 there were 1,748 industrial estates with an area greater than 0.5 hectares covering 32,240 hectares, which corresponds to approximately 18% of the urban and development land[4]. The metropolitan area of Barcelona is the territorial area where the largest number of industrial estates is concentrated, 712 (40.7%). In second place we have Comarques Centrals and Comarques Gironines with 329 and 287 industrial estates (18.8% and 16.4%, respectively). Next in order we have Camp de Tarragona and Àmbit de Ponent, with 176 and 159 industrial estates (10.1% and 9.1%, respectively). Then finally, we have Terres de l'Ebre and Alt Pirineu i Aran, with 61 and 24 industrial estates (3.5% and 1.4%, respectively – see figure 1). However, this order changes seen from the perspective of the total gross surface area taken up by the industrial estates. While the Metropolitan Area remains in first place with 15,623 hectares (48.5%), second place in order of total gross surface area in Catalonia is Camp de Tarragona (5,030 hectares - 15.6%) with Comarques Centrals (3,666 hectares - 11.4%) and Comarques Gironines (3,669 hectares - 11.4%) rating third. Àmbit de Ponent (2,717 hectares - 8.4%) remains in fifth place although the gross surface area here is closer to that of Comarques Gironines and Comarques Centrals. Finally, Terres de l'Ebre (1,376 hectares - 4.3%) and Alt Pirineu i Aran (158 hectares - 0.5%) remain in sixth and seventh place respectively.

These differences between the number of industrial estates and the total gross surface area they cover can be explained by looking at them according to their size and comparing the distribution between each of the areas. As figure 2 illustrates, in Comarques Gironines and Comarques Centrals there is a very high percentage of small and medium sized industrial estates, 67% and 68% respectively. In contrast, the percentage figures for medium-large industrial estates are lower (35% and

32%). In the Barcelona metropolitan area and Camp de Tarragona, the percentage distribution of industrial estates according to size is almost identical. Around 80% of the industrial estates are situated in the medium-size range (with and equal breakdown, 40% and 40%, between the medium to small and medium to large industrial estates) and a little over 10% for the extremes (small or large). As regards percentage figures for small industrial estates, these are well below those for Comarques Gironines and Comarques Centrals, particularly in the latter case, where they account for almost 20%. In Àmbit de Ponent, almost half the industrial estates are medium-large (48%), and this is the second area where the medium-large industrial estates are in the majority. In contrast, there are very few large industrial estates and account for only 5%, one of the lowest figures. Finally, the medium-small industrial estates make up 36%, a figure that is slightly lower than those for the rest of the areas. A characteristic feature of Terres de l'Ebre is a significant level of medium-large sized industrial estates - this is the area where they are more predominant, 53%. In addition, the figure for large industrial estates is 12%, in contrast to the figure for small industrial, 5%. In Alt Pirineu i Aran, where the total number of industrial estates is significantly lower than the rest of the areas, the characteristic features here are the figures for medium-large sized industrial estates (67%) and the absence of large industrial estates. The result of this distribution is that in the Camp de Tarragona, Terres de l'Ebre and the metropolitan area of Barcelona, industrial estates cover a higher average surface area (28.6 hectares, 22.6 hectares and 21.9 hectares, respectively) as opposed to Àmbit de Ponent (17.1 hectares), and particularly Comarques Gironines and Comarques Centrals (12.8 hectares and 11.1 hectares, respectively). In last place we have Alt Pirineu i Aran where the average surface area taken up by industrial estates is 6.6 hectares.

Whether one considers the number of industrial estates or the total gross surface area, the result is that in all the areas there is land available. As can be seen in figure 3, in the metropolitan area of Barcelona, there are many industrial estates with a high level of land taken up, although it is the area which has most land availability. Accordingly, on the one hand there are 250 industrial estates with more than 90% take up and around 125 with take up levels which are also quite high, 76%-90%. On the other hand, however, there are more than 150 industrial estates take up levels below 25%, and among these, all the land is available for 40. The availability of land in the metropolitan area of Barcelona is even more visible when we look at the graph showing the total gross surface area; we can see that there are almost 3,800 hectares with take up levels lower than 25% (2,500 with take up levels 1%-25% and 1,300 unoccupied). Further reading of this graph reveals a second level of land availability in Camp de Tarragona, where there are 2,300 hectares with take up levels below 25%, and among these, more than 500 hectares are unoccupied. Next in order, we have Comarques Centrals, Comarques Gironines and Àmbit de Ponent, with approximately 1,300 hectares with take up levels below 25%. Finally we have Terres de l'Ebre with some 600 hectares with take up levels below 25%. In Alt Pirineu i Aran, where there are few industrial estates, there are approximately 65 hectares with take up levels below 25%.

The differences in the intensity of urban and metropolitan development in each of these territorial areas explain the differences in terms of distribution and the take up levels in industrial estates in Catalonia seen in the tables given earlier. Similarly, if we take a closer look at each area we can see that the questions of location and site of the industrial estates have their own distinct characteristics.

1.1. The metropolitan area of Barcelona

The 712 industrial estates in the metropolitan area of Barcelona cover 15,623 hectares, which means approximately 20% of urban and development land for this area. As can be seen in map 1, the vast majority are located in Vallès Occidental, Baix Llobregat and Vallès Oriental regions, following the main corridors between Barcelona and the Pre-littoral Depression. If we take a closer look at the site and analyse the spatial relationships between them, we can see two opposing phenomena. On the one hand, in the major corridors, where a majority of the industrial estates are located (Llobregat corridor, Besòs-Mogent-Congost corridor, and the C-58 corridor, Riera de Caldes, Riera de Rubí), there is a configuration of as many as 17 major "business areas". On the other hand, one can also see an opposing tendency of fragmentation, the outcome of the industrial estates being isolated from each other. Generally speaking, these are small and medium sized industrial estates and the majority are located in the more peripheral spaces of the metropolitan area of Barcelona: to the north of the AP-7 in Alt Penedès region, on the Serralada Pre-littoral slopes in Vallès Occidental and particularly in Vallès Oriental and in some of the Maresme municipalities.

If one looks carefully at the site, from the perspective of the distance between industrial estates and population centres, one can see how 70% of the industrial estates in the metropolitan area of Barcelona are an appendage to, or integrated into, the urban fabric. The rest are segregated, that is, they are at a distance of more than 200 metres from urban centres. In the aforementioned major "business areas", and in general in the Pla General Metropolità (PGM – *General Metropolitan Plan*) area, the majority of the industrial estates are an appendage to, or integrated into, the urban stretches. In contrast, in the more peripheral parts, as we have already seen, the industrial estates are located in a more disperse and fragmented manner, and in addition they tend to be segregated from urban centres.

Analysis of the site of the industrial estates in the metropolitan area of Barcelona allows for concluding that in the PGM area a specific global view in the form of supra-municipal level planning, has led to a configuration of the territory where the industrial estates are generally grouped into "business areas" that are contiguous to the urban fabric. In contrast, for the rest of the area, the development of land for businesses has led to a distribution of industrial estates which are fragmented and/or segregated from the urban networks. Exceptions to this are the traditionally industrial cities (Sabadell, Terrassa, Mataró, Vilafranca and Vilanova) and other locations where, because of land development dynamics, they have ended up configuring industrial estate and urban centre continuums (C-17 corridor to Vallès Oriental).

If one looks at the availability of land, in the metropolitan area of Barcelona, there is a high percentage of industrial estates with a high take up levels: more than half, 394, have take up levels above 75% (figure 4). Nevertheless, this is the area in Catalonia with the most land available, as there are 156 industrial estates (a quarter), that add up to 3,787 hectares, with a take up level below 25%. Among these, the predominant feature is medium-small and medium-large industrial estates. In map 1 one can see that large industrial estates with available land are located within the PGM area: Delta del Llobregat, Centre Direccional del Vallès and the Polígon Can Sant Joan. From among the largest industrial estates in the rest of the metropolitan area of Barcelona one should also note the "business areas" to the south of Terrassa, and the Vilafranca del Penedès industrial estates. Medium-large industrial estates with land availability are, in the majority, located in the second ring of the metropolitan area, while the majority of the smaller industrial estates are found in the medium and small sized municipalities of the second ring, above all in Alt Penedès and the Vallès Oriental regions.

1.2. Comarques Gironines

In Comarques Gironines there are 287 industrial estates with a gross surface area of 3,669 hectares, which means approximately 13% of the urban and development land. Generally speaking, they are located following the structure of the urban system. Thus, the most important ones are found around Girona (map 2) and Figueres, followed by the rest of the region capitals: Olot, Banyoles,

la Bisbal d'Empordà, Ripoll, and Santa Coloma de Farners. The concentrations of industrial estates in la Jonquera, Blanes and Palafrugell should also be stressed. In the small population centres there are concentrations of small and medium sized industrial estates which provide support to local businesses.

When analysing the site, it should be noted that there are 202 industrial estates (comprising 70% of the total) that are more than 200 metres from one or other population centre. The phenomenon of segregated industrial estates, as is the case here, is quite widespread throughout the entire area and is found as much around the major cities as well as the rest of the municipalities. One can also see that, generally speaking, they are isolated from each other. So, a characteristic feature of site of industrial estates in Comarques Gironines is segregation and fragmentation.

Figure 5 illustrates that in Comarques Gironines there is a significant level of land availability in their industrial estates, since almost half have take up levels below 50% and, furthermore, among these there is a significant number of industrial estates with take up levels ranging between 1% and 25%. Availability of land is a particular feature of medium sized industrial estates and is illustrated by the large number of medium-small and medium-large industrial estates with take up levels in the 1%-25% range. It is the small industrial estates which show the highest levels of saturation, since 42 of the 51 existing industrial estates have take up levels greater than 50%. Another feature that should be noted is the availability of land in the large industrial estates. Even though they are fewer in number in this area, 8 of the 15 located there have take levels below 25%. In Girona (map 2) and Figueres, the two principal urban networks where the largest industrial estates are concentrated, there is land available in industrial estates of all sizes. In the remaining regional capitals and in the coastal municipalities, the industrial estates with available land in the medium-sized range. In Santa Coloma de Farners and la Bisbal d'Empordà, the predominant feature is medium-large sized industrial estates with take up levels ranging from 26% to 50%. One will find these same take up levels in the medium-small sized industrial estates in the Olot and Ripoll urban networks, and in the medium sized ones in Banyoles and the coastal municipalities.

1.3. Camp de Tarragona

The 176 industrial estates located in Camp de Tarragona cover 5,030 hectares, which corresponds approximately to 19% of the area's urban and development land. If one looks at the location, one noteworthy feature is the major concentration in the Tarragona-Reus metropolitan area. In the rest of the territory the main locations are in the municipalities of Valls, Montblanc and to the east of the Baix Penedès region, from el Vendrell to the Barcelona metropolitan area limits, following the N-340 and AP-7 road corridors.

If one analyses the site in greater detail, taking into account the spatial relationships between the industrial estates, one can see that there are a considerable number of concentrations that make up "business areas" in the metropolitan area of Tarragona-Reus (map 3). This phenomenon can be found as much around the port of Tarragona and the large petro-chemical complex as well as along the principal road network infrastructure (T-11, AP-7), and around the urban centre of Reus. Another noteworthy feature, given its size, is the petro-chemical area between the municipalities of Constantí, Perafort and el Morell; and the Constantí industrial estate.

A particular feature of Camp de Tarragona, more so than in any other area in Catalonia, is the large number of industrial estates segregated from the rest of the urban fabric. This is the case for 128 industrial estates, comprising 73% of the total. The great majority of these industrial estates are located outside the municipal limits of Tarragona and Reus, where the urban development has not been as intense. The distance from population centres is particularly important in the case of some Baix Camp municipalities and the Constantí industrial estate (the latter in the metropolitan area of Tarragona-Reus). In Montblanc and to the east of the Baix Penedès region, from Vendrell to the Barcelona metropolitan area limits, the existence of segregated industrial estates is due to their site along the road corridors (N-240, N-340 and the AP-7, respectively), which are found at a certain distance form the population centres.

In Camp de Tarragona almost two thirds of the 176 industrial estates have take up levels below 50%, which corresponds to more than 70% of the total gross surface area. As can be seen in figure 6, land availability is apparent for industrial estates of all sizes. A particularly noteworthy feature is the large number of medium-large sized industrial estates that are unoccupied or with take up levels within the 1%-25% range. There is also a considerable number (22) of medium-small sized industrial estates with take up levels below 25%. From among the large industrial estates, it should be noted that more than half (12 of the 23) have take up levels below 25%. Small industrial estates, the smallest in number for this area, are those with the highest level of saturation of land use, since 16 of the 21 existing small industrial estates have take up levels above 75%. In general, available land is located throughout the area, as much in the metropolitan area of Reus-Tarragona (map 3) as well as the rest of the territory.

1.4. Terres de l'Ebre

In Terres de l'Ebre there are 61 industrial estates, the majority of which are located in the triangle comprising the municipalities of Tortosa-Roquetes, Amposta-Sant Carles de la Ràpita, and l'Aldea-Camarles (map 4). The remaining areas with noteworthy concentrations are located in the southern and northern extremes of this area: to the south, the municipalities of Ulldecona, Alcanar and la Sènia; and to the north in Ascó, Flix, Gandesa and Móra d'Ebre. Taken as a whole, the industrial estates in Terres de l'Ebre cover 1,376 hectares, which corresponds approximately to 17% of the urban and development land for the area.

If one looks closely at their site, one can see that of the 61 industrial estates in Terres de l'Ebre, 38 (accounting for 62% of the total) and 71% of the total gross surface area, are at a distance of more than 200 metres from one or other population centre. As can be seen in map 4 (the triangle comprising Tortosa-Roquetes, Amposta-Sant Carles and l'Aldea-Camarles), the industrial estates, generally speaking, are segregated from the urban networks and quite fragmented, with the exception of the two concentrations closest to the urban centres of Tortosa and Roquetes. In general, all the industrial estates are located at a very short distance from the main road network infrastructures (AP-7, N-340, N-235, C-42 and C-12). A diverse set of circumstances can be seen in the rest of the territory. Accordingly, some industrial estates are grouped together forming small "business areas", mainly at a short distance from the population centres (Ascó, Mora d'Ebre, Perelló). However, in other areas where there is more than one industrial estate they are located in an isolated manner (Ulldecona, Sènia). Finally, in other municipalities, where there is only one industrial estate, it is located at a significant distance from the population centre (Gandesa, l'Ametlla de Mar).

In Terres de l'Ebre industrial estates there is more land available than taken up. Almost two thirds of the industrial estates have take up levels below 50%, which corresponds to almost three quarters of the total gross surface area. As can be seen in figure 7, land availability is a feature for industrial estates of all sizes, and particularly prevalent in the large number of medium-large sized industrial estates with take up levels below 25%. Bearing in mind the generally high degree of land availability, the small industrial estates have the highest level of saturation, since 15 of the 21 in the area have take up levels above 75%. Available land can be found throughout almost the entire territory, both in the triangle comprised by Tortosa-Roquetes, Amposta-Sant Carles and l'Aldea-Camarles (map 4), as well as the remaining regional capitals. Móra d'Ebre and Móra la Nova are the only exceptions: the land take up level for these municipalities in all the industrial estates is above 50%.

