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The new map of the industrial districts in Spain and the comparison with Italy and the United Kingdom: improving international comparison of industrial districts with common methodologies*

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Abstract: The identification of the boundaries of the industrial districts is necessary to perform empirical and quantitative analysis. The maps of industrial districts allow not only the analysis of particular districts but rather a comprehensive overview of the importance of this phenomenon in a country, its typologies, spatial distribution, and cross country comparisons. Italy is the country where a greater number of specific methodologies for the identification of industrial districts have been developed. The most commonly accepted of these methodologies is the Sforzi-ISTAT one, an algorithm which departing from local labour markets and activity data, provide a first operative approximation to mapping industrial districts. The former Sforzi-ISTAT methodology (1996 and 1997) was evaluated as the most suitable to draw the first map of Marshallian industrial districts in Spain (Boix and Galletto 2004 and 2006). This map allowed for the fist time the evaluation of the quantitative dimension of the industrial districts in Spain and their characteristics, as well as the comparison with other countries. At the end of 2005, the ISTAT revised and improved the methodology for Italy. The objective of this research is the elaboration of a new map of industrial districts for Spain using the new Sforzi-ISTAT (2006) methodology, and its comparison with similar maps for Italy and United Kingdom. The results confirm the quantitative importance of the Marshallian industrial districts in Spain (205 industrial districts which add up to 20% of total jobs and 35% of manufacturing jobs in Spain), close to the Italian figures and greater than those of United Kingdom. The results also allow comparing the main similarities and differences among the characteristics of the industrial districts in these countries.

Gateway: 13 INDUSTRIAL DISTRICTS AND INTERNATIONAL NETWORKS

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1. Introduction

Marshall (1980) documented the existence of a form of organization of production based on the concentration, in some districts of the industrial English cities, of population and small and medium sized firms specialized in the different parts of a productive process. In these "industrial districts", internal large scale economies were substituted by external economies related to the existence of qualified workers, specialized suppliers and an informal system of knowledge diffusion. The figure of the Marshallian Industrial District (MID) was recovered by Becattini (1975) to explain the success of the specialized local production systems of small and medium enterprises (SMEs) in the Italian Tuscany at the same time as the large firm productive model of Turin and Milan experienced a grave crisis. Becattini (1979) transferred the unit of analysis from the "firm" or the "sector" to the "industrial district", a "social and territorial entity that is characterized by the active presence of both a community of people and a group of enterprises in a natural and historically determined area" (Becattini 1991). Departing from a Marxist approach, Brusco (1975; 1991) arrived to the same figure, where the industrial district is a network of SMEs with heterogeneous production functions. Bagnasco and Trigilia (1984; 1985) introduced an additional element based on the interaction between market, institutions and policy. Bagnasco (1977) coined the term "Terza Italia" (Third Italy) to define those environments where industrial districts tend to flourish. Since the end of the 1970s, Italian scholars have provided the key elements of the Marshallian Industrial District theory (Becattini 1991; Bellandi 2002; Dei Ottati 2002).

Doubtless, one of the factors that have contributed to the diffusion of the MID theory has been the possibility to delimit and quantify the phenomenon not only by means of the study of particular cases but also through the early application of quantitative methodologies for the widespread identification of MID in Italy (Sforzi 1987; 1990; 2002). Are MID a model of industrial organization basically centred in Italy or are they also quantitatively important in other countries? Since the Spanish and Italian industrial systems share many socioeconomic structural characteristics it is expected that the Marshallian Industrial Districts in Spain should be an important reality quantitatively comparable to Italy. The objective of the research is the elaboration of a map of Marshallian Industrial Districts for Spain using the official Italian Sforzi-ISTAT (2006) methodology to produce comparable results. The research is divided in five sections: after the introduction, the second epigraph presents a review on the identification of MID in Italy and Spain. Third section exposes the new methodology applied by Sforzi and the ISTAT (2005 and 2006) for the identification of MID in Italy. Fourth section explains the results of the application of this methodology to Spain and compares them with the maps for Italy and the United Kingdom. Fifth section exposes the conclusions.

2. The identification of Marshallian Industrial Districts

2.1. The identification of MID in Italy

Several methodologies have been applied in Italy for the identification of MID, producing different results depending on the procedure and the period of application: (1) the Sforzi-ISTAT methodology (1987; 1990; 1996; 1997; 2005 and 2006) that identifies 156 districts in their last application; (2) 160 districts identified by the regions (IPI 2005); (3) 65 districts by *Il Sole 24 Ore* (1992); (4) 100 districts by *Il libro della piccola*

impresa (Fondazione G.Brodolini, 1995); (5) 84 districts by *Cnel/Ceris-Cnr* (1997); (6) 110 by *Club Distretti* (2005); (7) 52 districts by *Censis* (2001); (8) the southern districts by *Made in Italy* (Viesti 2000); (9) 199 districts of the multivariant methodology of Cannari and Signorini (2000); (10) 223 by the *Fondazione Edison* (2004) adding several large firm districts to those of the ISTAT (1997); (11) the proposal of Brusco e Paba (1997); (12) and the 148 districts by the Iuzzolino's algorithm (2003). A critical review of most of these methodologies can be found in Giovanetti et al. (2005).

The most outstanding contribution has been the methodology elaborated by Sforzi (1987; 1990) and Sforzi-ISTAT (1996; 1997; 2005; 2006). This methodology focus on two fundamental questions in the identification of MID: first, the definition of a MID as a "system of places that interacts" (Sforzi 1990) which suggests the use of the Local Labour Markets (LLMs) as the territorial unit for their identification. Second, the identification of MID is based on the socioeconomic characteristics that distinguish this form of organization from the rest of local labour systems. The methodology for the identification of LLMs and MID has evolved and improved from the 1980s. The first map of MID was made in 1981 and identified 61 districts (Sforzi 1990). The application for the year 1991 identified 199 districts (ISTAT 1996 and 1997)[1]. Finally, the application for the year 2001 (ISTAT 2005 and 2006) identified 156 districts.

