The (re)positioning of the Spanish metropolitan system within the European urban system (1986-2006)

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Another equally vivid memory is of my being with Josep in the bar of the ETSAB, one morning in late 2004, telling him in a 'chuffed' manner that I had located a data source of two-way European air traffic flows. Little did I know then what would be the outcome of what we would actually do with that data, or indeed where it would take us. Chapter 8 is testimony to the many hours of head-banging prior to our settling for the final objective.

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Arising, as the thesis has, out of in-house 'group work', there are many colleagues within the CPSV who to a greater or lesser extent have collaborated in this line of metropolitan research over the years – these include BahaaEddine Al Haddad, Joaquim

[i] *La caracterización territorial y funcional de las áreas metropolitanas españolas*, in the context of the *Estudio Prospectivo del Sistema Urbano del Sudoeste Europeo* (1998-2001), with ERDF funding through the INTERREG IIC Programme.
[ii] *La expansión urbana de las metrópolis del Sudoeste Europeo* (EURMET), with ERDF funding through the INTERREG IIIB Programme.
[iii] *Barcelona y Madrid: ¿dos modelos de urbanización convergentes?* (BIA2003-07176) with research funding from the Ministerio de Ciencia y Tecnología, in the context of the Plan Nacional de Investigación (2000-2003).
[iv] *El proceso de urbanización en la costa mediterránea* (SEJ2006-09630) with research funding from the Ministerio de Educación y Ciencia, under the Plan Nacional de I+D+I (2004-2007).
[v] *Monitoring urban sprawl and other urban rural fringe planning and environmental considerations around Barcelona's metropolitan area*, in the context of the SPOT5 Application and Validation Programme (SAVP), with joint funding and support from the CNES (France) and SpotImage.

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[vi] CPSV (1998) *La delimitación de las principales áreas metropolitanas españolas*, CPSV, UPC, Barcelona.
[vii] *Estudio Prospectivo del Sistema Urbano del Sudoeste Europeo* (1998-2001), with ERDF funding through the INTERREG IIC Programme.

Industry at the AAG 2007, held in San Francisco in April 2007. This session proved to create the incentive to complete a substantial component of the quantitative analysis of the thesis and provided the setting for the first presentation of the results contained in Chapter 8. The evening spent over dinner with Frank and Ben, Michael Timberlake and David Smith is another happy and vivid memory;
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[viii] Monclús, J. and Guàrdia, M. (2006) *Culture, urbanism and planning*, Ashgate, Aldershot.

but in particular over the summer periods of 2005 and 2006, provided a welcome and highly rewarding change from the on-going activities related to the thesis.

When politicians and people in public positions are forced to resign under *in flagrante* circumstances, the excuse invariably offered to the media is that it so that they can 'spend more time with their families'. The mental effort and enforced seclusion over the last three years has by necessity been shared very unfairly with Marga, Borja and Oriol. Hopefully the completion of this tome will indeed enable us all to spend more time together and simply do the myriad of things which have had to be sacrificed.

The thesis is dedicated to the memory of the late Richard (Dick) H. Williams, Senior Lecturer in Town and Country Planning and Associate Director of the Centre for Research in European Urban Environments at the University of Newcastle upon Tyne (UK), up until his untimely death. It was Dick's passion for the European spatial and cultural geography, the mechanisms and workings of Brussels, and spatial planning matters of a European nature in general, as well as his constant references to the European *spatial metaphors* which made such a lasting impression on me during my time spent in Newcastle upon Tyne (1995-1996) prior to coming to Barcelona.

Barcelona, July 2007

SUMMARY

The thesis seeks to demonstrate that during the period between 1986 and 2006, some of the principal cities of the Spanish metropolitan system[ix], have undergone significant change in terms of their European competitiveness. It is suggested that in the case of Madrid and Barcelona in particular this change has been of such a magnitude to proportion them a much more important place within the European spatial configuration than that which they occupied in the mid-1980s. Empirical evidence is offered to support this conjecture. The thesis lies wholly within the framework of spatial planning at the European territorial scale. It charts the comparative ascent of the Spanish cities from the moment of Spain's entry into the European Union (EU) in 1986 against the background of the development of European spatial policy, increased economic integration across Europe, the increased importance of the 'territorial' dimension of EU cohesion policy and an eventual waning of the applicability of the terminology of 'core' and 'periphery' to describe European geographical location.

Part One (Chapter 1) addresses the processes of urbanisation in general from a global perspective and then focuses on metropolitan growth in a number of different historical contexts from the start of the 19th Century. Parts Two (Chapters 2-5) and Three (Chapters 6-9) of the thesis carry out analyses at two contrasting but complementary spatial scales. Part Two examines the metropolitan growth processes in Spain, in the period since 1857, detecting the historical moments in which there were surges in the metropolitan populations of the seven cities of the metropolitan system. The dimensions of the spatial units of analysis corresponding to the seven Spanish metropolitan urban regions are described, based upon a methodology first developed by the Universitat Politècnica de Catalunya (UPC) in the context of a transnational spatial planning project of the INTERREG community initiative[x]. These seven spatial units form the basis for a socio-economic analysis of the structure of the metropolitan system, drawing upon data principally from the 2001 Census. If by 1930 one of the key characteristics of Spain's urban system was having not just one but two cities (Madrid and Barcelona) belonging to the group of 27 cities across the world with populations in excess of 1 million inhabitants[xi], this same differentiation between the country's two largest cities and the remainder of the urban system is equally valid today. Spain's urban system remains clearly bicephalous in being dominated by these same two cities in terms of demographic and economic strength.