1.5. Comarques Centrals

The 329 industrial estates in Comarques Centrals cover 3,666 hectares, which

corresponds approximately to 19% of the urban and development land for the area. The industrial estates in Comarques Centrals are mainly located on the three major plains in the areas (Pla de Bages, Plana de Vic and Conca d'Òdena), generally speaking following the structure of the urban system.

A characteristic feature of the site of the industrial estates in Comarques Centrals is that it has the second lowest percentage of industrial estates segregated from the urban networks (after the metropolitan area). In total there are 186 industrial estates, 57%, at a distance greater than 200 metres from one or other population centre. It can also be seen that, generally speaking, they can be found close to the main transport network infrastructures. In some cases, this site is due to relief factors, particularly in the regions of Solsonès, Berguedà, to the north and to the south of Bages and to the southeast of Anoia. That is, the parts of the territory which are not situated on the major plains of the area. Accordingly, the industrial estates (and also the main transport infrastructures) are located in the river-beds of the principal river networks (Llobregat, Anoia, Cardener).

On the Pla de Bages and Conca d'Òdena, the site of industrial estates reveal some similar characteristics (maps 5 and 6): within the municipal limits of the two capitals, Manresa and Igualada, the industrial estates are located in a concentric manner around the population centres, in the spaces closest to the access infrastructures to municipalities (radial) or in a circumvolutory manner (concentric). In the rest of the municipalities which make up part of the urban systems of Manresa and Igualada, the industrial estates are located very close to the main road network (the Llobregat motorway intersection with the Eix Transversal at Manresa and the A-2 at Igualada), but as opposed to what has happened in the two capitals, they are at quite a distance from the population centres. The industrial estates of Sant Fruitós de Bages, Santpedor and Sallent in the Manresa urban system, and the industrial estates of Jorba and Castellolí in the Igualada urban system, illustrate the segregation of industrial estates from population centres.

On the Plana de Vic, the municipality of Vic is of particular importance both in terms of the number of industrial estates as well as the total gross surface area they cover. Here the location of the industrial estates follows the model for Manresa and Igualada, that is, set up in a concentric manner around the population centre, in the spaces closest to the access infrastructures and by pass routes. In the rest of the municipalities of the Vic urban system, and the Osona region in general, the industrial estates, are generally appended to the population centres, despite there being a significant degree of fragmentation of small and medium sized industrial estates (see map 7).

In Comarques Centrals there is a great deal of land availability in the industrial estates. Even though the number of industrial estates with less than 50% take up account for 38% of the total number, the total gross surface areas is equivalent to 46%, almost half of the area total. As can be seen in figure 8, there is land available, above all in intermediary-sized industrial estates. Particularly noteworthy is that there are 41 medium-large sized industrial estates and 38 medium-small sized industrial estates with take up levels below 25%. If we single out the medium-small sized industrial estates as a whole, the most numerous in the area, there is a very significant number with high levels of saturation: 83 with take up levels above 75%. It should also be notes that the small industrial estates are those with the highest take up levels. Finally, in the few large industrial estates located in this area, one can find a wide range of circumstances, from industrial estates with high levels of land availability (4 with a take up level lower than 25%), to others with high levels of saturation (4 with take up levels above 75%). If we look closely at land available according to the location and the size of the industrial estate, one can see differences. As can be seen in maps 5, 6 and 7, in the main urban systems (Manresa, Vic, Igualada) land availability is particularly prevalent in medium and large sized industrial estates. In the two other region capitals (Solsona and Berga), land availability is prevalent in medium-large industrial estates. In the rest of the territory the situation varies considerably, and there is land available: at the two extremes, Sant Vicenç de Castellet-Castellgalí and in Avinyó, there is a wide variety of industrial estates with available land; in Balsareny the predominant feature is medium-large sized industrial estates; in Jorba large industrial estates and in Torelló medium-sized industrial estates. Finally, it should be noted that the polarities with less land availability are Manlleu, Calaf and Prats de Lluçanès.

1.6. Àmbit de Ponent

The 159 industrial estates located in Àmbit de Ponent cover 2,717 hectares, which corresponds to around 22% of the urban and development land for the area. The industrial estates in Àmbit de Ponent are mainly located following the urban system structure, very close to the main road transport network infrastructures, particularly the A-2 intersection and the Lleida urban system ring road network (LL-11, N-240, N-230, C-12, C-13, N-IIa). There is a major concentration of industrial estates in the Lleida urban system (map 8), both in terms of number and total gross surfaces area. Moving out, the Mollerussa and Tàrrega urban systems are located at a second level. At a third level we have the remaining regional capital urban systems: Cervera, Balaguer and Borges Blanques. At a fourth level we find the sub-regional polarities: Bellpuig, Agramunt and Guissona. Finally, there is a group of small-population municipalities: Ponts, Artesa de Segre, Maials, l'Albí, Vinaixa and Sant Guim de Freixenet.

When analysing the site of the industrial estates, it should be noted that there is a particularly high percentage of industrial estates segregated from urban fabrics. This is the case for 114 industrial estates, which account for 72% of the 159 located in this area and this high figure is attributable to a variety of factors: in general, at the planning stage, the industrial estates have been located at a considerable distance from residential development land, and in many cases these plans have still to be put into effect. One should bear in mind that municipal areas in Àmbit de Ponent, are larger in size that in the rest of Catalonia, and generally speaking the relatively flat. These features, combined with the trend to locate industrial estates at a distance from population centres, has meant that in many cases they have been located on the extreme limits of the municipality, with the paradoxical situation that, in some parts of the territory, they border on population centres of neighbouring municipalities. One also needs to bear in mind that many of the business enterprises located in these industrial estates are related to the agro-industry and highly incompatible with residential uses, hence the situation where the industrial estates which house these businesses have to be located a long way from population centres. In other cases, the proximity of the farming exploitation has become a determining factor when it comes to their site.

As regards the spatial relationship between industrial estates, one can see two opposing phenomena. On the one hand there are large "business areas", a feature which is found in the three major concentrations of industrial estates to the east of the municipality of Lleida and the two areas around the Alcarràs-Torres de Segre intersection on the N-IIa. This is also characteristic of urban development in Tàrrega, where find the areas' fourth most important of "business areas", and in Cervera, Agramunt and Bellpuig, among the remaining polarities at a regional and sub-regional level. On the other hand, along with the development of "business areas", one finds the opposite state of affairs, that is, fragmentation. Good examples of this would be the urban system of Mollerussa, Balaguer, and Bell-lloc d'Urgell (the latter being part of the Lleida urban system).

In Àmbit de Ponent more than half of the industrial estates have take up levels below 50%, which illustrates that there is a considerable amount of land available in the industrial estates. As can be seen in figure 9, the availability of land is particularly prevalent in medium-sized industrial estates highlighted particularly by 36 medium-large industrial estates with take up levels ranging from 1%-25%. Looking at medium-small industrial

estates one finds both extremes: there is a substantial amount of available land (36 with less than 25%) as well as others with high levels of saturation (30 with take up levels above 75%). Small industrial estates have very high take up levels - almost all of them have land take up levels above 75%. From among the few large industrial estates in this area, it should be noted that 5 of the 8 found here have take up levels below 50%. The distribution of industrial estates and availability of land in this area varies from one extreme to another. As can be seen in map 8, in the main "business area", to the east of the municipality of Lleida, the take up levels are the highest, although there are some industrial estates with less than 25% take up. In the second and third "business area" for this area, at the Alcarràs intersection on the N-IIa, one can see that there is a substantial amount of land availability in medium-sized industrial estates. Land is also available in Tàrrega, however, here in the case of large industrial estates. In Mollerussa there is land available in industrial estates of all sizes, while in the rest of the municipalities of the Lleida urban system one can see a strong presence of medium and large industrial estates with take up levels ranging from 26% to 50%.

1.7. Alt Pirineu and Aran

The 24 industrial estates in Alt Pirineu i Aran cover 158 hectares. They are located mainly following the urban system of the area. So, the major industrial estates are in la Seu d'Urgell, Puigcerdà and Tremp. At a second level we have Vielha e Mijaran. At a third level we have the other two region capitals (Sort and el Pont de Suert), and other sub-regional polarities (Pobla de Segur, Oliana, and Bellver de Cerdanya). Finally, we have two industrial estates, one in Prats i Sansor, in la Cerdanya, and another in Les, in the Val d'Aran. If we take a closer look at the site one can see that there are 18 industrial estates, 75%, located at a distance of more than 200 metres from one or other population centre. As regards the availability of land, as can be see in figure 10, more than half have take up levels below 50%, with a predominance of industrial estates with take up level within the 1%-25% range. If one looks at the data for the entire area, availability of land can be seen in small industrial estates (0.6-1.9 hectares), small-medium (2-4.9 hectares), and medium (5-9.9 hectares, and 10-19.9 hectares). In all the municipalities with industrial estates there are some with take up levels below 50%; the only exceptions being Vielha e Mijaran and Oliana.

2. Demand for space perspectives in industrial estates

The data given below provide us with information about the business enterprises located in industrial estates in Catalonia. These have been obtained from a questionnaire sent to the local councils where there is land classified for industrial use, tertiary or mixed. The resulting data obtained have been distilled and systematised by the IERMB team, from which a sample of industrial estates has been obtained. This sample allows for analysing data by territorial area[5] and, from these, for mapping out cross variables in some cases.

The first idea that should be noted from these results is that the traditional operations functions of industrial estates are undergoing a transformation. As can be seen in figure 11, in Catalonia industry occupies a little less than half of the land in industrial estates, while businesses dedicated to transport and warehousing are becoming more and more prevalent and even the predominant type of business in some of the more recent industrial estates. Both industry and transport/warehousing take up approximately three quarters of the land in industrial estates throughout Catalonia. The third branch of business enterprises in terms of percentage take up is wholesale commerce, accounting for almost 8%. Next in order are services provided for companies and people, which add up to approximately another 8%. Retail businesses account for 1.5% of the land.

This land take up is the result of changes taking place in recent decades in the internal structure and organisation of business enterprises, which have led to an increase in the presence of tertiary sector enterprise (in terms of production and take up) and with a resulting loss of the secondary sector. This, however, continues to be a key element to guarantee economic growth and competitivity. This transformation of the economy has been accompanied by territorial dynamics of decentralisation and dispersion of production throughout Catalonia combined with the relocation of business operations at a world scale.

Industrial estates, as spaces for specialised business enterprises, are the areas where these changes are most clearly visible. The location of retail and wholesale businesses, services enterprises for companies and people, the increase in demand for spaces for logistic businesses, the "pushing out" of "light" manufacturing companies from the centres of cities, the transformation of old industrial spaces for mixed use with residential functions in mind, have transferred competition for land use to industrial estates. In some cases, however, this has made it difficult to consider traditional manufacturing businesses as the main candidates for these spaces. All things considered, we are witnessing a process of relocation of business activities and an increase in logistics and tertiary businesses, facts which are determining demand for space in industrial estates.

The relocation of manufacturing began in the 1980s in Barcelona and in other cities with an industrial tradition in the metropolitan area of Barcelona. This process is dealt with in 1994, volume 18 of the journal *Papers*[6]. In this volume various contributors analysed the principal relocation dynamics of manufacturing enterprises ranging Barcelona out towards the rest of the metropolitan area of Barcelona. The general consensus in these articles underlined how manufacturing was relocated or "pushed out" from the centre of the city to industrial estates on the periphery of Barcelona and the other consolidated Metropolitan cities.

These relocation dynamics of manufacturing companies, as is illustrated by the data collected during 2006, have continued in the metropolitan area of Barcelona with a parallel pattern that has extended to the major cities in Catalonia. Illustrative examples of this are the transformations in the urban areas of Gran Via-L'Hospitalet, Badalona and Cornellà (being the most important), part of the urban spread of Barcelona. But this has also been the case for Lleida, Reus, Olot and other cities that have put into practice policy changes regarding the urban fabric and urban uses, substituting traditional industrial spaces for residential or mixed use spaces.

Also, during recent years there has been a heavy increase in demand for land for logistics use in industrial estates, although this has not happened in the same way throughout the territory of Catalonia. As can be seen in figure 12, the main concentrations of logistics enterprises has taken place in Àmbit de Ponent, where 40% of the land is taken up with these kinds of companies, and in Àmbit Metropolità with a 25% take up of land. In addition, there are noteworthy concentrations, albeit to a lesser degree, in Comarques Gironines (15%), Terres de l'Ebre (12%) and in Comarques Centrals (11%), not forgetting Alt Pirineu i Aran where there is also a considerable concentration (above 40%). Despite the fact that quantification has not been possible, it has also been possible to verify the presence of transport and warehousing businesses linked to port transit in the Tarragona-Reus metropolitan area based on the in-depth interviews.

In Àmbit de Ponent, such high levels of land take up by logistics enterprises need to be seen in the light of warehouses and agro-food stuffs haulage businesses. With recent improvements to the Ebre corridor road and rail network and its trajectory through Àmbit de Ponent, it is expected that land demand for logistics businesses will continue to increase.

Generally speaking, as we have already seen for the metropolitan area of Barcelona, transport and warehousing businesses occupy one quarter of the land. Nevertheless, this percentage changes in relation to the year the industrial estate came into operation. As can be seen in

figure 13, the more recent the industrial estate the greater the percentage land take up for logistics businesses and the lower the percentage for industry. For industrial estates coming into operation prior to 1960, the percentage of transport and warehousing businesses does not even reach 10% of the total, however, this percentage increases to 15% for those industrial estates that opened between the 1960s and 1980s, and reaches almost 20% for those that started to operate in the 1980s. In Industrial estates that have been set up and running more recently (between 1994 and 2006), transport and warehousing companies account for almost 50% of industrial estate land use, which indicates that the space demand for these businesses has increased in recent years. The main reason behind this lies in the increase in cargo transit at the Port of Barcelona. Given the growth perspectives of the Port, one can expect that, in the future, demand for logistics businesses will continue to grow, both in the metropolitan area as well as in the bordering regions: Baix Penedès, Anoia, Bages, and la Selva.

Tertiary businesses occupy one fourth of the industrial estates' land in Catalonia. As has taken place in this sector in general, there is a diverse range of tertiary businesses operating in industrial estates. However, one has to take into account that the presence of these businesses is one of the main factors that have contributed to increasing competition for land use. This fact, as mentioned earlier, has caused difficulties in some cases regarding location manufacturing businesses. In an attempt to analyse this competition for land use, a classification has been made of tertiary businesses based on the kinds of manufacturing operations they carry out in industrial estates and location alternatives. Accordingly, three basic different groups of businesses have been defined: those that need to be located in the industrial estates, those which provide a direct service to companies or persons that work there; and those located in industrial estates that do no fit into the two previous categories.

A clear example of tertiary businesses that need to be located in industrial estates, are wholesale businesses. As can be seen in figure 11, they take up 8% of the land in industrial estates in Catalonia. These companies need large surface areas to be able to store merchandise and require good accessibility and access. Furthermore, they are incompatible, in the majority of cases, with residential use, since they generate quite significant flows of heavy goods vehicles to meet their transportation needs. These are businesses which are likely to grow in the future and, consequently, so will their demand for space in industrial estates.

The second group includes those businesses which provide services to companies and workers in industrial estates. These are catering businesses, banking facilities, petrol stations, some hotels and others. At present there are many industrial estates lacking in these services, as can be seen in figure 14: approximately 60% of industrial estates do not have restaurants, almost 90% do not have banking facilities, and another 90% are not provided with other types of services for companies in industrial estates. In addition, one can appreciate differences depending on the territorial area, particularly in the case of banking facilities: there is a sharp contrast between the metropolitan area of Barcelona, where these services are provided in one in four industrial estates, and the rest of Catalonia, where they are practically non-existent. It should also be pointed out that there is a serious shortage of services for industrial estates in Comarques Centrals .