2.2. The identification of MID in Spain

The official entry of the modern theory of the MID in Spain can be dated to 1986 with the translation of the seminal article of Becattini (1979) opening the first number of the *Catalonian Economic Review* (Revista Econòmica de Catalunya). Since the 1990s, several researches have tried to identify and to analyze MID in Spain and their importance as a source of advantages in the production. At a regional level, it is worth to mention the woks for Valencia by Ybarra (1991), Tomás Carpi (1997), Camisón and Molina (1998), Soler (2000), and Giner and Santa María (2002); for Catalonia by Costa (1988) and Trullén (2002a; 2002b); for the Balearic Island by Bibiloni and Pons (2001); for Madrid by Celada (1999). At a national level Boix and Galletto (2004 and 2006) overcame the problems the statistical data and adapted the earlier ISTAT (1996 and 1997) methodology to produce a map comparable with the Italian one and giving evidence on the quantitative importance of the MID in Spain.

Other researches had focused on the identification of specialized local production systems with characteristics very similar to the industrial districts but less restrictive in its definition. At a regional level there are Caravaca et al. (2000) for Andalusia, Climent (2000) for La Rioja, Larrea (2000) for the Basque country, Juste (2001) for Castilla y León, and Hernández et al. (2005) for Catalonia. For Spain as a whole there are the researches of Vázquez Barquero (1987), Costa (1992), MICYT (1993) and Santa María et al. (2004).

3. The Sforzi-ISTAT (2005) methodology for the identification of Marshallian Industrial Districts

3.1. The Sforzi-ISTAT (2005 and 2006) methodology

[1] The Sforzi-ISTAT (1996 and 1997) methodology was applied by De Propris (2005) to the United Kingdom. The application showed the existence of 47 MID in UK.

The new ISTAT (2005 and 2006) methodology starts with the identification of the Local Labour Markets (ISTAT 2006; Boix and Galletto 2006) using a procedure very similar to the British TTWA[2]. Departing from these units, the objective of the procedure is to identify those LLMs of small and medium enterprises specialized in manufacturing, and whose main manufacturing specialization is mainly composed by SMEs. It consists of four steps.

3.1.1. Identification of local labour systems specialized in manufacturing

1. All economic sectors (NACE Rev.1) are aggregated in eight groups (table 1): (1) Agricultural manufacturing; (2) Extractive industry; (3) Construction; (4) Manufacturing; (5) Business services; (6) Consumer services; (7) Social services; (8) Traditional services.

2. A local specialization index (LQ1) is computed for each LLM:

$$LQ1_{LLS,NACE} = \left(L_{LLS,NACE} / L_{NACE}\right) / \left(L_{LLS} / L\right) \quad [1]$$

, where L = employment; LLM = Local Labour Market; NACE = aggregation of manufacturing activities from table 1.

3. It is computed a prevalence index for Manufacturing, Business Services and Consumer Services[3]:

$$PR1_{LLS,NACE} = \left[\left(L_{LLS,NACE} / L_{NACE}\right) - \left(L_{LLS} / L\right)\right] L_{NACE} \quad [2]$$

4. Taking into account both indexes, we will consider than a LLM is specialized in manufacturing when:

> 1. It shows a localization index (LQ1) higher than 1 (higher than the national average) in Manufacturing, Business services or Consumer services, and
>
> 2. The prevalence index for Manufacturing is higher than those of Business services and Consumer services.

3.1.2. Identification of manufacturing LLM of Small and Medium Enterprises

[2] The detailed iterative algorithm can be found in ISTAT (1997); ISTAT (2006) and Boix y Galletto (2006).

[3] The prevalence index is a new feature in the procedure. Its introduction tries to soften one of the inconveniences of the previous methodology, in which we could find a high localization coefficient of a sector in a LLS, but at the same time there could be some other sector with a lower localization coefficient, but with a higher level of employment. What criterion should it prevail then, the specialization or the size? How do we also weight up the fact that some sectors of an economy are much bigger than others? The index compares the local dimension of each sector with the national one, and it offers a comparable magnitude of the local dimension of each sector regarding the other.

Departing from the manufacturing LLM, we compute a firm size specialization index for the three EU standard firm size intervals: small (less than 50), medium (between 50 and 249) and large (more than 250)[4]:

$$LQ2^{MAN}_{LLS,DIM} = \left(L^{MAN}_{LLS,DIM} / L^{MAN}_{DIM}\right) / \left(L^{MAN}_{LLS} / L^{MAN}\right) \quad [3]$$

, where L = employment; LLM = Local Labour Market; DIM = firm size (small, medium or large); MAN = Manufacturing sector.

3.1.3. Identification of the main industry in each LLM

1. All the manufacturing activities are divided in 11 groups: Textile and textile products; Leather and footwear; Products for the house; Jewellery, musical instruments and toys; Food, beverages and tobacco; Machinery, electrical and optical equipment; Manufacture of basic metals and fabricated metal products; Chemicals and plastics; Transport equipment; Paper, publishing and printing; and Other manufacturing as a residual sector (table 2).

2. A localization index is computed for each manufacturing group in each LLM:

$$LQ3^{MAN}_{LLS,NACEMAN} = \left(L^{MAN}_{LLS,NACEMAN} / L^{MAN}_{NACEMAN}\right) / \left(L^{MAN}_{LLS} / L^{MAN}\right) \quad [4]$$

, where L = employment; LLM = Local Labour Market; MAN = manufacturing; NACEMAN = each of the 11 manufacturing groups (table 2).

3. Then it is computed the prevalence index to find out which is the group with a higher employment in relation to the national total:

$$PR2^{MAN}_{SLT,NACEMAN} = \left[\left(L^{MAN}_{SLT,NACEMAN} / L^{MAN}_{NACEMAN}\right) - \left(L^{MAN}_{SLT} / L\right)\right] L_{NACEMAN} \quad [5]$$

The group that shows a localization index (LQ3) above 1 and the highest prevalence index[5] is considered as the "main industry" or "district industry" of a Manufacturing LLM.