As can be seen in figure 15, the presence of these kinds of services is closely related to the size of the industrial estates. Accordingly, the largest industrial estates have more services than the medium size industrial estates, and these, in turn, have more than the small industrial estates. One can conclude that the demand for space for these services will be determined by the size of the industrial estate under development. Whatever the case, one has to consider that these businesses contribute characteristics to the industrial estate which improve the competitivity of the companies located there, not to mention the quality of life for the people who work there.

As stated earlier, there is a third group among tertiary industry businesses located in industrial estates. These are those businesses which do not provide a direct service either to companies or individuals that work there, and that, furthermore, do not have characteristics that are incompatible with residential uses. As can be seen in figure 16, these businesses occupy approximately 8% of the land in industrial estates in Catalonia. On closer analysis of the data by territorial area, one can see that in the remaining areas the percentages are quite similar and vary between 7% in the metropolitan area of Barcelona and 12% in Comarques Gironines. The exception here is Alt Pirineu i Aran, where these businesses occupy 35% of industrial estates' land space. The location of these kinds of companies in industrial estates, from a global perspective, has to be seen in the light of a need for land space for buildings at a lower price, bearing in mind that, as opposed to other services businesses, these kinds of companies could be located in urban centres.

3. Qualitative analysis: in-depth interviews

As stated in the introduction to this article, the quantitative analysis given in the preceding sections have been complemented with a qualitative analysis. The objective here is to gather the opinions and perceptions of people linked to industrial estates, either because they are responsible for managing them from one or other local government area, or because they are experts on this topic.

This qualitative analysis was carried out using in-depth interviews and, after analysis, four main topic areas have been determined based on the opinions of those interviewed and, in addition, some proposals for improvements which are also given below[7]. The four major topics are the: economic and territorial dynamics of businesses, supply, characteristics and functions of industrial estates, and demand for industrial estates.

Economic and territorial dynamics of businesses follow, according to those interviewed, two tendencies in Catalonia. The first, which began some decades ago, is a process moving away from the urban centres to the periphery of the cities, a phenomenon which is known as relocation. The second tendency, which is more recent and complementary to the first, is the phenomenon known as outsourcing, which is the process of re-siting activities outside Catalonia, in benefit to other autonomous regions or even other counties.

Relocation is well-known and common to all urban areas. This is related to the need to move "bothersome" businesses away residential areas and to consolidate urban land space for other uses. This process consists of relocating these businesses out towards a city's peripheral urban areas or else towards smaller population centres in the surrounding areas. What is interesting here are the nuances that those interviewed give when assessing the rate of this process. City dynamics move at a slow pace and even though it may have begun some decades ago there are now still many medium and small industries occupying land space areas within urban limits. This situation invites one to believe that this will maintain demand for land space in peripheral urban areas for some time to come, because slowly but surely small and medium-small sized companies are moving away from the consolidated urban areas of cities.

Outsourcing is a dynamics of relocating companies outside Catalonia, which those interviewed attribute to different factors such as the price of land, the need for more space, supply of services, communications and infrastructures. The target land implies thinking at different territorial levels, even though the most common case is moving abroad - when companies decide to move to another country where production costs are much lower. Nevertheless, the destination for the new locations is not the only or most important consideration. According to those interviewed, the territories most in competition with Catalonia are bordering autonomous communities: Aragón —and

the city of Zaragoza, where there is a substantial offer of industrial land and a dry port—, and the Comunidad Valenciana —with the city of Valencia, where large companies linked to exporting can take advantage of the seaport. The same can be said, although not to the same degree, for Castile-La Mancha, the coast of Andalusia and Murcia. Outsourcing manifests itself in different ways according to the size of the company: in the case of large companies this takes the form of a division of operations (production is moved away while management stays here), while in the case of small companies the move means the entire production unit. Despite the fact that these dynamics show all the signs of continuing, some of those interviewed warned that outsourcing a company is a very complex operation and so this phenomenon may not be as widespread as one might predict.

The metropolitan area of Barcelona and Àmbit de Ponent are, according to those interviewed, the only territorial areas with predominant businesses sectors. In the case of the metropolitan area of Barcelona, the most significant current business sector is the metal products industry, seconded by textiles, although textiles is a sector that is clearly in decline. The tertiary and quinary sectors, which have come forward as a replacements for companies with little added value or sectors in clear decline do not appear to be able to compensate for the loss of companies and jobs. In Àmbit de Ponent the most important businesses are linked to the agro-food stuffs industry derived from livestock (abattoirs, the meat industry, freeze storage, etc) and handling fruit and vegetables. All of these take up a large amount of land space with the backing of a significant logistics sector.

Opinions regarding the supply of industrial estates focused on areas of major growth potential and land availability, both (as one might expect) closely related. The supply of industrial land is not seen as monolithic issue at a global level for Catalonia, but rather that its analysis by obligation has to start from its location. The view of those interviewed not only made mention of the quantity of land but also of to the value of its relative location in the territory.

All those interviewed concur in the fact that in the metropolitan area of Barcelona those zones with the greatest degree of land availability and growth potential are located in Alt Penedès, Vallès Occidental, Vallès Oriental and Baix Llobregat, albeit with a few peculiar features. Vallès Occidental appears to be one of the regions that offers most attractive to the business world, while great emphasis and value is placed on the presence of "clusters" (the result of help from the European Union). The experience in this region could well extend to Bages and Osona, provided that infrastructures are improved. Baix Llobregat, in contrast, is attributed with positive characteristics which are the result of the mixture of uses between industrial and residential functions.

As for Baix Penedès, region as a hinge between Camp de Tarragona and the metropolitan area of Barcelona, the advantages seen here are related to the AP-7 motorway as a connector between spaces outside Catalonia (Aragon and País Valencià), to flat orographic conditions and that they have not reached the saturation levels of the metropolitan area of Barcelona. A little to the south, Camp de Tarragona is seen as one of the growing areas with comparable advantages such as major infrastructures (port, airport, motorway) and a network of cities consolidated by mixed land uses and availability. Concerning Àmbit de Ponent, the opinion is that there is a generation of new industrial land which will be set aside for logistics, particularly at some 25 kilometres from area of the capital Lleida. Reasons given are based on the comparative advantages regarding land availability, price and infrastructures, etc. Within these parameters, the industrial land in the western areas is seen in relation to all the development that is going on in Saragossa. This city is not seen as a competitor but rather as a complementary element to all that could happen in Lleida. Finally, and located more to the north, there was mention of potential growth in Alt Empordà.

The people we interviewed see availability of land in terms of its location related to the metropolitan area of Barcelona: the further away the greater the availability of land. Taking this factor as a basis, there are two variables that impose restrictions on its use: the short supply of sizeable parcels of land appropriate for companies with large land space requirements, and changes in land classification –land programmed for industrial use being re-classified for residential use. This re-classification is being carried out by a number of local councils. The price of land, however, does not appear to be a decisive factor, although there has been a lobby against those who are holding on to land expecting land prices to increase.

Another of the key ideas expressed by those interviewed is that in recent years business profiles in industrial estates have been changing at the same time that functional aspects have been added derived from the secondary sector and linked to services. These changes have been accompanied by new accessibility needs, both regarding workers and goods. One of the most relevant facts, and at the same time seen as a positive factor, is the increase in the diversity of businesses in industrial estates, which is related to changes in the economy in general and changes in the production structures. For these reasons, more now than ever, industrial estates are no longer associated with industry, particularly those that have been created more recently.

Turning to more atypical businesses which can now be found in industrial estates, we would like to point out two: the science and technology parks and logistics businesses. Concerning the former it was stated that, despite having grown very quickly and apparently spread all over the territory (linked to universities), their relative use in terms of percentage of industrial land is very low and therefore they do not represent a threat to more traditional industrial land use by the secondary sector. However, it was pointed out that the supply of land set aside for these uses is growing fast. Logistics is one of the very recent elements introduced into industrial estates, a significant growing trend resulting from global dynamics, such as the fragmentation and specialisation of production processes, but also from dynamics at a more local level. All of this is influenced by the strategic position of Catalonia situated between the Mediterranean and the rest of Europe. Concerning logistics, they also point out some conflicts deriving from the perception this kind of business requires a lot of land but generates few jobs, although everyone agrees that this is strategic.

Of all these transformations and the actual ageing of industrial estates, some problems are appearing particularly in those built before the 1980s. The oldest, at the time of writing, are already in need of remodelling and modernising which requires the active involvement of the local governments and the companies themselves. The main focus of remodelling is to improve access both in terms of accessibility within and outside as a necessary requirement for industrial estates to be competitive and efficient. On this particular point those interviewed underlined the needs of workers to be able to get to the workplace in industrial estates by public or collective transports means.

According to those interviewed, the change in demand for industrial estates, lies in the type and order of land holding option for industrial estate premises and the infrastructures, while at the same time they attribute this change to transformations in manufacturing businesses and companies relocating.

In this context one can see a diversification of the types of land tenure since, somewhat tentatively, renting seems to be gaining ground (as in the rest of Europe) as an alternative, albeit for a minority, to land ownership. The main advantage of renting is related to reduced requirements for tied-up capital. It is in this context that formulations are in the early states, to apply pressure to local authorities to intervene and promote and offer industrial estate premises for rent. This needs to be protected through official legislation or through some involvement by local authorities, so that certain manufacturing sectors can have access to this option.

They also explain that the trend in the profile of industrial estate premises, throughout Catalonia, is moving more and more towards small buildings, around 500 m^2 or even smaller and of a modular nature. However, this tendency in no way suggests that the demand for large spaces is disappearing.

The opinions and perceptions concerning demand not only refer to land or the industrial estate premises but also to the infrastructures that industrial estates have or should have. Following on from this, the main deficits referred to by those interviewed are generally centre on the road and energy networks, and they underline the lack of connections with the Barcelona port and airport. Growth needs are not only related to the availability of land but also to the quality of the infrastructures that can give added value to the territory that goes far beyond the price factor, given that prices have increased everywhere. Finally, it should be pointed out, even though this is not a topic that came out in all the interviews, the quality of the environment around the industrial estates is perceived as being a factor that is becoming more and more important.

Finally, our interviewees pointed out a series of proposals that revolve around two basic ideas: supra-municipal planning of industrial estates and shared management of them. The first attempts to resolve current atomising in the site of industrial estates in the territory. This is due far too often to planning formulated at a local level, and has serious implications for the environment, not forgetting accessibility problems and does not allow for sufficient critical mass. Generally speaking, those who were interviewed coincide in pointing out that the Generalitat (the autonomous Catalan government and local supra-municipal government with jurisdiction over urban planning), would need to make strategic land reserves so as to be able to develop them from a more large and less local level. They also point out the importance of coordination with local governments. The second proposal refers to shared industrial estate management, with the creation of a figure who could manage topics that are common to this public space: infrastructures and services provided for the industrial estates, and complexities common to the companies. This position of industrial estate manager would be adequate both for the businesses of the industrial estate and for the Administration, which would have a unique speaker.

4. Conclusions

In this article an analysis has been made of some of the principle elements that have a bearing on the supply and demand of industrial estates in Catalonia. This study begins from the premise that there is a lack of information resulting from the lack of a specific official institution that would facilitate identifying and defining what are known as industrial estates. These are identified in urban planning legislation according to use (industrial, tertiary and/or mixed) for the purpose of classifying land, but in many cases, within these areas there is more than one industrial estate. As a rule, it has been the governments, particularly local governments and some institutions, that have delimited the industrial estates in the territory under their jurisdiction basing their delimitation on the criteria of continuity between the urban fabrics or from the development of urban planning. The result, however, is that in Catalonia the study of industrial estates has been based on sources that are neither homogenous nor exhaustive.

This situation is the starting point of this article which attempts to compensate for the aforementioned deficiencies. Three different sources have been drawn on which are mutually complementary, both in terms of methodology used as well as the information gathered. The first source, cartographic, has allowed for carrying out a *Cens de polígons d'activitat de Catalunya, 2005-2006*, which with the application of GIS techniques has provided spatial data related to location, dimensions, site and land take up in industrial estates. The second source provides statistical data based on questionnaires answered by local governments in Catalonia who have jurisdiction over land assigned for industrial, tertiary or mixed use. This resulted in the *Mostra de polígons d'activitat de Catalunya, 2005-2006*, with quantitative information about the businesses located throughout Catalonia. Finally, by way of a further complementary source, it was felt necessary to carry out in-depth interviews with experts and people with knowledge in this area, which provided qualitative information concerning the reasons and arguments behind the current situation of the industrial estates in Catalonia.

Once all the data was collected and organised, the next step was to analyse supply of and demand for industrial estates which is presented in this concluding section, combining quantitative data for Catalonia as a whole (to date non-existent) with feedback from the various agents mentioned. Supply has been considered in terms of location and surface area, availability of land in the industrial estates, and their site in relation to the rest of the industrial estates and to urban centres. The basis for analysing demand has been the businesses located in industrial estates, relating them with the main tendencies in economic and territorial dynamics.

The first supply factor analysed was location and surface area of industrial estates. According to data from the census, in Catalonia there are 1,750 industrial estates that cover an area of 32,000 hectares. Generally speaking, it can be seen that although there is a concentration of industrial estates in the metropolitan area of Barcelona, there is also a substantial park of industrial estates in the rest of the territory. To be more specific, half of the industrial estates in surface area are located in the metropolitan area of Barcelona, 15% in the Camp de Tarragona, 11% each for Comarques Gironines and Comarques Centrals, 8% in Àmbit de Ponent, 4.3% in Terres de l'Ebre and 0.5% in Alt Pirineu i Aran.

The second supply factor analysed was the availability of land. According to the data from the census, from the 32,000 hectares of industrial estates in Catalonia, 10,000 hectares (one third) have take up levels lower than 25%, and from these approximately 2,700 hectares are unoccupied –most of this space corresponds to industrial estates in the phase of being set up and running or at the project stage. The following is a break down by area of land availability given in hectares where take up levels are lower than 25%. First in order is the metropolitan area of Barcelona which has 3,789 hectares with take up levels below 25% (35.9% of the total land in Catalonia with these take up levels). Second, we have the Camp de Tarragona which has 2,300 hectares (21.4% of the total for Catalonia). Third, we have Comarques Gironines, Comarques Centrals and Àmbit de Ponent, each having approximately 1,300 hectares (each corresponding to 12% of the total for Catalonia). These regions are followed by Terres de l'Ebre where there are approximately 600 hectares (5.9% of the total for Catalonia) and, finally, Alt Pirineu i Aran with 65 hectares (0.6% of the total for Catalonia). The views of those interviewed concerning land availability in industrial estates in Catalonia centred on their location with respect to the metropolitan area of Barcelona. In their opinion the further from the capital (Barcelona) the greater the availability of land. Nevertheless, as has been seen, the data obtained from the census do not appear to corroborate this view entirely. Almost certainly these differences derive from two interpretations: for the metropolitan area of Barcelona, land presently being developed as industrial estates (e.g. the "Parc empresarial de Viladecans") or at the project stage (e.g. the "Centre Direccional in Cerdanyola del Vallès") are not seen as a supply component; secondly, the fact that there are many industrial estates with high take up levels adds to the perception of saturation (9,000 hectares, more than half, have take up levels above 75%). In short, one can conclude that there is a substantial amount of land available in all the territorial areas and the metropolitan area of Barcelona is the area where most is located.

As has been seen, the availability of land and its distribution throughout Catalonia are factors that need to be highlighted when considering the supply of industrial

estates. Therefore, given the current situation, one cannot consider supply to be an impediment to developing economic activities. However, from among the other elements related to supply that have been analysed here, it should be stressed that dimensions, in most cases very small, and excessive fragmentation and dispersion of industrial estates throughout Catalonia, are perceived by those interviewed as factors that have a negative impact, not only on the territory but also on the competitivity of the economy. This view is held by the majority of those interviewed who, in addition, point out that large industrial estates or concentrations of industrial estates that make up "business areas" are a feature of rational land use and the only way to promote collective transport. From the census it has been possible to diagnose the current state of affairs concerning these issues. The first thing that should be underlined are the differences in the size of industrial estates between different territorial areas. Accordingly, in Camp de Tarragona, Terres de l'Ebre and the metropolitan area of Barcelona, the average figures for land space occupied by an industrial estate are higher (28.6 ha., 22.6 ha. and 21.9 ha., respectively), as opposed to Àmbit de Ponent (17.1 ha.), and particularly in Comarques Gironines and Comarques Centrals (12.8 ha. and 11.1 ha., respectively). As this study has shown, these differences between areas are also reproduced within each one. Generally speaking, in those parts of the territory where urban development has been more intense one can see concentrations of industrial estates that make up "business areas". This is the case for the area covered by the Pla General Metropolità (PGM – *Barcelona Metropolitan Planning*), the traditional industrial cities in the metropolitan area of Barcelona, the metropolitan area of Reus-Tarragona, and some of the other major urban systems in Catalonia (Lleida, Girona and Manresa). From these areas one needs to differentiate between PGM area, where the "business areas" are mapped out in the majority of cases from a supra-municipal perspective, and the rest, where planning is limited by an individual municipal view. In the other parts of the territory the characteristic features of site of the industrial estates are a high degree of fragmentation and being either medium sized (between 2 and 10 ha.) or small (from 0.5 to 2 ha.). In short, as regards dimensions and site of industrial estates, one can talk of supply in terms of a diverse range and spread out across Catalonia, both across different areas and, especially, within each area. With the exception of the PGM area, this due to the lack of a supra-municipal perspective.

An analysis has also been made of the site of the industrial estates in relation to urban centres. With the exception of areas where urban development has been most intense (the PGM area) or where the development land is seen as limited due to relief conditions, based on the census one can see a sharp degree of segregation with respect to the rest of the urban fabric. In total in Catalonia, of the 1,750 industrial estates, half are at a distance of more than 200 metres from one or other urban centre. Breaking this down by areas, the metropolitan area of Barcelona (the area with the highest level of urban development) shows the lowest percentage for segregated industrial estates (30.2% over the total industrial estates for this area), however since there is a very large park of industrial estates the number is very significant (215 segregated industrial estates). Second in order, we have Comarques Centrals (with 56.5%, 186 industrial estates) and Terres de l'Ebre (62.3%, 38 industrial estates). Finally, we have the areas with the highest percentage of segregated industrial estates: Comarques Gironines (70.4%, 202 industrial estates), Àmbit de Ponent (71.7%, 114 industrial estates) and Camp de Tarragona (72.7%, 128 industrial estates). These high percentages are generally due to a combination of two factors. First, in the general plans, the industrial estates have been located at quite a distance from the urban centres, leaving space in between to allow residential areas to grow, and in most cases these provisions have not been put into effect. The second most common factor has to do with the location of many industrial estates close to main road network infrastructures at a certain distance from urban fabrics. Given this, the majority of those interviewed, when referring to the issue of site of industrial estates in relation to urban centres, begin from one premise: the functions of industrial estates have changed and many of the businesses located in industrial estates are not incompatible with residential uses.

Turning to the perspective of demand for space in industrial estates, the change in the functions of industrial estates turns out to be a particularly important factor. First of all, one needs to bear in mind that these changes are determined by the main economic and territorial dynamics. At present, they are characterised by the shift towards tertiary enterprises in the economy, the fragmentation of production, the relocation of businesses inside Catalonia and the outsourcing of business enterprises outside Catalonia. The latter process was one of the most predominant issues referred to by those interviewed. In general, this is seen as being linked more to production costs rather than the consequence of land shortage or land prices. In contrast to the production costs issue, the quality of the environment around the industrial estates is considered by those interviewed to be an important factor for competitivity in order to attract and keep companies there.

Industrial estates, as specialised spaces of economic activity, are the areas where these processes are most apparent, and, as stated earlier, they have led to changes in the kinds of businesses that can be found in industrial estates. Accordingly, industry occupies a little less than half of the industrial estates' land, and one can predict that the demand for space by this sector will not increase appreciably. New demands will be determined by the relocation of manufacturing businesses (from the centres of cities to the periphery) and attracting new companies. With this in mind, the main future challenges appear to be: remodelling the oldest industrial spaces, adapting them to the new demands for industrial estate premises (smaller format, modular, with spaces for offices, and also introducing the option to rent) and the profile of industrial estates (services for companies and workers, development quality and facilities, good access routes).

These opinions are backed up by the data from the sample, where one can see that transport and warehousing businesses account for one fourth of the land, and are even more predominant in some of the more recent industrial estates. Statistical evidence for the presence of logistics companies in industrial estates provide us with a break down of the most important areas where they are concentrated: 40% in Àmbit de Ponent, 25% for the metropolitan area of Barcelona, and Camp de Tarragona (although the sample did not allow for empirical quantification, we were able to verify the case for this area from the in-depth interviews). In the first case, the strong presence of logistics businesses is associated with local agroindustrial companies, while in the other cases this is due, above all, to the proximity of two of the principal Mediterranean ports. In all three areas it is expected that the demand for space by these businesses will continue to grow, in one case due to the agroindustrial businesses and in the other two because of expected growth of the ports. One can expect that logistics enterprises will continue demanding space in industrial estates throughout Catalonia since, as pointed out by those interviewed, with the fragmentation and specialisation processes of production the commercial exchange of goods is becoming more and more commonplace. In general, the logistics sector is seen by those interviewed as a kind of undesired type of activity, especially as one moves further away from the ports of Tarragona and Barcelona. So, although everyone considers this to be a strategic matter, they also point out certain conflicts resulting from the belief that logistics enterprises require large areas of land but generate few jobs.

Finally, tertiary activities account for one fourth of the land of the industrial estates in Catalonia. One has to take into account that the presence of these businesses is one of the principal elements that have caused an increase in competition for land use, which in some cases has posed

difficulties for locating manufacturing businesses. As it is happening in the sector in general, there is also a wide range of tertiary businesses in industrial estates. To facilitate analysis of this competition, tertiary businesses have been classified based on the operations they carry out in the industrial estates and location alternatives. Accordingly, one needs to distinguish three business groups: in the first group there are those which have to be located in industrial estates, such as wholesale businesses which, due to the volume flow of goods, would make them incompatible with residential uses. These activities account for 8% of the land in industrial estates in Catalonia and it is forecast that demand will continue to increase. The second group is comprised of businesses that offer services to companies or workers in industrial estates. These are catering businesses, banking facilities, petrol stations, some hotels and others. At the moment there are many industrial estates where there is a shortage of these services, particularly in the smallest industrial estates. So, one can predict that demand for space by these services will be determined by the size of the industrial estates under development. However, one has to bear in mind that they improve competitivity of the companies located there and the quality of life for those people who work there also. The third group is comprised of those businesses which do not provide a direct service either to companies or people, and furthermore are not incompatible with residential uses. These businesses account for 8% of the land in industrial estates in Catalonia and, generally speaking, their location has to be related to the possibility of access to more ground space at a lower price. However, one should bear in mind that these businesses add to competition for land use in industrial estates which can pose difficulties regarding the locating of other branches of business.

1 This article brings together the major contributions from the study entitled "Anàlisi de l'oferta i la demanda de polígons industrials i terciaris a Catalunya" ("*An analysis of supply and demand for industrial and tertiary industrial estates in Catalonia*") by the IERMB team commissioned by the Departament de Política Territorial i Obres Públiques (*Department for Territorial Policy and Public Works*).The authors would like to especially thank Maria Costa's work in the development of the *Census*.

2 Ortofotomapes 1:25.000 de l'ICC, versió 4. Any dels vols 2000-2003.

3 In this article we have used the seven functional areas for the purpose of our study as given in the Pla Territorial General de Catalunya (*General Territorial Plan for Catalonia*): the Àmbit Metropolità (*Metropolitan Area*), Comarques Gironines (*Girona Regions*), Camp de Tarragona (*Tarragona Area*), Terres de l'Ebre (*Ebre Lands*), Comarques Centrals (*Central Regions*), Àmbit de Ponent (*Western Area*) and the Alt Pirineu i Aran (*High Pyrenees and Aran*). We also use "metropolitan area of Barcelona" when referring to the Metropolitan Area.

4 Data source for urban and development land: Direcció General d'Urbanisme. www.gencat.net/ptop

5 The data for Camp de Tarragona (*Tarragona Area*) have not been included as they proved to be of slight significance.

6 See the article entitled "La ciutat i la indústria" ("The City and Industry").

7 For a complete list of interviewed, please see footnote 6 on the Catalan text.

ACCESS TO INDUSTRIAL ESTATES: UNFINISHED BUSINESS

Àngel Cebollada

Introduction

Industry has been re-located to industrial estates on the urban periphery without considering how accessible they are for workers. There is a severe deficiency of collective transport systems linking these industrial estates, and so the car is effectively the means of transport which best guarantees access. This situation has serious social and environmental repercussions. To address this situation, the "Llei de mobilitat de Catalunya" ("*Mobility Law for Catalonia*") provides for executing mobility plans for its industrial estates and creating mobility managers. These two provisions have just begun to be put into practice throughout Catalonia.

1. Inaccessible industrial estates

In recent decades Catalonia has witnessed a process of re-location of economic activities, characterised, to a certain degree, by focusing services (especially advanced services) in urban centres and relocating commercial enterprises that require large land areas, such as industry, to the peripheral urban areas. This is also part of a larger picture, a gradual process of specialised land use according to the purpose for which it is used, and which generates unique and physically separate specialised zones. This is precisely the case for the industrial estates which now form part of our daily urban landscape (López de Lucio, 1993).

The creation of these industrial estates coincides with the increased use of privately-owned vehicles and with the gradual downsizing of various collective transport means. As a result, areas have been specifically designed to house industry in suburban spaces located at varying distances from traditional urban stretches without allowing for means of transport other than a privately-owned car (Cebollada i Miralles, 2005).

The outcome of this process is a situation where there are numerous and fragmented industrial areas where accessibility is a serious problem unless one gets there by car. This is illustrated in the study by the Metropolitan Region of Barcelona's Comissió de Mobilitat del Pacte Industrial[1] (see table 1): 19% of industrial estates within the Metropolitan Area of Barcelona and 20% of the land area where industry is located are particularly difficult to get to if public transport is used. By this I mean that the closest inter-urban bus stops or train stations are 1.5 kilometres from the centre of an industrial estate as the bird flies. In contrast, 23% of industrial estates and 26% of the land area where industry is located are accessible through regular public transport services (PIRMB, 2003). However, these figures are somewhat optimistic when we take into account that the transport services themselves have not been evaluated adequately. By this I mean that while an industrial estate could be 500 metres from a train station, the trains may only run once every two hours, or there may be a bus that runs once an hour to an industrial estate where five thousand workers are employed. Furthermore, what has not been taken into consideration are physical, natural or urban obstacles that separate the train station or bus stop from the industrial estate.

Another issue is the minor role played by company-operated transport. In the beginning (at the end of the 1960s and the beginning of the 1970s), the first companies to set up business in these industrial estates provided transport for their employees, but with the passing of time this means of transport has been progressively withdrawn. This fact is explained by increased car ownership among the population, residential dispersion, inflexibility of available services and the gradual externalisation of transport costs. At the moment, according to data from the survey, *Mostra de polígons d'activitat de Catalunya, 2005-06*[2] carried out by the Institut d'Estudis Regionals i Metropolitans de Barcelona[3], only 10.3% of the industrial estates in the Metropolitan Area of Barcelona and 7.4% of industrial estates in Catalonia as a whole have at least one company that relies on company-operated transport services.

In the light of these statistics concerning collective transport, the breakdown of transport means used by people who work in industrial estates comes as no surprise. The following table illustrates the breakdown by mode of the different industrial estates in the Metropolitan Area of Barcelona. Here you can see a group of industrial estates, all located in periphery municipalities, where the use of a privately-owned car to get to work is above 90%. This percentage drops dramatically in industrial estates where some of the major firms provide company transport (i.e. the case for the Montornès del Vallès group of industrial estates), or those industrial estates located close to metropolitan centres where there is a relatively wide offer of public transport services (for example, Granvia Sud de l'Hospitalet de Llobregat).

2. Economic and social dysfunctions resulting from the lack of accessibility

The lack of accessibility to industrial estates via means other than a privately-owned vehicle brings in its wake a chain of consequences for the environment and socio-economic dysfunctions. This article deals only with the latter of these two, which I have grouped according to who is affected: the workers in the industrial estates, the companies in the industrial estates; and those who are excluded or "absent".

2.1. The workers in the industrial estates

This case concerns that group of people who, despite the problems accessing industrial estates mentioned earlier, are able to get to the industrial estates and, consequently, the work place. This does not detract, however, from the fact that these people have to assume additional costs resulting from this situation. For the majority of workers who get to work using their own vehicle, these costs can be translated in terms of the time taken to get to and from work, the money spent and accidents that can occur *en route*.

Additional costs in terms of time are directly related to the mass use of privately-owned vehicles and the resulting road congestion. This fact mainly translates as an increase in travel time and, consequently, the working day since the journey is directly related to the job. This significant amount of time spent getting to and from work has a direct impact on reconciling time spent at work and time spent with the family.

Cost in financial terms derives mainly from the need to purchase and maintain a privately-owned vehicle as a necessary means to get to the work place. However, this cost increases as a result of road congestion due to the amount of wear and tear on the vehicle and higher fuel consumption.

Accidents which occur *in itinere* are clearly another problematic element for those people who have to travel to work using a privately-owned vehicle. Here I am referring to accidents which occur when travelling to and from work. If we look at figures for the Spanish State as a whole, 40% of road accidents are *in itinere* (some 40,000 per year). In Catalonia alone, the total in figures for this category of accidents was 17,371 in 2004. In Catalonia, in 2003, 90 people were killed in road accidents *in itinere* (the majority due to road accidents), a figure which means that 6 out of every 10 work-related deaths happened while travelling to or from work. In addition to these statistics, 1 in every 9 work-related accidents resulting in sick leave in Spain are due to road accidents, which means that 140 million work days were lost as a direct result of road accidents (CONC, 2004).

Turning to workers in industrial estates who travel by public transport, we find that the cost in time is very high, and a number of factors explain this. First, the need to change to another service; second, because of road congestion which bus users also have to live with; third, because of the distance between the bus stop or train station and the work place; and fourth, the adapted service schedules for industrial estates, which means that they have to get to work well before the work day begins or that they have to wait for a long time before being able to set off home.