3.1.4. Firm size of the main industry

It is considered that the main industry is mainly formed by SMEs when:

1. Employment in SME in the main industry accounts for more than 50% of total LLM employment:

[4] Previous methodology only considered two intervals: SMEs and large firms. In their application of the earlier methodology to Spain, Boix and Galletto (2006) remarks that the two intervals division did not produce very satisfactory results due to the small number of large manufacturing establishments which generally concentrated in the same areas than MID. The division in three intervals softens this problem. A LLM is considered to be formed mainly by SME when the highest value of the localization coefficient by firm size corresponds to the small or medium size intervals.

[5] That is to say, that both the concentration as well as the size of the sector in a LLM are substantially larger than the national average.

$$CE1^{MI}_{LLS,SME} = \left(L^{MI}_{LLS,SME} \middle/ L^{MI}_{LLS} \right) > 0.5 \qquad [6]$$

, where L = employment; LLM = Local Labour Market; MI = Main Industry (District Industry); SME = Small and medium-sized enterprises.

2. If the LLM only has a medium sized firm in the main industry, an additional test is introduced to verify that employment in small firms of the LLMs main industry is larger than half the employment of the medium-sized firm:

$$CE2^{MI}_{LLS} = \left(L^{MI}_{LLS,SE} \middle/ L^{MI}_{LLS,ME} \right) > 0.5 \qquad [7]$$

3.2. Additional features in the application to Spain

In the Spanish application, an additional filter was later introduced to remove those micro-LLMs with characteristics of MID which dimension was considered too small to be classified as MID and does not add any important information for the analysis. This filter requires that the main industry in a LLM should have at least 250 employees, the same size than a large firm.

3.3. Advantages and limitations of the ISTAT (2005) procedure to identify industrial districts

1. The procedure to identify industrial districts has some important features:

> 1.1. It is a simple and transparent in all its phases, allowing to explain the results consulting the original data, and this way to detect defects in the databases or to interpret possible anomalies.
>
> 1.2. It uses the LLMs as territorial units because the industrial districts usually have a supra-local dimension that can not be explained using NUT3 (counties) or NUT2 (regions). The LLM approaches a NUT4 dimension from an economic point of view.
>
> 1.3. The requirements of information are reasonable. Basic data come from national Census, and business databases or industrial reports can be used to complement the main source.
>
> 1.4. Previous characteristics confer to the procedure a high facility of inter-country application (sometimes a previous adaptation is needed), and therefore it facilitates international comparisons.

2. As the main limitations of the procedure, Brusco and Paba (1997), Cannari and Signorini (2000), and Boix and Galletto (2006) suggest:

> 2.1. It contains elements of arbitrariness, as the definition of large firm as those with more than 250 employees that does not take into account peculiar characteristics of each country. However, in our opinion the homogeneous intervals introduced by Eurostat are reasonable and they facilitate comparisons.

2.2. The sharp separation between manufacturing and the rest of economic sectors, and the use of a sector aggregate or common *filière* in all LLM for the identification of MID. The latter limitation is impossible to overcome due to the lack of input-output tables at LLM level.

2.3. Industrial districts can have more than one specialization. Boix and Galletto (2004 and 2006) use the concept of multi-specialized districts and suggest the search of the additional specializations as a complement in the analysis of industrial districts.

2.4. The sectoral aggregation used in the procedure forces to seek afterwards the concrete specialization of each industrial district, for example, to point out the different specialization in textile or tailoring, or in tiles or furniture.

2.5. The taxonomy is rigorously dichotomic: a local system is a district or it is not a district. In ISTAT (2005), De Propris (2005) and Trullén (2006) is carried out an identification and analysis of manufacturing systems of large firms as a complement to the map of MID.

2.6. The general limitations of a quantitative method with limited information to detect all the nuances of the socio-economic features of the local community. On that point, Sforzi and Lorenzini (2002) suggest a two phases' strategy: in the first phase the quantitative methodology is used to identify potential industrial districts, and in the second phase field investigation is used to validate which of these are truly industrial districts.

2.7. If one of the characteristics of the Becattini's industrial district is the "community", then a measure of "social capital" should be introduced as complement of the previous process. This would require the elaboration of a social capital database with municipal detail. In Italy some measures of social capital exist at provincial level, made from surveys. In Spain, the IVIE estimations on social capital by provinces (Pérez et al. 2005) show the correlation between the volume of social capital and the localization of industrial districts.

4. The map of the Marshallian Industrial Districts in Spain

4.1. Data

The application for Spain starts from the 806 LLMs identified in Spain by Boix and Galletto (2006) using the ISTAT (1997 and 2006) methodology. As in the Italian case, data on employment and jobs comes from national Censuses. However, Spanish Censuses do not provide data about firms. To overcome this limitation we used data from several sources. First, we used SABI[6] to build a database of employment in medium and large sized manufacturing firms for the year 2001 (4,958 medium and 719 large firms). This provides a good proxy to the number of employees (mainly for the large firms) at four digits industry detail. The main problem related to SABI is that the

[6] SABI is an enhanced version of Amadeus for Spain and Portugal provided by Bureau van Dijk.

employment is picked up at firm level instead of establishment[7]. For this reason, for each local system the number of large firms is compared with the number of establishments larger than 250 employees from the Spanish Central Directory of Enterprises (DIRCE)[8]. If the number of DIRCE establishments in the LLM is larger than SABI, this information is added considering that the firm has a minimum of 250 employees by establishment. Furthermore, we consulted annual industry reports from employer's associations, trade unions and chambers of commerce to detail, when it was possible, the employment of the DIRCE establishments. Thus, after building the database for medium and large firms, the occupation in small firms was obtained as the difference between the employment recorded in Census and the employment recorded in the database of medium and large firms.

4.2. Results

4.2.1. Generals results

In the year 2001, there are **205 Local Labour Markets with characteristics of Marshallian Industrial Districts** in Spain (25% of the LLM). They account for **20% of the country's population, employment and productive establishments** (8,253,000 inhabitants, 3,105,000 employees and 615,000 establishments). The manufacturing sector accounts for 957,000 employees in MID (35% of total manufacturing employment in Spain); 70% corresponds to small firms, 20% to medium firms, and 10% to large firms. Manufacturing employment adds up to 31% of the total employment in MID, whereas in the rest of manufacturing LLM (large firm manufacturing systems) it adds up to 29% of employment and 18% in non-manufacturing LLMs.