2.2. The companies

The lack of accessibility via means of transport other than a privately-owned vehicle also affects the companies that operate in industrial estates since they are often obliged to take on employees from a limited labour market. This situation affects the lowest professional levels (students on work experience) and, to a lesser degree, the high-profile professional categories.

In order to meet employment needs for the less specialised job profiles, they are only able to resort to the very local labour market, often from the same municipality, because the percentage of people in this group who own a car is low. This means that companies have difficulty satisfying their employment needs and are unable to take advantage of the most appropriate human resources in the region where they operate.

The difficulties resulting from being unable to take advantage of students on work experience is another drawback which these companies have to deal with. The professional training courses in secondary education include work experience in companies as part of the student's studies. Generally speaking, companies place a high value on the possibility of engaging students on work experience, as this is an opportunity to try out workers who already have basic training and, at the same time, students can complete their training according to the specific needs of the company where they are fulfilling their work experience requirement. The difficulties related to access to industrial estates means that many companies forgo the possibility of taking advantage of work experience students.

The high-profile professional categories are another group which pose problems for companies when it comes to fulfilling employment needs (and on occasions securing those already employed). Some companies in suburban industrial estates in the second metropolitan ring have experienced the situation in which it is becoming more and more common for employees to place a higher value on having more time for themselves. The existing road congestions and the subsequent time that they have to spend on the road, means that proximity and savings in terms of time are important considerations when it comes to choosing a job. Faced with this situation, the strategy employed by the companies to retain personnel of particular interest is to offer higher salaries.

Another consequence of the lack of accessibility, and related to the points I have just mentioned, is the difficulty of maintaining a stable workforce in certain companies. In the previous paragraph we have seen the case of workers belonging to the high-profile job categories. But the same can be said for the middle and lower professional job profiles, particularly in those companies that are located further away from the collective public transport services and/or those operating in sectors where salaries are lower.

Road congestion also affects companies since in real terms this means lost working hours. A pertinent example is the case of lost production capacity at the Seat plant in Martorell, where up to 2,000 vehicles were not produced due to workers arriving late over the course of one year. As a result of this situation, a plan has been put forward to provide a train service to the plant to prevent road congestion (CONC, 2004).

2.3. Those "absent"

The third category affected comprises those groups who do not have access to a privately-owned vehicle on a daily and independent basis. These make up the group I call "absent" from industrial estates. One only has to page through the classified ads to see that job vacancies include the requirement "own vehicle required" to get to work; even if it refers to temporary work for three months and for the lowest of the job profiles. This clearly has a direct impact on job opportunities for these people and the likelihood of finding a job. Generally speaking, the social groups that find it most difficult to get to industrial estates are women, students, young people and immigrants.

The women most affected are those with a low formal education profile who tend to seek employment in production or outsourced services such as cleaning. To overcome this accessibility obstacle, women have to resort to strategies which make them dependent on third parties, a fact which explains why they continue to be the principal users of the carpool system or a colleague's car. This means that access to industrial estates by women is very much limited to local areas.

From among students on work experience, those who are most affected are those in the Catalan "cicle formatiu mitjà"[4] who are still not of legal age, and particularly young men who choose to qualify to work in the industrial sectors and, therefore, need to further their training in companies, the majority of which are located in

industrial estates. In contrast, young women usually specialise in sectors such as administration, healthcare, hairdressing or sales; in the majority of cases their work experience training can be carried out within city limits. As is the case for women, this group has to rely on the car as a passenger to be able to get to the industrial estates. The lack of safety provisions on the road networks that link to the industrial estates rule out the possibility for them to resort to alternative transport means such as a bicycle or moped.

In addition to students, the young people most affected by this situation are the lowest age groups, with less formal training and with very limited financial resources. This group in particular has difficulty entering the job market because lack of accessibility leads to them being undervalued socially and means that they run a very high risk of social exclusion.

Immigrants also have serious difficulties accessing industrial estates. Nevertheless, people from this particular group attempt to overcome this obstacle by resorting to a wide range of strategies: walking or cycling along lengthy suburban stretches on the side of the road (and at unsociable hours), travelling as a car passenger, forming part of a carpool or using public transport means. They make use of whatever is available to address their disadvantaged situation in the labour market.

Paradoxically, from one perspective, this inadequate state of affairs regarding access to industrial estates seriously discriminates against the socio-economically weakest groups. Yet these very same social groups have set up mobility strategies which are more sustainable (which is precisely what is needed, a requirement from society and sustainable mobility), but yet is difficult for us to put into practice to access the work place in industrial estates with the present offer of transport services.

3. The instruments foreseen to improve access to industrial estates: mobility plans and the position of mobility manager

As of July 2003, Catalonia now has a new set of official guidelines for regulating mobility. The objective behind the mobility law, unanimously approved by the Catalan Parliament, is to plan and manage mobility based on the criteria of environmental and social sustainability. The problems that have been identified to date have lead to this law providing for a particular method of working that gathers information about accessibility problems to industrial estates and establishes the need to draw up and execute specific "Mobility Plans" for these areas. Among other issues, these plans include the need to create the position of a mobility manager.

3.1. Drawing up mobility plans

At present the first mobility plans for industrial estates are being drafted, partly as a direct result of this law, but, particularly, in response to the local representatives who realise that we need to get down to tackling a problem which is becoming increasingly conspicuous in the areas where they operate.

The mobility plans are enacted by a variety of territorial administrations and from the perspective of different territorial areas. The transversal nature of mobility and the different territorial levels involved means that that there is (or could be) a certain profusion of plans proposed and areas affected and which could denote a certain degree of lack of coordination in their studies and proposals. At present, mobility plans are being sponsored by the Generalitat de Catalunya (*Catalan Autonomous Government*), the Diputació de Barcelona (*Barcelona City Council*), the Consells Comarcals (*County or Regional Councils*) and Ajuntaments (*Town Councils*). In addition, there is a plethora of areas, each sponsoring their own plans: territorial and urban policies, economic development, mobility and the environment. This multiplicity of administrations and areas means that on occasions there is an overlapping and different resources could be allocated to the same industrial estates. This has reached the point where, on one occasion, a local council approved two different mobility plans for the same industrial estate without the two departments responsible for putting them forward (in this case economic development and environment) being aware of the other's proposals. Although common sense and good will avoid such flagrant contradictions, and overlapping and lack of coordination are rectified, this should not distract us from the fact that in general what is lacking is a global strategy for dealing with this issue.

In the following paragraphs I shall comment on some of the mobility plans put into operation for industrial estates in the Metropolitan Area of Barcelona, grouped according to methodology and objectives.

In 2004, as a pioneering project, the Barcelona's Metropolitan Region Industrial Pact (PIRMB), and more specifically their Commission on Mobility, promoted the initiative of drawing up mobility plans for industrial estates for three metropolitan municipalities. The objective was to go beyond the plans themselves and to draw up methodology criteria that would serve as a basis for plans in other industrial areas. These plans incorporated a clearly innovative dimension: the inclusion of socio-economic dysfunctions derived from the lack of accessibility and the identification of those groups excluded, thus going beyond the limits of conventional studies on mobility needs.

This task included the participation of the Catalan Autonomous Government's Departament de Política Territorial i Obres Públiques (DPTOP - *Department for Territorial and Public Works*).

Almost parallel to this, and from the area of Barcelona City Council's Vies Locals (*Local Road Networks Department*), a mobility plan was drawn up for an industrial package for three municipalities in Vallès Oriental. On this occasion there was cooperative exchange regarding methodology with the PIRMB mentioned earlier, so that their plan would have comparable results to the previous case. The same approach has been adopted in the municipality of Viladecavalls' Industrial Estates Mobility Plan, proposed by the Pacte per a l'Ocupació del Vallès Occidental[5].

Based on the proposed measures to be adopted, these plans are at different stages of implementation, basically those referring to improvements to, or the creation of, new bus services. Other proposed measures, such as those referring to creating mobility committees, mobility managers or steps to be taken in the area of privately-owned vehicles, have not yet been put into operation.

The Barcelona City Council's Department for the Environment is heading a three-year European project whose objective is to map out ten mobility plans for industrial estates (seven for the administrative boundaries of Barcelona and one for each of the other three administrative areas of Catalonia) as the first step (the first year), and to establish a methodology for putting into operation negotiation mechanisms between the local representatives of the industrial estates in order to implement the proposed measures. For this reason, the project foresees the need for training and appointing ten mobility managers to carry out this task during the remaining two years.

I would also like to point out the work being carried out by the Pacte per l'Ocupació del Consell Comarcal del Vallès Occidental to make an inventory of all the mobility plans and projects that affect industrial estates in this region. This inventory hopes to gather all the proposals for improving accessibility to industrial estates, particularly those which at present have not yet been put into practice, to highlight possible areas of overlapping interests, detect points in common and map out those industrial estates that have been "overlooked", etc. All in all, this is a project that is attempting to make a global reading of the situation so as to be able to provide operational guidelines at a regional / county level which embrace an area that goes beyond the just the industrial estates themselves or an individual municipality. One has to bear in mind that the industrial areas for the Metropolitan Area of Barcelona often form part of urban extensions that cross over the boundaries

of municipal administration jurisdiction. This means that many industrial estate mobility plans for a given municipality affect the area they comprise although the industrial area extends beyond their administrative boundaries.

Altogether, an inventory was made in Vallès Occidental of 58 plans or projects, 21 specific to industrial estates[6] which illustrate the panorama of local councils and local representatives involved as well as the different areas that are working on mobility. Another issue that this study has highlighted for discussion is the lack of coordination and exchange of information that sometimes exist between the local councils themselves.

3.2. The mobility manager

As I stated earlier, the mobility law foresees creating mobility managers. This position, however, still needs to be defined and presents a number of issues to be resolved concerning what their profile should be, which the territory they should cover and who would be responsible for appointing them.

As regards their job profile, it appears that they should be responsible for managing mobility to industrial estates based on applying the agreed plan, and they have to take great care to work with representatives from the industrial estates to make progress in solving this problem. In any case, given the lack of mobility provisions for industrial estates in many respects, there are those who are in favour of creating an overall industrial estates' mobility manager rather than an individual mobility manager assigned to a specific industrial estate.

Turning to the area which an industrial estate should comprise, there is also confusion. In the Vallès Occidental region alone a list has been drawn up of 112 industrial estates: some cover a very small surface area, others are small units integrated into an extended industrial area that were classified as industrial estates as a result of a partial plan that had been developed. It would seem pointless to assign a mobility manager to each of these industrial estates, and yet it would possibly be more viable to group certain individual industrial estates together based on key variables such as territorial continuity, labour market and mobility flows.

Finally, which local authorities or local representatives should set aside time and take on the expense of appointing and training mobility managers, is another current problematic issue. If the law states, "a framework for setting up and financing has to be established which is the responsibility of the companies who operate there…"(Catalan Mobility Law - additional third paragraph)[7], then this is not a realistic possibility while it is based solely on the disposition of the companies and not on clearly binding legislation.

At the moment we can talk of two mobility managers who are responsible for Zona Franca and the Universitat Autònoma de Barcelona (*Autonomous University of Barcelona*), although the latter is not an industrial estate in the strict sense of the term. But, both cases are special areas which each cover a very large surface area, so this does not make them the best of models from which to base experience for applying to other areas. As a final point, the managers of the project headed by the Barcelona City Council's Department for the Environment foresee the financing of managers through European institutions, as a pilot project, which means that it would be difficult to extend this financing to other areas.

4. The world of the industrial estate: a heterogeneous reality to be taken into account to improve accessibility

Improving access to industrial estates means making the necessary instruments available to travel there via means other than a privately-owned vehicle. However, industrial estates are very heterogeneous in themselves when it comes to structure, local representatives, social groups, tasks, and schedules, etc. This diversity needs to be taken into account: proposals should not be thought of in general terms but rather tailored to the needs of specific social groups. Companies are the physical space where different social groups coincide on a daily basis to perform their jobs, but each of these interested parties interacts in its own way with means of transport and mobility strategies.

The following paragraphs provide a breakdown of those who make up the groups of people that need to gain access to industrial estates on a daily basis.

The workers directly employed by the companies located in the same industrial estate are not a homogeneous group, either by gender, age, professional category, working hours, disability or rights. However, they do make up the most visible group and they are the main focus of the diagnostic studies and proposals for mobility plans to industrial estates.

Sub-contracted workers make up a mixed bag who play an important role in the daily running of companies that outsource a large number of tasks, including production work. These sub-contracted workers are likely to use vehicles to get to the industrial estates, sent by the following companies:

a) *Temp or Seasonal Job Agencies*. These are a supply source of a large number of people who have to get to and from industrial estates on a daily basis. Given the temporary or seasonal nature of their work and that these people tend to correspond to the lower professional job profiles given the tasks they perform, this group encounters great difficulties getting to industrial estates since many of these workers do not own a vehicle.

b) *Companies providing cleaning services*. This task is common to all the companies in industrial estates and is generally sub-contracted. The workforce in this sector is usually comprised of women who have mobility difficulties and who often work unsociable hours, typically before the normal work day begins. Therefore, these are people who work during hours when there is a serious lack of transport services other than a privately-owned vehicle.

c) *Employment associations working with disabled people*. Although they can also be hired directly by the company, there are associations that, in effect, operate like companies providing a service with the objective of placing people with some disability. This social group also has a specific profile as regards mobility as they need access to more specific means of transport. The majority of the busses that run to the industrial estates are not suitably equipped which means that industrial estates are inaccessible for this particular group.

d) *Other sub-contracted groups*. This encompasses a group that could range from the security sector, gardening or catering. These people also have a specific job profile regarding the hours they work and the available means of transport.

The Secondary Education Schools and the universities also generate a group of people who are required to carry out their training, at least partially, in companies located in industrial estates. The mobility problems faced by this particular group of students on work experience have been discussed earlier in this article. The curriculum for Catalonia's secondary schools' "cicles mitjà i superior" includes, as part of the study programme, a work experience module which students are required to fulfil to be able to complete their formal education. These work experience modules are an integral part of the academic year whereby students have to combine a half-day's work at a company with a half-day at school. Students, therefore, make up a group with a specific mobility profile as regards mode of transport, working hours and the route they have to travel.

5. Views concerning mobility strategies

In addition to this heterogeneous reality regarding the profile of local representatives and social groups found in industrial estates, there are also a variety of views concerning the different mobility strategies. Being familiar with these views is of primary importance when it comes to carrying out proposals concerning

accessibility: what would be the agreements and objections to introducing improvements, what role should be played by each local representative and what responsibility would they be ready to take on? All of this would be extremely useful information for the mobility manager to elaborate measures that by necessity are extremely complex, as is the problem to be resolved. In the following paragraphs, I shall describe these mobility strategies and the most common views held by the various local representatives.

The car as a driver. This is the predominant strategy and the one seen as being the most practical for getting to the industrial estates. In fact we have already seen at the beginning of this article how this is the majority transport choice in the industrial estates for which we have data. This fact needs to be put into a context of the poor offer of alternative means of transport other than the privately-owned vehicle, and the fact that there is an absence in these industrial estates of other social groups, that is, those who do not own a vehicle. This very lack of alternatives means that many companies specifically require their workers to be car owners to the degree that those excluded continue to be overlooked when proposing a mobility model.

Car sharing. So often we forget that there is a more rational use of the car from a social and environmental point of view. Car sharing is also a common practice for getting to and from industrial estates. In the table below, you can see that the percentages for those who resort to this strategy runs from around 4.3% for the Granvia Sud industrial estate, to 10% for the industrial estates in the Polinyà industrial estate.

Here we have two ways of sharing. The first is the carpool, that is travelling together with other work colleagues. The reason for resorting to this strategy could be sharing travel expenses or alternating the car being used, or it could be another way for some people to get to work who do not own a car. The second vehicle sharing option is to rely on resources within the family whereby a family member expressly drives the person to the work place when no other solution is available; typically, this is the strategy resorted to by women and young people. Many companies do not view this strategy option positively as they do not consider it to be a valid solution because if anything happens to the person driving this will result in absenteeism of his/her companion travellers. Therefore, to promote this particular strategy one first needs to establish measures that would solve these problems and meet with the approval of all parties concerned.

Company-run transport. It is viewed by many firms as a relic from the past on the road to extinction. This is a service that has been steadily decreasing year after year as workers rights to this service have been "bought up" by the companies. In some cases this service has been maintained because it is required by law (i.e. if the company has relocated) or because company committees (with the exclusive right to decide on these matters) have chosen to retain the service. The continuity of these transport services undergoes re-negotiating conditions, that it should be a service shared by various company collectives and there should be mutual agreement between all the parties involved.

Public transport. It is considered completely inadequate by all the local representatives. The statistics generated by the surveys answered by workers in the industrial estates clearly illustrate the state of these services. We have already seen in table 2 how the figures for those using public transport are very low and vary between a marginal 0.2% for Parets del Vallès to the exception of 27.6% for Granvia Sud de l'Hospitalet de Llobregat. However, taking aside the latter case, the data for all the industrial estates reflect figures of 6.7% or lower.

Setting up new lines of service or adapting those already in operation needs to be adapted to needs related to working schedules, complementing present services and integrating them into the public transport service routes. For example, you cannot have a situation where the proposed bus service begins before that of the urban bus services in the municipality where this service would run from. Here, proposals for operating public transport services, must also take care to provide a transport service that is competitive in terms of journey time and tailored to the size of the industrial estate and the number of existing workers. Likewise, these proposals have to incorporate concerns and views regarding safety, comfort and road safety provisions for the trajectories that run to the bus stops and stations. Once again, it is essential to incorporate gender considerations since, on the one hand, women are the main users of these means of transport, and on the other hand, they are the group most likely to experience potential risk situations: what is the point of a bus stop that is inaccessible or perceived as a potential danger? There are precedents for non-use of this means of transport precisely for this reason.

Non-motorised modes. Despite the fact that these modes of mobility are viewed as marginal, walking to work affects the majority of workers since it is an integral part of the majority of the routes. Therefore, any proposal that has the goal of improving access to industrial estates has to take into account itineraries undertaken on foot or by bicycle, be it within the boundaries of the industrial estate or possible links to transport infrastructures and urban nuclei in the surrounding areas. These routes have to be feasible and safe at any time of the day and for any of the social groups. Once again, this means taking into account gender at the design stage.

6. Final conclusions

At present, in Catalonia we are at the point where plans and operations to improve accessibility to industrial estates are emerging. The present problems encountered accessing these industrial spaces, that have resulted from lack of planning, and the environmental, social and operational problems that have ensued, are reason enough to justify the interest shown by many and various local representatives to work towards providing solutions to the problems highlighted in this article.

But the drawing up of these plans by the various bodies, and in different municipal areas, does not necessarily mean one should disregard working from a global perspective that could include areas that extend beyond an industrial estate and that could create links with its potential labour market and with other industrial estates in the area. To do this, it is necessary to take advantage of points of common interest, make good use of existing services, share services, not only for individual companies but also for different industrial estates as the most important factors.

It is also important for plans and proposals to be put into effect with the agreement of the local representatives involved for them to be effectively put into practice. As I have mentioned throughout this article, the proposals that have been put into operation are mainly those referring to public transport. But, the other face to the coin is that other proposals could be left hanging: setting up mobility managers, creating a mobility council, policies regarding the use of a privately-owned vehicle or improvements to accessibility for non-motorised modes, often end up not being put into operation. These considerations are no less important. But, above all, these are measures that require consensus and the active participation of the local representatives, the other dimension to a theoretical plan.

Another item to take into account is that all the local representatives and social groups in these industrial estates need to be considered: the most visible and hidden, those present and those absent. When mobility plans for industrial estates are proposed one has to have a very clear focus on the two objectives being pursued: the change in the transport mode for those people who travel to and from the industrial estates on a daily basis, and the inclusion of that sector of the labour market that has been left aside because it is impossible for them to get to the industrial estates. The surveys that deal with demand have focused on those who can get there and, normally, those

who have been directly employed by companies in the industrial estates, and include very little data for subcontracted groups. The very same data that is used as a basis for getting to know the world of people who work in industrial estates can tend to overlook groups of workers such as cleaning services, ETTs (Temp or seasonal employment agencies in Spain) or auxiliary services. And, as I have already said, regardless of the volume of people they may represent, this particular group of people are vulnerable because of the mobility modes they have to use.

To be able to identify the group I call "those absent", we need to resort to qualitative research methods. Getting to know the nature of the problem, views and concerns surrounding mobility problems generated by the lack of accessibility and the profiles of those absent, are key data that should allow us to draw up proposals to facilitate their inclusion.

Finally, it is necessary to see that newly constructed industrial estates incorporate accessibility needs into their initial stage of conception and include modes of transport that would allow for sustainable, safe and universal access.

1 The Pacte Industrial de la Regió Metropolitana de Barcelona is a territorial association made up of local administrations, trade-unions and businesses organisations and a wide variety of bodies related to economic development and the promotion of employment.
2 Survey of active industrial estates in Catalonia, 2005-06.
3 Institute for Regional and Metropolitan Studies of Barcelona.
4 This is a two-years period of professional learning, usually for 16 to 18 years old people.
5 Vallès Occidental association of companies, trade unions and local administrations to promote employment.
6 In this study the more general plans were used if the municipality did not have specific studies for their industrial areas.
7 "ha d'establir-ne el règim d'implantació i el finançament a càrrec de les empreses que hi operen..." (*Llei de mobilitat, Disposició adicional tercera*).

INSTRUMENTS FOR THE PLANNING, DESIGN AND MANAGEMENT OF NEW AREAS OF ECONOMIC ACTIVITY[1]

Margarida Castañer
Antoni Ferran

Introduction

In the month of September 2005, Olot was the venue for the third Workshops on Environmental Evaluation[2] applied to town and country planning. The workshops were organised by the *Fundació d'Estudis Superiors d'Olot* (Olot Foundation of Higher Studies) and the *Col·legi d'Ambientòlegs de Catalunya* (Professional Association of Environmental Scientists of Catalonia) and involved the collaboration of the *Generalitat de Catalunya's* departments of Territorial Policy and Public Works, and Environment and Housing[3], as well as the *Observatori del Paisatge* (Landscape Observatory) (table 1).

The workshops focused on debating a specific aspect: the implementation of new areas of economic activity in the territory. Three key questions were approached in this respect: where do we locate them? What is installed there? And how are they installed?

1. Conceptual framework

The workshops, which were held in the context of the *new culture of territory*[4], particularly focused, as a preliminary element of the debate, on the fact that territory should be understood as being a finite, limited and scarce resource[5], one that is of key importance to all citizens, and which should be understood as a common asset that is not at the free disposition of the urbanisation process. They also considered, as a guiding element, the need to promote a change in the environmental policies that have been observed until now. The aim is to shift from *end of the pipe or corrective policies to preventive policies*[6].

The new concept of sustainable development and the need for it to occur on a local and regional scale offers an excellent opportunity for the integrated incorporation of the environmental and ecological question into town and country planning[7].

From an environmental perspective, the inclusion of environmental planning in plans and programmes[8] is a key part of this process. The idea is to plan ahead for the initial stages of the planning process and even of policies, in order to incorporate the environmental dimension from the outset and guarantee that all of the alternatives and impacts are adequately considered. But what are the tools and instruments available for the planning, design and management of areas of economic activity on the basis of this new conceptual framework?

2. Territorial planning

A primary element for reflection is that referring to the selection of the location for these areas. The choice is a key decision which should consider environmental and landscape criteria as variables that should be present in the decision making process.

But how should the choice of location be dealt with? Does every municipality have to have its own *industrial estate*[9]? There are several reasons why supramunicipal implementations are often necessary. This justification is included, synthetically, in the first conclusion to be drawn from the workshops: "The practice of locating an area of economic activity in every municipality has led to serious problems of an environmental and territorial nature. Among other effects, we should mention: the indiscriminate use of land, the difficulty of supplying them with water, power, new technologies... Moreover, dispersion generates problems in terms of mobility, both of people and merchandise and many of them are not very competitive".

Without large-scale planning and coordination, each municipality would have to construct its own estate, becoming obsessed with persuading activities to locate in its municipal district, pursuing the dangerous and imprecise vision of linking such location with richness and employment. It is as if those municipalities that do not manage to establish their own industrial estate would have to be indefectibly condemned to being marginalised in the general process of national growth.

The development model, in this context, must not lack a global territorial vision, either from the physical (accessibility, mobility of people, suitability of the type of soil, orography, environmental impact) or the strategic (exploiting the potentialities of each territory, specialising uses to obtain the maximum synergies, etc.) point of view. This option makes it possible to more efficiently deal, from an environmental perspective, with other aspects such as mobility, public transport access[10], quality supply of water and power, etc, while preventing these areas from being dispersed too much around the territory in order to guarantee that what is already a scarce enough resource is used more functionally and rationally[11].

Pluri-municipal industrial estates may be a solution in terms of the rationalisation and optimisation of the processes of territorial occupation, thus leading to a tendency to concentrate rather than disperse. This scenario obviously presents major problems in terms of town and country planning. The beneficial consequences derived from it (table 2) would be sufficient compensation for the major difficulties that would need to be overcome, and which cannot be denied, and the proposal signifies a change of panorama in terms of the urban planning of this country[12].

Territorial planning must assume a highly relevant role in this aspect, both in terms of the promotion and the establishment of these new locations in the territory, and of considering the criteria of functionality, rationality and efficiency. In this sense, the criteria for the development of the *Programa de Planejament Territorial* (Territorial Planning Programme) states:

"Territorial plans (...) must be restrictive in the implantation of industrial estates and business parks that are formally autonomous and separate from urban bodies. It would be useful for these implantations to be limited to those that

are of strategic territorial interest and are big enough to justify their development as a singular or autonomous network with a public transport service"[13].

So, the implementation of areas of economic activity on a supramunicipal scale cannot happen without considering the sensitivity of municipal authorities[14]. In awareness of this, debates of the issue have arisen in different forums. Clear examples of these, among others, are the recent workshops held in Vilafranca del Penedès, promoted by the Alt Penedès County Council, and the debates that have arisen in the county of La Selva, also promoted by the County Council.

In Vilafranca del Penedès it was highlighted that "For several years different voices within the county, and outside of it, have debated the need to find forms of territorial cooperation and compensation that can make the protection and conservation of the Penedès landscape compatible with local councils' needs to find mechanisms and strategies that can help them to promote the growth of their municipalities and provide a service to their citizens".

And in Santa Coloma de Farners it was said that "Municipalities must satisfy their citizens' needs. In this sense, there is an increasing need to find sites for waste disposal, municipal pounds, warehouses, libraries, sports centres, etc. All of this involves the acquisition of land, which has to either be purchased or acquired through the relevant transfer. It is the local administrations' lack of economic resources that has led to the existence of such a high offer of industrial land".

Consequently, there is a need for the local authorities that plan and manage new areas of economic activity of a supramunicipal nature to decide how they will be able to compensate for the advantages and disadvantages of the implantation of new areas of economic activity in consideration of all of the municipalities involved as a whole.

In this sense, the Olot workshops concluded (table 3) that "In order to develop this new strategy for supramunicipal areas of economic activity there is a need to find the right formulas and legal tools to viably distribute the advantages and disadvantages that are generated in relation to the different municipalities implied". This aspect will be commented upon in greater detail further on, when we discuss the management of these spaces.

3. Design

Another element for reflection is what elements should be installed and how they should be installed (table 4). Evidently, this involves a change in the scale of analysis (Plan Parcial or 'Zoning Plan'). This is the moment when the incorporation of environmental and landscape criteria can determine the final result and, especially, affect the perception that citizens might have of these new areas[15].

At this advanced stage of the decision making process, it is important to make a new effort to try to find what aspects require or could require more detailed work in order to achieve the maximum level of integration of environmental and landscape criteria in the development of the zoning plan. This is not a matter of theoretical considerations or of defining the standard criteria and recommendations in a generic fashion, but rather a matter of looking in finer detail at the location and identifying the aspects of greatest interest and those that could be the most vulnerable. Moreover, there is a need to define the actions that could be effective and efficient in the short term through application of the principle of precaution and prevention that was mentioned earlier.

In this context, the first question to be considered is that referring to the area and content of the obligatory environmental study. Current legislation specifies that this must contain sections that offer a description, an analysis and a justification of the plan. It must also include the specific environmental recommendations and conditioners that will need to be considered in order to neutralise or minimise any impact.

Recently, the *Direcció General d'Arquitectura i Paisatge* (General Management of Architecture and Landscapes), associated to the Generalitat's Department of Territorial Policy and Public Works, drew up a draft regulation bill that develops Law 8/2005, of June 8, for the protection, management and planning of the landscape[16]. Chapter II of said project covers the regulation of the landscape integration and impact study and the landscape integration and impact report as innovative instruments in the legislature of Catalan town and country planning. The draft regulation bill itself determines that a landscape integration and impact study will be required, among other situations, when any law, disposition or town and country planning in general establishes such a requirement.

In accordance with the aforementioned project, the study must contain the following:

a) Description of the state of the landscape: main components, landscape values, visibility and fragility of the landscape.

b) Characteristics of the project: site and insertion, documents that define the project: elevation, sections, floors, volumes, materials and other relevant aspects.

c) Criteria and measures of integration: potential impacts, analysis of alternatives, justification of the adopted solution and description of the measures adopted to correct the impacts.

The study must be accompanied by the graphic documents required to visualise the impacts and the proposals for integrating the project in the landscape, as well as information related to the state of the plans in which the action is to be included. Meanwhile, the main objective of the landscape impact and integration report is to evaluate the suitability and sufficiency of the criteria or measures adopted to integrate the required actions, uses, works and activities in the landscape. The issue of this report is the perceptive duty of the *Direcció General d'Arquitectura i Paisatge*, among other requirements, when so determined by territorial zoning plans and territorial directive plans, as well as all other possible situations established by territorial or planning legislation.

Environmental conditioners are covered by legislative decree 1/2005, of July 26, which passes the redrafted text of the *Llei d'Urbanisme de Catalunya* (Urban Planning Law of Catalonia) and establishes, among other matters, what the content of an environmental report should be. Law 9/2006, of April 28 was passed more recently on the evaluation of the effects of certain plans and programmes concerning the environment. In fact, this law provided a response to the pending transposition by central government of Directive 2001/42/CE of the European Parliament and of the Council of June 2001 concerning the evaluation of the effects of given plans and programs on the environment, which establishes guidelines on the basis of which a sustainability report should be produced, in terms of its content and the situations in which one should be made[17].