The MID's **main industry** accounts for **402,500 employees** (table 3), of which 72% corresponds to small firms (292,000 employees), 21% to medium firms (85,000 employees) and 7% to large firms (26,000 employees). The main industry accounts for 42% of the manufacturing employment in the industrial districts, 14.6% of the total manufacturing employment in Spain, and 2.6% of total employment in Spain.

4.2.2. Results by sector

1. Sectors with the largest **number of MID** are Products for the house (62 MID); Textile and textile products (46 MID); Food, beverages and tobacco (37 MID); and Leather and footwear (23 MID) (table 3). They are followed by Machinery, electrical and optical equipment (14 MID); Chemistry and plastic products (9 MID); and Transport equipment (9 MID). With a reduced number of districts we find Jewellery, musical instruments and toys (2 MID); Paper, publishing and printing (2 MID); and Manufacture of basic metals and fabricated metal products (1 MID).

2. Sectors with the largest **number of employees in the main industry** in MID are Products for the house (119,000 employees and 29.6% of the employment in the main

[7] This problem is softened when working with local systems instead of municipalities, because in many cases there are several establishments in the same local system.

[8] The DIRCE database comes from the Spanish Institute of Statistics. It includes the number of establishments by municipality at two digits. However, it does not directly provide the exact number of employees but intervals of employees. The main problem is that DIRCE does not provide intervals above 250 employees so that it is impossible to know if an establishment contains 250 or 25,000 employees.

industry); Textile and textile products (85,000 employees and 21.1% of the employment in the main industry); Leather and footwear (73,000 employees and 18.1% of the employment in the main industry); Food, beverages and tobacco (51,000 employees and 12.7% of the employment in the main industry) (table 3). With less than 50,000 employees in the main industry there are Machinery, electrical and optical equipment (35,500 employees); Chemistry, plastic products and petro-chemistry (22,500 employees); and Transport equipment (12,000 employees). With a much reduced number of employees there are Jewellery, musical instruments and toys (3,600 employees); Paper, publishing and printing (1,149 employees); and Manufacture of basic metals (687 employees).

3. Regarding the **total employment in manufacturing**, MID account for 35% of the total manufacturing employment in Spain (957,000 employees). MID have the largest share in employment over Spain's total sector employment in the sectors of Leather and footwear, with 85.2% and 84,000 employees (table 4). It is followed by Textile and textile products (50.4% and 136,000 employees); Products for the house (43.9% and 186,500 employees); Jewellery, musical instruments and toys (42.3% and 7,600 employees); Machinery, electrical and optical equipment (30.3% and 214,000 employees); Chemistry (29.5% and 81,000 employees); Paper, publishing and printing (23.4% and 54,000 employees); Transport equipment (22.5% and 63,000 employees); and Manufacture of basic metals (12.9% and 7,300 employees).

4.2.3. Sub-specializations inside the main industry

The ISTAT's aggregations of industries do not allow observing detailed specializations inside the main industry. For example, there is not possible to say if an industrial district whose main industry is Food, beverages and tobacco is specialized in Drinks, Meat industry or Preparation or conservation of fruits and vegetables. However, the availability of additional information allows finding these specializations to three digits detail. For this purpose it has been used a simple procedure that consists in calculating the share of each three digits activity on the total of the main industry:

$$SESP_{ID,NACESUB}^{NACEMAN} = L_{ID,MISUB}^{MI} \Big/ L_{ID}^{MI} \qquad [8]$$

, where L = employment; ID = industrial district; MI = main industry of the district; MISUB = each three digits CNAE93 (NACE Rev.1.1.) sub-sector of the main industry.

The results show that in 75% of the MID, a sole sub-sector accounts for more than 50% of the main industry employment, and in 30% of the districts this share arrives to 90% of the main industry employment. In other districts, the combination of two or three sub-sectors accounts for quite all the main industry employment. Considering only the sub-sector with more employment in MID inside the main industry, these specializations account for 267,000 jobs, representing 66.5% of the main industry. The specializations more repeated are Tailoring (36 MID); Furniture (33 MID); Footwear (20 MID); Meat (13 MID); Beverages (8 MID); Preparation and conservation of fruits and vegetables (8 MID); Ceramic tiles (7 MID); Other alimentary products (6 MID); Pieces for non electric motors (6 MID); Plastics (6 MID); Stone (6 MID); Textiles (6 MID); and Non refractory ceramic (5 MID).

4.2.4. Geographical distribution

1. The MID show a **defined pattern of territorial distribution**. Most of the districts are concentrated on four axes (figure 1). The main goes along the east coast of Spain from the north of Catalonia to the south of Murcia. The second one starts in the south of Catalonia and arrives to the Basque Country and the northeast of Castilla and León. The third goes from the centre to the south of Spain. It starts in the south of Madrid and extends to the provinces of Toledo, Ciudad Real, Jaen and Córdoba. The fourth axis is scattered across the northwester provinces of Pontevedra and A Coruña. There are some districts outside these four axes, however, their number is very small.

2. Focusing on the **distribution of MID by region**, the highest **number of MID** is found in Valencia (53 MID and 25.9% of the Spanish MID); Catalonia (32 MID and 15.6% of the Spanish MID); Castilla-La Mancha (32 MID and 15.6%); Andalusia (24 MID and 11.7%); Aragon (11 MID and 5.4%); Castilla and León (9 MID and 4.4%); La Rioja (9 MID and 4.4%); Galicia (8 MID and 3.9%); Murcia (7 MID and 3.4%); Navarre (7 MID and 3.4%); Extremadura (4 MID and 2%); the Basque Country (4 MID and 2%); Balearic Islands (2 MID and 1%); Cantabria (2 MID and 1%); and Madrid (1 MID and 0.5%). In Asturias, Canary Islands, Ceuta and Melilla there is not any industrial district (table 5).

3. Considering the **employment in MID**, it is worth to say that 66% MID's jobs concentrate on Valencia and Catalonia (table 6). In **Valencia,** MID account for 1,168,918 employees (37.6% of the Spanish employment in MID); 337,755 employees in Manufacturing (35.3% of the Spanish manufacturing employment in MID); and 167,574 employees in the main industry (41.6% of the main industry employment in MID). In **Catalonia**, MID account for 879,550 employees (28.3% of the Spanish employment in MID), 296,501 employees in Manufacturing (31% of the Spanish manufacturing employment in MID), and 89,399 employees in the main industry (22.2% of the main industry employment in MID).