It should be considered that any proposal for developing a new area of economic activity should be developed on land that has already been qualified as industrial for the purposes of said plans. In relation to the set of variables that may be susceptible to study (such as land occupation, the water cycle, air quality, acoustic, lighting and radio-electric conditions, waste and material management, the conservation of biodiversity and natural heritage and landscape quality), there is a need to identify which are likely to cause the greatest impact and which ones are likely to be affected. Any activities that could be developed at the site need to be defined when regulating the plan.

4. Public promotion of a pluri-municipal site: The *new* challenge of inter-administrative collaboration

Given the changing scale of urban planning operations, both in physical and strategic

terms, the traditional methodologies for urban development based on the confluence of the actions and interests of the binomial of the town council and the promoter of the land, which until now has enabled municipal requirements and the interests of investors to converge, now appears to have its shortcomings. It now seems that unplanned public and private initiatives find it difficult to develop large-scale actions due to the complexities derived from this new scenario, which affects the shared territory or interests of several municipalities.

The promotion of a site for economic activity on a pluri-municipal scale requires agreement between a group of municipalities in a certain territorial region where a possible location has been identified. These municipalities must agree to act in a coordinated fashion, showing mutual concern and the will to collaborate in achieving these objectives (with or without the help of other administrations or the private sector). The importance of this *new* way of working was explicitly described in the workshop's conclusions, which said of the issue that it is "necessary for municipalities to integrate the *new territorial culture* in their day-to-day activities and to see the advantages they can benefit from by initiating a new strategy on a supra-municipal scale when it comes to defining the sites for new areas of economic activity in Catalonia. A new era has begun in which pacts and agreements between neighbouring municipalities will need to be made in order to be able to undertake common projects"[18].

The objectives that this group of municipalities and collaborating public or private agents will have to share will be specified over time as they observe a series of necessary stages.

1) Study the viability of the project.

2) Acquire the necessary land.

3) Prepare and manage the new urban planning project.

4) Urbanise the new site.

5) Commercialise and promote the plots of land resulting from the urbanisation process.

6) Manage the operations of the site over time.

The principles of approval, collaboration and solidarity must necessarily govern the relations between municipalities. The initiative must be understood to be a joint, decided and sustained management project that supports the development of the new site. This joint project will be specified by a series of major transactions, decisions and investments whose objective is to plan, construct and maintain a business park.

The distribution of advantages and disadvantages between the municipalities and other agents that are directly affected by the new industrial estate must form the basis for relations between them in accordance with the principle of solidarity. All of the participating agents must obtain benefits that correspond to their level of participation in the project, but must also bear any corresponding burdens. This logically implies that in carrying out the project, all effort and management tasks as well as investments should be fairly distributed.

The redistribution of income derived from the implantation of the business park should occur on the basis of two concepts: the sale or lease of sites must be adjudicated to each agent in accordance with the investments they contributed and their participation in active administration, as should be fiscal benefits, as established by agreement (project licence for new buildings, property tax on buildings constructed, business taxes).

Current regulations foresee two formulas for agreed activity between municipalities, both of which involve voluntary association: *mancomunitats* (the joint management of different communities) and consortiums with other administrations (table 5). In order to specify terms, there would be a need to formalise an urban planning agreement involving all of the administrations implied in order to establish the legal framework that will have to be constituted, establishing the essential elements of its statutes as part of the process.

Both situations are primarily governed by their statutes. However, in the case that concerns us, the promotion of industrial estates by local administrations, the consortium makes it possible for other public or private agents to be integrated; agents that are specialised in these kind of projects, and which have the technical and financial capacity to ensure they are carried out successfully[19].

In short, the need to find mechanisms for territorial compensation and cooperation is the challenge that needs to be solved in order to proceed with this new strategy, one which must be able to tackle the new territorial and environmental challenges in our country today. Consensus regarding the need to find new mechanisms for territorial compensation and cooperation is unanimous and proposals have been put forward in several different forums.

There are plenty of formulas and ideas regarding the issue. There are French[20], Italian[21], Basque[22] and Catalan[23] experiences. But in fact, as Fernando Nebreda, managing director of Oarsoaldea told us at the end of his talk in Olot, "in any case, the other interpretation we could draw from this experience is that instruments for collaboration on a county level do exist, but they are incomplete or imperfect. Current legislation does provide us with mechanisms. But putting these into practice requires political desire. And for there to be political desire, we need to deal with a preliminary process of reflection, to convince ourselves that it could be the right instrument for participating not only in the costs, but also in the benefits of a joint promotion of industrial land".

---

1 In writing this article we based our work on the reports presented at the third Workshops on Environmental Evaluation applied to town and country planning. We would like to thank the different speakers for the effort they put into preparing the materials used in the workshops and especially the contributions made by Albert Cortina, Ramon Forcada, Fernando Nebreda and Joan López.

2 Previous editions: See the minutes of the I Workshops on the Evaluation of the Environmental Impact of Town and Country Planning, which discussed the technical and political challenges of applying Directive 2001/42/CE. The minutes of the "II Workshops on the Introduction of Strategic Environmental Evaluation in Town and Country Planning: challenges and experiences" are also available. FES. Olot, 2000 and 2002. Càtedra de Geografia I Pensament Territorial. Universitat de Girona.

3 For more information see www.fes.org

4 See the Declaració de Figueres (Figueres, 2003), Declaració de Tortosa (Tortosa, 2005) and the *Manifiesto por una nueva cultura del territorio* (2006); Madrid, Colegio de Geógrafos.

5 The European Soil Charter published by the Council of Europe in 1972 said "Soil is a limited resource that is easily destroyed". Later, in 1992, in the Curitiba Declaration, which formed part of the Rio de Janeiro summit and was possibly the first constitutional attempt at specifying the requirements for sustainability on a local scale and in the territorial sphere, says we should "waste the minimum and economize the maximum".

6 Antoni Ferran i Mèlich; *La consideració dels aspectes ambientals i paisatgístics en el disseny dels nous polígons*.

7 World Charter for Nature. United Nations Resolution of October 28, 1982: The United Nations General Assembly passed the charter for nature which proclaimed such principles as: "In the planning and implementation of social and economic development activities, due account shall be taken of the fact that the conservation of nature is an integral part of those activities".

8 Directive 2001/42/CE of the European Parliament and the Council of June 27, 2001, concerning the evaluation of the effects of given plans and programs on the environment, transposed to the Spanish legal framework by Law 9/2006 of April 28 on the evaluation of the effects of certain plans and programs on the environment.

9 We speak of an area of economic activity although the term *industrial estate* is often used to refer to the same, which does lead to a certain conceptual and terminological confusion.

10 Joan López: "The most outstanding fact is that industrial estates spread all over the territory lead, through their very nature, to mobility that is difficult to satisfy with collective means of transport", Institut d'Estudis Regionals i Metropolitans.

11 See footnote number 6.

12 Ramon Forcada i Pons (2005); *Actuacions industrials i d'activitat econòmica d'abast plurimunicipal. Projectes de l'Incasòl*.

13 Departament de Política Territorial i Obres

Públiques; *Criteris per al desenvolupament del Programa de Planejament Territorial.*

14 In the opinion of municipal representatives, the development of new areas of economic activity (industrial, commercial and services) represents a possibility for local financing. The promotion of an industrial estate by private initiative initially involves a set of benefits for local bodies: Short and medium terms income in the form of project licences, long term income in the form of IAE (Impuesto sobre Actividades Económicas - Business Tax) (medium and large companies), the use of the space by municipal services through transfer of the corresponding percentage of land, generation of local employment. However, if the planned occupation of land does not lead to the companies actually being implanted, all that is generated is land in reserve that is subject to speculation in relation to costs, without generating any benefits for the municipality, other than the availability of land for locating municipal services. (Minutes of the meeting of La Selva CSPS [Supramunicipal Council of Sustainable Planning] of June 29, 2006.)

15 Antoni Ferran i Mèlich; *La consideració dels aspectes ambientals i paisatgístics en el disseny dels nous polígons.*

16 Edict of May 9, 2006 that made public the draft decree to develop Law 8/2005, of June 8, on the protection, management and planning of the landscape.

17 For more information see the Generalitat de Catalunya DMAH website.

18 Fernando Nebreda Díaz de Espada, managing director of Orasoaldea, spoke along similar lines when opening his talk by saying "I am going to present the most relevant issues of an experience that is based on the existence of the shared political desire of several municipalities to join together and concentrate their strengths and resources in order to promote an industrial site. (...) this desire is more important than a clear legal structure ..."

19 Ramon Forcada i Pons (2005); *Actuacions industrials i d'activitat econòmica d'abast plurimunicipal. Projectes de l'Incasòl.*

20 For more information see the *web.*

21 Graziella Guaragno; *Strategie territoriali per la pianificazione sostenibile delle aree produttive: le esperienze della Provincia di Bologna.*

22 With respect to the way that costs and benefits can be distributed, in presenting the experiences of the county of Oarsoaldea (Euskadi), its managing director, Fernando Nebreda, said: "We have seen the fundamental elements of the experience that is taking place in this county of Guipuzcoa. The agreement was signed by the mayors of the municipalities of Errenteria, Lezo, Oiartzun and Pasaia and the president of the Development Agency on February 11, 1998, and it is currently fully operational, and is receiving 50% of the annual IAE of the operations that have been performed. Some might ask whether the reforms to the IAE have affected this agreement. Well, the way we understand it (...) there is no reason why it should have any effect because it is purely a calculation criterion. Even if the IAE were to disappear, the desires expressed in the agreement would require another calculation criterion to be found that would lead to roughly similar amounts".

23 Ramon Forcada: "In reference to the management and maintenance of taxation, there would be a need for the statutes to establish that both the costs derived from the maintenance of the industrial estate once it is up and running (provision of public services: electricity, drainage, water, etc.) and income (rates, property tax, business tax, land value added tax, etc.) will be distributed among the members in the right proportions. The councils may delegate authority to the 'mancomunitat' or consortium in relation to rates and special contributions, as well as fixing public prices. But they cannot be granted the authority to establish taxes, which should be the authority of the relevant councils. Either by agreement or by statute it may be established that the council can transfer to the association a portion of the income obtained by the industrial estate through application of taxes. This management by the 'mancomunitat' or consortium may not obstruct the constitution of an administrative conservational association", Incasòl.

AREAS OF ECONOMIC ACTIVITY IN TERRITORIAL PLANNING

Juli Esteban i Noguera

1. Principles

Spaces where intensive economic activities take place, along with those used for housing and infrastructures, to different degrees constitute the most perceptible forms of occupied land and are those that provide it with a structural function. Other spaces, though also hosting economic activities, may - due to their extensive nature - play the role within the territory of being open spaces that form part of the necessary balance between extension and intensiveness, soft and hard, permeable and paved, rural and urban, etc., which does not necessarily have to be quantitative, but structural.

Territorial planning seeks to provide guidelines for rationality and efficiency among the three above-mentioned components of land colonisation: agrarian areas, infrastructures and settlements. To do this and in order to maintain coherent attitudes in different territories and circumstances, the *Generalitat de Catalunya's Programa de Planejament Territorial* (Territorial Planning Programme) has proposed fifteen criteria expressing the logic that makes sense of contemporary territorial planning[1].

Although the criteria should be understood as a whole and many of them are highly transversal in nature, we can highlight here those that are of the greatest relevance to the subject of this article.

Criterion 8. To favour the coexistence of activities and housing in urban areas and rationalise the implantation of industrial and tertiary estates.

Criterion 10. To ensure the compact and continuous nature of growth.

Criterion 11. To reinforce the nodal structure of the territory through urban growth.

Criterion 12. To make mobility a right and not an obligation.

The objective of mixed urban areas in which activities and housing coexist in keeping with the reinvention of the dense and varied Mediterranean city has very much been assumed nowadays, at least in ideological terms. I do not believe that it has been assumed quite so much in terms of specific projects. Whatever the case, the spatial interrelationship between housing and activities is an objective to be defended at least insofar as this coexistence or proximity should not have more negative than positive effects for one use or the other.

It could be said that in this historic period for cities, the factors that benefit the coexistence of activities and housing are the more dominant. The increase in the number of jobs in tertiary activities (trade and services) in comparison with industrial and some primary jobs that may once have been of importance in certain areas (such as mining and the energy sector), has led to a high proportion of employment that can be located in a fully urban context. If we also consider those small-scale industrial activities that continue to be located in the urban environment, we could safely say that urban areas that contain housing and compatible uses, and that have been developed continuously through growth from the historic core, are the spaces offering the largest amount of employment and are therefore the main areas of economic activity.

However, it is also true that there are factors that tend to lead to specific areas of economic activity being differentiated and located in separate parts of the general, mixed-use urban fabric. These factors are derived from the incompatibility, either objective or subjective, of certain activities and their containers with urban fabrics in which housing is the dominant use. There is, however, a need to determine and analyse these factors.

Incompatibility due to the disturbance, danger or unhealthiness caused by activities is sufficient reason to promote specialised areas for such activities. Another important factor is the size of the spaces and buildings that some of these require. It is certainly difficult to properly fit elements of anything greater than two hectares in an urban street network. Apart from geometric problems, a large industrial or logistic site located in an urban area will generate a very large void in the immediate surroundings where there will be very little urban intensity. There may also be difficulties, although the effects on the surroundings could be very different, if the site is destined for commercial, hotel, leisure or public-service purposes. In these cases, urban intensification could occur, although in some cases disturbances to housing could be generated as a result of the intensification itself.

We should add that in recent decades there has been a progressive increase in

the size of commercial, hotel and service sites and the most common response has been far too simple and lacking in creativity. These elements (important as centres of economic activity but also as generators of urban relationships) have been located outside of the city, often in industrial estates. Certainly, from a particular size onwards, the only possible site for certain facilities is outside of the city in large-scale estates or on specific sites designed for them. I also believe that we should consider two things here. The first relates to planning attitudes with regards to the increasingly oversized nature of industrial, logistic, tertiary, service, tourist, recreational sites and so on, which necessarily have to be settled outside of urban areas and on sites whose location is difficult to forecast. The logic behind all these implantations of areas with economic activity inevitably separates them from the territorial model we seek, which is one based around the nodal structure represented by large and medium sized cities and which avoids, as much as possible, the proliferation of spatially autonomous areas of activity (and residence). In whatever case, and although the expected result is not the one we would like, we should accept that some economies of scale at location have withstood the end of Fordism and are still important for certain economic activities; therefore, the territory must accommodate at least a few sites of this type. Similarly, it would be useful to know how to make an evaluation in each case of the sense and effects of the site: its strategic value within the territory, the reasons for such a large-scale demand, the mobility flows that will be generated and the future alternatives, should the activity end. This evaluation should especially consider the differences between those activities in which a large scale is a structurally functional requirement, and others where a different business focus would enable them to split up and locate the smaller parts in different places. Another important factor to evaluate is the distinction between those activities that provide few jobs and do not have direct users (such as logistic centres) and those where the opposite occurs, such as services and shopping centres.

The ideological basis of this analysis is none other than the consideration that the implantation of new and territorially isolated areas of activity (even though they are large) is in principle topologically undesirable, but that we should accept that territorial functionality and economic (and sustainable) development has to involve at least a few of these.

The second reflection is on the frequent incapacity of urban planning to create urban spaces that can integrate new forms of activity that are perfectly compatible as components of the new mixed-use fabric of cities. The typologically residential specialisation of new urban sectors highly limits the capacity for mixing new housing with other uses, but this need not be an impediment to the coexistence in integrated fabrics of residential buildings and other buildings used as office space, for commerce, for hotels, etc. Therefore, especially in new urban extensions, urban planning should offer the right sites and volumes to serve the functional needs of buildings that can be used for urban activities that, due to the lack of adequate conditions, often end up being located in industrial areas, which dissipates their capacity to act as structuring elements within new city fabrics.