There are other five autonomous communities with more than 100,000 employees in MID (table 6): Castilla-La Mancha (202,449 employees and 6.5% of Spain); Castilla and León (136,126 employees and 4.4% of Spain); Andalusia (135,087 employees and 4.4% of Spain); Galicia (117,589 employees and 3.8% of Spain); La Rioja (117,318 employees and 3.8% of Spain); and the Basque Country (106,611 employees and 3.4% of Spain). With a smaller number of employees in industrial districts we find Murcia (89,199 employees and 2.9% of Spain); Aragon (51,697 employees and 1.7% of Spain); Navarre (50,853 employees and 1.6% of Spain); Balearic Islands (15,081 employees and 0.5% of Spain); Cantabria (13,406 employees and 0.4% of Spain); Extremadura (11,612 employees and 0.4% of Spain); and Madrid (10,505 employees and 0.3% of Spain).

4.3. Comparison of the map of Industrial Districts of Spain (2001) with the maps of Industrial Districts of Italy (2001) and UK (1997)

The results of the investigation are directly comparable with those of the ISTAT (2005 and 2006) for Italy. They are partially comparable with those of De Propris (2005) for the United Kingdom whose methodology if based on ISTAT (1996)[9].

[9] Data about industrial districts provided by De Propris (2005) are not as exhaustive as in the other two papers, limiting this way the comparison with the United Kingdom.

1. There are 205 MID in Spain, 156 in Italy and 47 in the United Kingdom.

2. In Spain, MID account for 25% of the LLM and 62% of the manufacturing LLM. In Italy they are 23% of the LLM and 65% of the manufacturing LLM (table 7). In UK they account for 16% of the LLM and 53% of the manufacturing LLM.

3. In Spain, MID account for 20% of population and employment (8,250,000 inhabitants and 3,105,000 jobs) (table 7). In Italy, they have 22% of population (12,591,000 residents) and 25% of employment (4,930,000 jobs). MID have 35% of total manufacturing employment in Spain, 39% in Italy and 21% in the UK[10].

4. The distribution by sector of the specializations of MID and their importance follows a certain parallelism between Spain and Italy (table 8). However, a stronger polarization is detected in Italy, since 74% of MID and 78% of manufacturing employment of MID concentrates on Machinery, electrical and optical equipment (30.5%); Textile and textile products (28%); and Products for the house (20%). In Spain, 69% of MID's employment concentrates on Machinery, electrical and optical equipment (22%); Products for the house (19.5%); Textile and textile products (14%); and Food, beverages and tobacco (13%). The industry with the highest number of MID in Spain is **Products for the house** (62 MID and 19.5% of the manufacturing employment in MID), twice the number of Italian districts with this specialization (32 MID) and with the same participation in the Manufacturing employment of the industrial districts (19.8%). In Spain it also stands out the importance of the **Food, beverages and tobacco** industry, with 37 districts and 12.6% of the manufacturing employment in districts, in front of the 7 districts and 1.7% of Italy.

5. A significant polarization in the territorial distribution of MID was observed in Spain and Italy (figures 1 and 2) while in the UK (figure 3) there is not evidence about concentration. While in Italy is detected a North-South duality, Spanish MID are distributed in axes and the greatest concentration is located in the east coast, where Valencia and Catalonia account for 41% of the districts and 66% of total employment in industrial districts.

5. Conclusions

The objective of the research is the elaboration of the map of Marshallian Industrial Districts (MID) in Spain using the new Sforzi-ISTAT (2006) methodology for the year 2001. The new map uses the Local Labour Markets identified in Boix and Galletto (2004 and 2006) as the territorial unit of reference, data from 2001 Population Census, and a combination of several business databases. The main conclusions are:

1. Marshallian Industrial Districts are a **quantitatively important phenomenon in Spain**. There were identified 205 MID which have 20% of the Spanish population, employment and productive establishments (8,250,000 inhabitants, 3,105,000 jobs and 615,000 establishments). Manufacturing in industrial districts accounts for 35% of Spanish manufacturing (956,000 employees) of which 70% corresponds to small firms,

[10] It is noticed that the share of manufacturing on total employment is larger in Italy (23%) than in Spain (19%), and the United Kingdom is the least specialized in manufacturing (16%).

20% to medium, and 10% to large firms. The main industry of MID accounts for 42% of total manufacturing employment in MID (402,000 jobs) and 2.6% of total Spanish employment.

2. Marshallian Industrial Districts are **specialized in mature and light industries**. The most important are the districts of Products for the house (62 MID and 119,000 employees in the main industry); Textile and textile products (46 MID and 85,000 employees in the main industry); Food, beverages and tobacco (37 MID and 51,000 employees in the main industry); and Leather and footwear (23 MID and 73,000 employees in the main industry). Inside these main industries, the dominant sub-specializations are Tailoring (36 MID); Furniture (33 MID), Meat industry (13 MID), Drinks (8 MID); Preparation and conservation of fruits and vegetables (8 MID); and Tiles and ceramic tiles (7 MID).

3. Marshallian Industrial Districts show a **defined pattern of territorial distribution along four axes**. The main axis extends from the north of Catalonia to Valencia and Murcia. It accounts for 41% of the districts and 66% of the employment in industrial districts of Spain. The regions where the districts are quantitatively more important are Valencia (53 MID and 1,169,000 employees in districts) and Catalonia (32 MID and 880,000 employees in districts). MID are also quantitatively important in Castilla-La Mancha, Andalusia and Castilla and León. MID are also detected in Galicia, Murcia, Navarre, Extremadura, The Basque Country, Balearic Islands, Cantabria and Madrid.

4. The **quantitative importance of the industrial districts is very similar in Spain and Italy**, and in both countries is apparently higher than in the United Kingdom. The sectoral distribution of the main specializations of MID is also very similar between Spain and Italy, although in Italy a stronger polarization by sector is detected. Regarding the main differences, it should be pointed out the greater importance of Machinery, electrical and optical equipment in Italy and Food, beverages and tobacco in Spain. Important inequalities are detected in the territorial distribution of the MID in Spain (distribution along four axes) and Italy (concentration in the north of the country), while in the United Kingdom they seem to be more equally distributed in space.

5. Maps of Marshallian Industrial Districts constitute a **tool for the analysis and implementation of policies** aimed to support innovation and improving productivity (COM 2005-121; COM 2005-488; MITYC Orden ITC/2691/2006 and Order ITC Frebruary 2007). This tool must be completed with additional economic and territorial figures as systems of large firms and metropolitan areas. The extension of the methodology to other countries, such as France and Germany, would allow additional comparisons improving the knowledge of this type of phenomena and the design of common strategies.

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Table 1. NACE Rev.1 groups used to identify LLM specialized in manufacturing

Group	NACE Rev.1
Agriculture, hunting and fishing	01, 02, 05
Mining and quarrying	10, 11, 12, 13, 14
Manufacturing	15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37
Construction	45
Business services	511, 516, 631, 634, 65, 67, 712, 713, 72, 73, 741 a 747, 911, 924
Consumer services	55, 633, 70, 711, 714, 921, 922, 923, 927, 93
Social services	66, 80, 85, 90, 913, 925, 926
Traditional services	40, 41, 50, 512, 513, 514, 515, 517, 52, 60, 61, 62, 632, 64, 748, 75, 912

Source: Authors' elaboration from ISTAT (2006)

Table 2. NACE Rev.1 Manufacturing activities used for the identification of the "main industry" of the LLM

Group	NACE Rev.1
Textile and textile products	17 Manufacture of textiles
	18 Manufacture of wearing apparel; dressing and dyeing of fur
Leather and footwear	19 Leather and footwear
Products for the house	20 Wood and cork
	26 Manufacturing of other non metallic mineral products
	361 Manufacture of furniture
Jewellery, musical instruments and toys	362 Jewellery
	363 Musical instruments
	364 Sport articles
	365 Toys
Food, beverages, tobacco	15 Food and beverages
	16 Tobacco
Machinery, electrical and optical equipment	223 Reproduction of recorded media
	275 Foundry of metals
	28 Manufacture of fabricated metal products, except machinery and equipment
	29 Manufacture of machinery and equipment n.e.c.
	30 Manufacture of office, accounting and computing machinery
	31 Manufacture of electrical machinery and apparatus n.e.c.
	32 Manufacture of radio, television and communication equipment and apparatus
	33 Manufacture of medical, precision and optical instruments, watches and clocks
Manufacture of basic metals and fabricated metal products	271 a 274 Manufacture of basic metals
Chemistry, plastic products and petro-chemistry	23 Manufacture of coke, refined petroleum products and nuclear fuel
	24 Manufacture of chemicals and chemical products
	25 Manufacture of rubber and plastics products
Transport equipment	34 Manufacture of motor vehicles, trailers and semi-trailers
	35 Manufacture of other transport equipment
Paper, publishing and printing	21 Paper
	221 Publishing
	222 Printing

Source: Authors' elaboration from ISTAT (2006)

Table 3. Industrial Districts and main industry employment, 2001.

Sector	Total employment			%		
	Nº districts	Manufacturing	Main industry	Nº districts	Manufacturing	Main industry l
Products fro the house	62	186,487	119,073	30.2%	19.5%	29.6%
Textile and textile products	46	136,324	85,064	22.4%	14.2%	21.1%
Leather and footwear	23	83,808	72,786	11.2%	8.8%	18.1%
Food, beverages, tobacco	37	120,350	51,028	18.0%	12.6%	12.7%
Machinery, electrical and optical equipment	14	213,775	34,665	6.8%	22.3%	8.6%
Chemistry, plastic products and petro-chemistry	9	81,065	22,510	4.4%	8.5%	5.6%
Transport equipment	9	63,088	11,954	4.4%	6.6%	3.0%
Jewellery, musical instruments and toys	2	7,603	3,632	1.0%	0.8%	0.9%
Paper, publishing and printing	2	54,206	1,149	1.0%	5.7%	0.3%
Manufacture of basic metals and fabricated metal products	1	7,332	687	0.5%	0.8%	0.2%
Other manufacturing	0	2,744	0	0.0%	0.3%	0.0%
Total	**205**	**956,782**	**402,548**	**100.0%**	**100.0%**	**100.0%**

Source: Elaboration from 2001 Population Census (INE).

Table 4. Employees per sector in industrial districts, 2001.

Sector	Spain	Industrial districts	Districts % on Spain
Leather and footwear	98,390	83,808	85.2%
Textile and textile products	270,519	136,324	50.4%
Products fro the house	424,960	186,487	43.9%
Jewellery, musical instruments and toys	17,985	7,603	42.3%
Food, beverages, tobacco	378,990	120,350	31.8%
Other manufacturing	8,823	2,744	31.1%
Machinery, electrical and optical equipment	706,158	213,775	30.3%
Chemistry, plastic products and petro-chemistry	274,963	81,065	29.5%
Paper, publishing and printing	231,494	54,206	23.4%
Transport equipment	280,835	63,088	22.5%
Manufacture of basic metals and fabricated metal products	56,963	7,332	12.9%
Spain	**2,750,080**	**956,782**	**34.8%**

Source: Elaboration from 2001 Population Census (INE).