In short, and as can be directly gleaned from the criteria exposed, territorial and also urban planning must foster the mixed and integrated growth of urban areas that can play a vertebral role in the territory and restrict to the bare minimum those implantations that do not constitute proportionate and well articulated extensions of the existing urban areas. This is the idea of "rationalising the implantation of industrial and tertiary estates" that was expressed in the previously mentioned criterion.

The *Programa de Planejament Territorial*'s criteria suggest that the desideratum is a territory in which:

– The creation of new urbanised sites (for housing and activities) should be polarised in large and medium sized cities that offer the conditions to extend their urban area and have the capacity to construct the nodes that must form part of the functional structure of the territory as a whole.

– Other cities and small urban nucleuses should grow in a moderate fashion that does not modify their position within the territorial structure.

– Rural areas that do not have to be occupied by the urban extensions should substantially maintain their integrity and only receive those buildings that are constructed for the purposes of the agrarian or rustic activities performed there.

However, we know that this will not be 100% possible and there would have to be deviations of different types from the three objectives; specifically, some areas of intensive economic activity that do not fit in with these established guidelines would have to be admitted. In whatever case, as well as needing to be justified in terms of the advantages they would bring to the territory in relation to economic development and in terms of the minimisation of the number of implantations, these actions would need to be located somewhere that complies with certain conditions of functional, and also formal, rationality in relation to infrastructures, the territorial surroundings and the landscape.

2. The difficulties

Territorial planning involves two congenital difficulties in reference to the vectors of time and space, which despite being common to all physical planning to a certain extent, are of particular importance in this case. The first difficulty is spatial and is derived from the division of the territory into municipal regions, each of which has its own personality and its own projects; the second is temporal, and is derived from the nature of the plan and the procedure of formalising and processing it, which can lead to a relatively long period of time between the definition of proposals and their execution. A third and also temporal difficulty that should be considered from the outset of any planning process is the high degree of uncertainty in forecasting future episodes and circumstances.

However, it has to be said that these difficulties can be somewhat overcome when defining the nodal model of growth proposed by territorial plans. The indication of certain areas that will polarise urban extensions does not involve determinations of form, and can be argued with sufficient objectivity depending on the existing nodal structure, the foreseen connectivity and the availability of land. But we should not forget that the nodal structure implies the spatial distribution of most of the employment. Meanwhile, the urban development of nodes and cores will occur through municipal urban planning's determination of sites that, due to their location in relation to existing urban areas, offer implicit prospects for urban development. Therefore what the territorial plan indicates with respect to the nodal potential (or not) of an urban area's development does not contribute new and immediate urban prospects, and therefore does not introduce new factors that can distort the land's market value, which inevitably structures its prices in accordance with the imagined prospects based on urban and topographic reality.

The difficulties are much larger in relation to territorial planning's possible determination of new areas of economic activity that are separated from urban areas. As is well known, there are many local councils that aspire to having an industrial estate that is separate from the urban core and can be used to locate already existing but supposedly disruptive workshops and industries, offering the option of locating economic activities that can generate jobs and will create income for the generally deficient municipal funds.

In the present-day context, and from a municipal point of view, this objective is incontrovertibly logical, but its results are evidently unsatisfactory from a territorial perspective in terms of the landscape and environment. We could add that this model for setting up an activity could leave plenty of room for functional improvement, but, for obvious reasons, this is not a particularly valued factor given the simplicity involved

in independent management by individual councils in relation, if possible, to sites where the landowners' attitudes are favourable.

The objective of rationalising these urban implantation processes is an imperative for territorial planning that is legally founded by the general principles for urban planning actions of the *Llei d'urbanisme* (Urban planning law) and especially articles 3 and 9 of this Law, which are specifically transferred to the criterion for "rationalising the implantation of industrial and tertiary estates" that was explicitly adopted by the Programme.

In accordance with this criterion, territorial planning clearly establishes two complementary lines of action for the creation of areas of activity that are typologically differentiated from urban networks.

- Sites that are continuations of existing urban areas for those activities that are compatible with a certain proximity to housing. Of an extension that is in principle proportionate to the reality of the urban area and under the requirement that the urban planning and architecture of the buildings and landscape provide the most appropriate solutions for the morphological integration of these areas with the contiguous urban networks and the image of the surrounding rural space.

- Minimisation of the number of isolated implantations (or that are not proportionate to the contiguous nucleus) leading to larger-scale concentrations that could include more services and a more carefully considered territorial implantation.

In order for this concentration model to provide a response to motivations for creating new industrial estates and for this to be a credible alternative to the dispersion that follows municipal division, the formulas for creating these areas of activity would have to enable the participation of the town councils with a vested interest in the benefits and charges of the implantation, regardless of localisation in one municipality or another being a determinant factor.

This is a perfectly achievable objective, but it would be foolish to ignore the difficulties, which are made all the more serious due to inexperience and, often, to a lack of trust. The use of this alternative model undoubtedly requires demonstrative actions and the provision of incentives and cohesive elements by supra-municipal administrations and most especially by the *Generalitat*. It would also be useful for improvements to be made to the Local Administration's legal regulatory framework in the sense that this should clearly privilege intermunicipal collaboration as opposed to individualism.

The model for concentrating separate areas of activity also involves a series of difficulties in relation to the locations of these areas. If the aim is for the territory to have relatively few, larger and preferably territorially integrated, separate areas of economic activity, the question of where these are to be located is of particular importance. However, once the municipal logic has been surpassed, the question is: who determines the locations of the new areas of activity on a territorial basis? It seems the answer has to be territorial planning.

That will surely be through a process of territorial planning that can evaluate the different concurring variables: the general territorial model, foreseeable demand, accessibility, available services, environmental values, landscape, uses that prefer certain locations over others, etc. But this does not mean that it would be recommendable for territorial or master plans to determine the locations chosen for such actions.

It is fairly common knowledge that a plan-based formal recognition of a site's prospective value that had not been considered earlier, or was uncertain or more or less distant, leads to landowners being gifted a generous increase in the value of their property; until the present, this has frequently been an added difficulty for developing actions.

This problem is hard to solve, especially in territorial or master plans that take shape at a relatively distant moment from the action (which must pass through more intimate and precise urban-planning instruments), and where it is difficult to establish agreements in which the owners do not overvalue the land - making it problematic to proceed with the plans. We should also remember that what can be done in municipal urban planning, given the size of the region and the familiarity of the owners and operators with vested interests, is more difficult in the wider territorial arena.

These concerns could be substantially reduced if the criteria when evaluating expropriations for the purposes of urban activity were genuinely independent of the plan's own expectations, and if this could enable the generalisation and flexibility of public actions for expropriation at prices that were reasonable and not derisory. Meanwhile, as far as possible, there is a need to prevent the spatial expression of proposals for action leading to the rural land being overvalued by its owners and thus posing difficulties for carrying out the necessary actions.

3. Planning techniques

3.1. The quantitative objectives

The quantity of space for non-primary economic activities depends on the economic growth expected. In fact, demographic growth and the corresponding space for new housing also depends on economic growth, as the jobs that are created are also a cause for immigration, which will cause the population to increase. Without immigration, the population of Catalonia would clearly decline over the next few decades. In short, it could be said that it is on the basis of the hypothesis of an increase in jobs that we can define the future quantitative scenarios required to provide a response to territorial planning.

There are two additional comments: first, although perhaps debatable, the objective of economic growth has not been questioned by any significant political force in Catalonia. Second, most of the economic growth in our country corresponds to the creation of jobs; growth resulting from an increase in productivity is of very little relevance.

Hypotheses and predictions regarding the creation of jobs are therefore starting points for defining the scenarios in which there is the need of space for housing and for economic activities.

Economic activity is spatially a far more imprecise concept than the concept of housing. Hence, while territorial planning adopts the criterion that housing should be located in continuous and mixed urban networks, economic activities, as well as preferably being integrated in urban networks of this type, may also in some cases be more conveniently located in specialised areas. It should be added that the entails adopted by the plans establish conditions for the distribution and integration of the growth of urban areas, but not a globally limitative quantification in the territory. On the other hand, given that specialised areas are considered a model of implantation to be limited to those cases where they are justifiable, it would be useful for the territorial plan to contain at least one approximate quantification of what surface area or land would be required, and to evaluate possible distribution.

The methods of calculation would inevitably be estimative and results would have to include a safety factor, but methodologically they would have to follow a pattern with the following steps:

a) Expected new jobs.

b) Subdivision into sectors of activity in accordance with the existing situation and predicted evolution.

c) Estimation of: jobs of an urban nature, jobs in specialised areas and jobs in no fixed location.

d) Application of standards: m^2 of covered surface/worker.

e) Application of constructible area: m^2 of built-up area/m^2 of industrial site.

f) Surface area of land required.

3.2. Spatial distribution

If all of the land was publicly owned (or its transformations could always be decided by means of public policy) and the supra-municipal authority monopolised urban responsibility, the next step would be the conversion of the necessary hectares for specialised economic activities, proposing a set of well delimited actions in the most appropriate places in terms of topography, accessibility, availability of services and landscape integration. This is a complex task, especially for an instrument that, in addition to its broad focus, also requires precision at the local scale; but nevertheless it is perfectly feasible. In whatever case, the two further reasons previously mentioned require a more careful approach in order to make room for those operations that need to enable action as agreed with and between councils and, if relevant, to make room for the necessary acquisitions of land to facilitate adequate leadership by the public operators of urban development in this type of area.

Therefore, the determinations made by territorial planning in this area should be undertaken with a great deal of prudence and should result in assignations of more or less quantified supra-municipal transformations, which would need to constitute areas of economic activity within reach of and of interest to the surrounding municipalities.

The solutions to the problems that cannot be dealt with via the level of spatial *indetermination* maintained by this formula will have to be guided by the establishment of conditions for implantation in the area in relation to configuration, access, provision of services, image, etc. Some of these conditions will be of general relevance in the area of the territorial plan while others may refer to specific locations.

In the first territorial plans produced by the Programme, the creation of new specialised areas of economic activity was governed by dispositions such as the following:

– Creation of new industrial estates or, in general, new areas of economic activity (and, if relevant, the extension of existing areas, when their size means they transcend the boundaries of the municipality), must be associated with an inter-municipal agreement that enables the equal sharing of benefits and charges relating to the action.

– The Plan indicates the pluri-municipal areas that could be the object of these actions. The municipalities involved must be active agents in the decisions concerning the implantation and operation of these new areas of economic activity.

– The initiative to develop an area that might affect the land of one or more different municipalities requires the agreement of all of the municipalities involved in the area indicated by the Plan, accompanied by the establishment of formulas that enable equal sharing of the benefits and charges resulting from the action. Municipalities that so desire may opt to refrain from participating. Also, the municipalities that neighbour the pluri-municipal regions established by the Plan may request to be incorporated in the action and must be admitted if their spatial implication with this action is justified.

– When the action does not take place due to a lack of agreement between the municipalities but where simultaneously there is a general interest in the territory for it to be carried out, the *Generalitat de Catalunya* may promote this via the *Institut Català del Sòl* (Catalan Land Institute) and provide the adequate mechanisms for the equal distribution of the benefits and charges of a social and financial nature that are likely to affect the municipalities as a result of the plan.

– Actions for the implantation of areas of economic activity will be specified using whatever instruments of urban planning are necessary.

– The plan of initiatives for new areas of economic activity must foresee and guarantee access via the transport network and the provision of power supplies considered necessary, in accordance with the size of the area and the expected activities.

This regulatory basis will undoubtedly need fine-tuning both in relation to the procedure for action and the conditions of implantation, especially due to the incorporation of the *Pla de les Directrius de Paisatge* (Landscape Directives Plan), which establishes legislation in this ambit.

3.3 Unexpected opportunities

Apart from clearly indicating the land that cannot be the object of urban development under any circumstances, territorial planning establishes a framework in other areas for action based on the structural definition of the model and actions. This framework is markedly flexible with regard to the formal concretion of urban and infrastructural implantations. However, there is always the need to consider that the definition of regulations for development will also come across the dilemma between the possibility of leaving out actions that may be of interest to the territory (but that do not comply with one of the established conditions) or that are too imprecise in their definitions of the same (which could lead to undesirable implantations). This dilemma is particularly relevant in relation to actions involving the implantation of economic activities. The continuous process of change to their content and requirements can lead to the conditions, established on the basis of the current situation and dynamics, possibly omitting new options or alternatives that could be of veritable territorial interest.

For these reasons, territorial planning must have the capacity to incorporate unexpected actions considered coherent with the main objectives of the plan and of declarable territorial interest. There should therefore be a possibility for these actions to be formally considered by some kind of method as implicit elements of the plan's intentions, and for these not to require any kind of modification to the territorial plan, which would involve as long a process as its original formulation. To do this, territorial plans indicate that they consider part of their provisions to be exceptional actions recognised by the *Comissió d'Urbanisme de Catalunya* (Urban Planning Commission of Catalonia) as being of territorial interest, which is a pre-requisite for any kind of urban-planning procedure.

However, it is established that these possible exceptional actions, which are limited to objectives concerning service or economic activities, should be subject to the following conditions:

a) They must be of a size and have the functional requirements to justify a site that does not follow the guidelines for the extension of urban areas established by the Plan. Those actions that could occur within the framework of the Plan's spatial determinations are not considered exceptional.

b) The motives for fostering territorial interest in the action will be the improvements that this could represent to the territory in terms of services, environment, economic development, international projection, social cohesion or standard of living.

c) The action must propose satisfactory environmental solutions in relation to access requirements, in terms of expected flows and the provision of water, energy, telecommunications and waste removal services.

d) The action will comply with the requirements of planning, architecture, materials, colours and complementary vegetation that ensure its acceptable integration in the territory's morphology and landscape, in accordance with the criteria established in the plan's regulations, specifically the Landscape Directives. The draft proposal for the project presented to the *Comissió d'Urbanisme de Catalunya* will include whatever specifications are considered necessary in relation to these matters.

e) The actions will exclude the use of housing, other than that which will be used for the permanent vigilance of the installations.

It should be added that the inclusion of these actions in master plans that

may deploy the territorial plan are also understood to be a form of recognition of their territorial interest and their conformity with this.

The considerations noted here are to a large extent also applicable to the problem of the determination of new areas of economic activity in master urban plans. I also feel that, given the more precise and intimate nature of such plans, the matter requires some specific considerations that are not strictly relevant to the current discussion, and which still require a certain amount of methodological fine-tuning.

To conclude, I wish to highlight that, despite their limitations and the lack of practical experience, territorial plans could contribute to the spatial rationalisation of implanting economic activity. Nevertheless, for the proposals to be fully effective, there is a need to proceed by increasing the following variables:

– Capacity for action of municipalities and local supra-municipal bodies.

– The desire for municipalities to cooperate.

– Synergy between plans and actions.

– Capacity to acquire land at reasonable prices.

Without preventing it from proceeding as effectively as it can, certain vital changes need to be made to the legislative framework in order to achieve an operative context that benefits from the spatial rationalisation of areas of economic activity.

1 The criteria are detailed in chapter 2 of the reports of all of the territorial plans, that can be consulted on the Departament de Política Territorial i Obres Públiques website (www.gencat.net/ptop).