Table 5. Number of Industrial Districts and Manufacturing Local Labour Systems per Region (Autonomous Community)[*]

	Local Labour Systems			Industrial Districts	
Region	N. of Districts	N. of Manufacturing LLM	Total N. of LLM	% Total districts	% Manufacturing LLM
Valencia	53	60	83	25.9%	88.3%
Catalonia	32	45	72	15.6%	71.1%
Castilla-La Mancha	32	54	84	15.6%	59.3%
Andalusia	24	38	183	11.7%	63.2%
Aragon	11	26	42	5.4%	42.3%
Castilla y León	9	26	75	4.4%	34.6%
La Rioja	9	11	12	4.4%	81.8%
Galicia	8	17	66	3.9%	47.1%
Murcia	7	11	22	3.4%	63.6%
Navarre	7	14	14	3.4%	50.0%
Extremadura	4	5	60	2.0%	80.0%
The Basque Country	4	13	16	2.0%	30.8%
Balearic Islands	2	3	25	1.0%	66.7%
Cantabria	2	4	9	1.0%	50.0%
Madrid	1	2	3	0.5%	50.0%
Asturias	0	3	16	0.0%	0.0%
Canary Islands	0	0	22	0.0%	-
Ceuta	0	0	1	0.0%	-
Melilla	0	0	1	0.0%	-
Total	**205**	**332**	**806**	**100.0%**	**61.7%**

[*] Industrial district is assigned to the region where the main municipality of the LLM is located.
Source: Elaboration from 2001 Population Census (INE).

Table 6. Employees in Industrial Districts per Region (Autonomous Community)[*]

	Total			%		
Region	Employees	Employees in manufacturing	Employees in the Main industry	Employees	Employees in manufacturing	Employees in the Main industry
Valencia	1,168,918	337,755	167,574	37.6%	35.3%	41.6%
Catalonia	879,550	296,501	89,399	28.3%	31.0%	22.2%
Castilla-La Mancha	202,449	61,742	29,012	6.5%	6.5%	7.2%
Andalusia	136,126	36,186	10,126	4.4%	3.8%	2.5%
Aragon	135,087	37,868	21,325	4.4%	4.0%	5.3%
Castilla y León	117,589	27,492	13,061	3.8%	2.9%	3.2%
La Rioja	117,318	36,345	11,891	3.8%	3.8%	3.0%
Galicia	106,011	46,199	25,012	3.4%	4.8%	6.2%
Murcia	89,199	31,189	16,552	2.9%	3.3%	4.1%
Navarre	51,697	15,120	6,133	1.7%	1.6%	1.5%
Extremadura	50,853	16,418	6,052	1.6%	1.7%	1.5%
The Basque Country	15,081	3,754	1,922	0.5%	0.4%	0.5%
Balearic Islands	13,406	3,694	1,329	0.4%	0.4%	0.3%
Cantabria	11,612	3,412	2,114	0.4%	0.4%	0.5%
Madrid	10,505	3,107	1,046	0.3%	0.3%	0.3%
Asturias	0	0	0	0.0%	0.0%	0.0%
Canary Islands	0	0	0	0.0%	0.0%	0.0%
Ceuta	0	0	0	0.0%	0.0%	0.0%
Melilla	0	0	0	0.0%	0.0%	0.0%
Total	**3,105,401**	**956,782**	**402,548**	**100.0%**	**100.0%**	**100.0%**

[*] Industrial district is assigned to the region where the main municipality of the LLM is located.
Source: Elaboration from 2001 Population Census (INE).

Table 7. Industrial Districts in Spain and Italy. Main indicators. 2001

España	Total Districts			% on manufacturing LLM			% on total de SLT		
	Spain	Italy	UK	Spain	Italy	UK	Spain	Italy	UK
Districts	205	156	47	61,7%	65,0%	53%	25,4%	22,7%	16%
Local Units (establishments)*	615283	1180042	-	65,3%	68,4%	-	20,5%	24,9%	-
Jobs	3105401	4929721	-	64,0%	68,0%	-	20,3%	25,4%	-
Local Manufacturing Units	82782	212410	-	72,9%	74,6%	-	31,5%	36,0%	-
Jobs in Local Manufacturing Units	956782	1928602	-	67,5%	70,2%	-	34,8%	39,3%	21%
Number of municipalities	2099	2215	-	57,0%	59,9%	-	25,4%	27,3%	-
Inhabitants	8252988	12591475	-	63,5%	65,4%	-	20,2%	22,1%	-

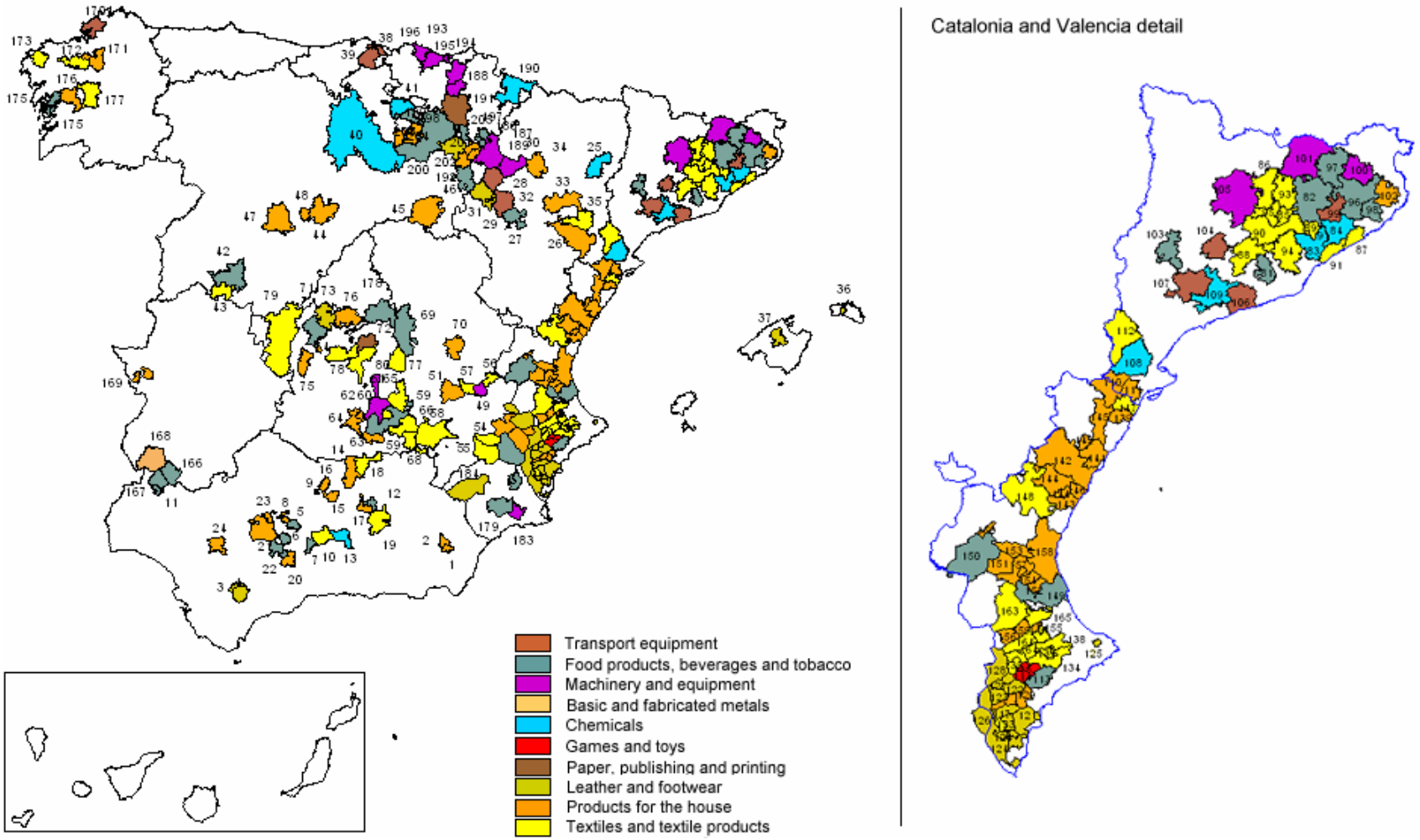
* Elaboration from DIRCE.
Source: Elaboration from 2001Population Census (INE), DIRCE (INE) and ISTAT (2005)

Table 8. Employment per sector in Industrial Districts in Spain and Italy. 2001

	Total				%			
	Nº of districts		Manufacturing jobs		Nº of districts		Manufacturing jobs	
	España	Italia	España	Italia	España	Italia	España	Italia
Products for the house	62	32	186.487	382.332	30,20%	20,50%	19,50%	19,80%
Textile and textile products	46	45	136.324	537.435	22,40%	28,80%	14,20%	27,90%
Food, beverages and tobacco	37	7	120.350	33.304	18,00%	4,50%	12,60%	1,70%
Leather and footwear	23	20	83.808	186.680	11,20%	12,80%	8,80%	9,70%
Machinery, electrical and optical equipment	14	38	213.775	587.320	6,80%	24,40%	22,30%	30,50%
Transport equipment	9	0	63.088	0	4,40%	0,00%	6,60%	0,00%
Chemistry and plastic products	9	4	81.065	48.585	4,40%	2,60%	8,50%	2,50%
Jewellery, musical instruments and toys	2	6	7.603	116.950	1,00%	3,80%	0,80%	6,10%
Paper, publishing and printing	2	4	54.206	35.996	1,00%	2,60%	5,70%	1,90%
Basic and fabricated metal products	1	0	7.332	0	0,50%	0,00%	0,80%	0,00%
Manufacturing n.e.c.	0	0	2.744	0	0,00%	0,00%	0,30%	0,00%
Total	**205**	**156**	**956.782**	**1.928.602**	**100,00%**	**100,00%**	**100,00%**	**100,00%**

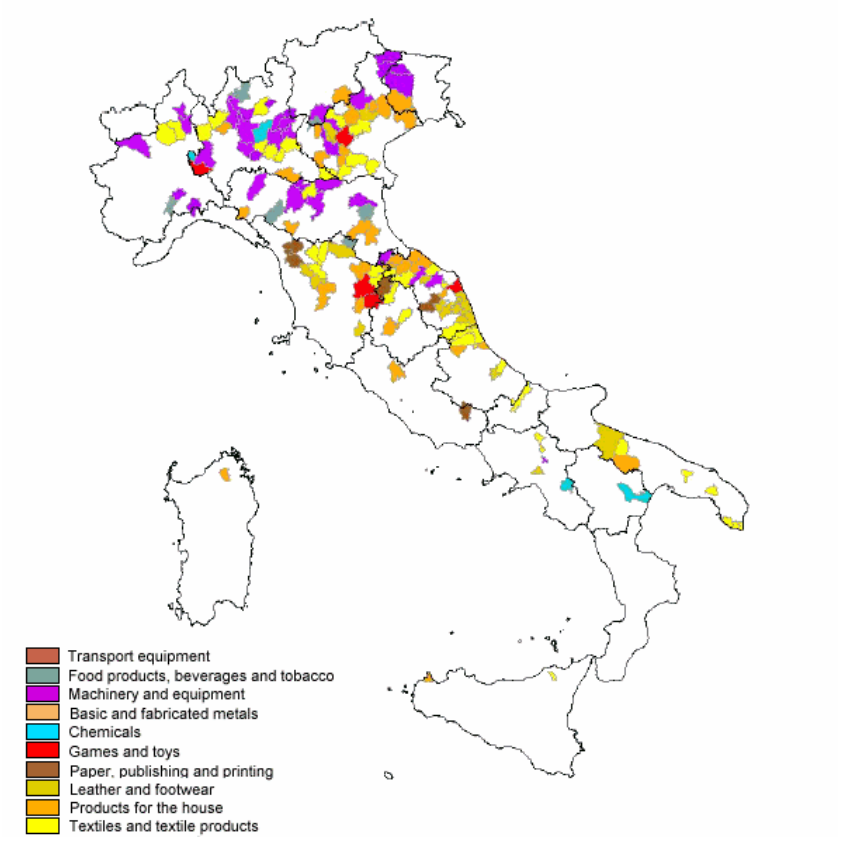
Source: Elaboration from 2001Population Census (INE) and ISTAT (2005).

Figure 1. The map of Marshallian Industrial Districts in Spain using the ISTAT (2005) methodology, 2001



Source: Elaboration from 2001 Population Census (INE), SABI (Bureau van Dijk) and DIRCE (INE).

Figure 2. The map of Marshallian Industrial Districts in Italy using the ISTAT (2005) methodology, 2001



Source: Elaboration from ISTAT (2005)

Figure 3. The map of Marshallian Industrial Districts in the UK using the ISTAT (1996) methodology, 1997

Source: Elaboration from De Propris (2005).