[ix] Understood as comprising Madrid, Barcelona, Valencia, Sevilla, Bilbao, Zaragoza and Málaga.
[x] CPSV (2001) *La caracterización territorial y functional de las áreas metropolitanas españolas*, CPSV, UPC, Barcelona.
[xi] Mumford, L. (1961) *The City in History*, Penguin, London.

Part Three begins by examining the evolution of European spatial policy against the background of an ever-enlarging European Union and changes with regard to the notion of cohesion – from a concept understood in terms of economic and social factors, to one in which the territorial dimension has become increasingly important. The European urban system is then critically examined through a number of key and influential studies, with particular regard to the rankings and hierarchies of metropolitan urban regions deriving there from and the changes in the placing of the Spanish metropolitan urban regions therein. Taking inspiration from the seminal contribution of Manuel Castells[xii] in the context of the structural changes resulting from the informational and technological revolution, the thesis seeks to replicate the concept of a 'space of flows'. This is carried out through a 'network analysis' approach drawing upon air passenger flows between some 28 European metropolitan urban regions of the EU15+2 group of countries, enabling the analysis of the interaction between these 28 cities. This methodology enables arriving at a number of descriptive indicators which in turn, through the application of a multi-dimensional scaling mathematical technique, permits comparing the functional and physical distances of each of the metropolitan urban regions from the centre of the 'conceptual space of air passenger flows' and the centre of gravity. The resulting map of the functional positioning of the cities offers a spatial vision of metropolitan Europe quite different to that based upon Cartesian coordinates. Such an approach enables demonstrating that cities such as Barcelona, Madrid, Helsinki, Lisbon and Athens, traditionally considered as physically peripheral to the European core area, appear to be more favourably positioned in functional terms. Furthermore in the case of Spain the results indicate that Barcelona lies closer to the centre of the conceptual 'space of air passenger flows' than Madrid.

In light of this empirical evidence, together with the signs of increased economic integration across some parts of Spain, the prospects of Spain forming part of a wider European territorial concentration of flows and activities, and the recognition of the territorial capital of Madrid and Barcelona within recent EU spatial policy declarations, the thesis concludes in Part Four that these two metropolitan regions have undergone a clear consolidation and (re)positioning within the European metropolitan hierarchy.

[xii] Castells, M. (1989) *The Informational City: Information Technology, Economic Restructuring, and the Urban-Regional Process*, Blackwell, Oxford; and Castells, M. (1996) *The Information Age: Economy Society and Culture. Volume I: The Rise of the Network Society*, Blackwell, Oxford.

RESUMEN

La tesis trata de demostrar que durante el período entre 1986 y 2006, unas de las principales ciudades del sistema metropolitano español[xiii], han experimentado un cambio significativo en términos de su competitividad europea. Es sugerido que en el caso de Madrid y Barcelona en particular este cambio ha sido de tal magnitud para proporcionarlas un lugar mucho más importante dentro de la configuración territorial espacial europea que dichas ciudades ocuparon en el mediado de los años 80. Se ofrece evidencia empírica para sostener esta conjetura. La tesis se sitúa dentro del marco de la ordenación territorial a la escala europea. Traza la subida relativa de las ciudades españolas desde el momento de la entrada de España en la Unión Europea (UE) en 1986, contra el fondo del desarrollo de la política territorial europea, la integración económica aumentada a través de Europa, la importancia aumentada de la dimensión "territorial" de la política de la cohesión de UE y una eventual disminución de la aplicabilidad de la terminología del "centro" y la "periferia" para describir la ubicación geográfica europea.

La Primera Parte (Capítulo 1) esta dirigida a evaluar los procesos de la urbanización en general, desde una perspectiva global, y después se centra en examinar el crecimiento metropolitano en varios contextos históricos, a partir del comienzo del siglo XIX. La Segunda (Capítulos 2-5) y Tercera Partes (Capítulos 6-9) de la tesis llevan a cabo unas análisis en dos escalas territoriales contrastantes pero complementarias. La Segunda Parte examina los procesos del crecimiento metropolitano en España, a partir de 1857, discerniendo los momentos históricos en los que había oleadas en las poblaciones 'metropolitanas' de las siete ciudades del sistema metropolitano. Se describe las dimensiones de las unidades espaciales de análisis que corresponden a las siete regiones urbanas metropolitanas españolas, basadas en una metodología desarrollado por el Universidad Politécnica de Cataluña (UPC) en el contexto de un proyecto trasnacional de ordenación territorial de la iniciativa comunitaria INTERREG[xiv]. Estas siete unidades espaciales forman la base para un análisis socioeconómico de la estructura del sistema metropolitano, utilizando datos principalmente del 2001 Censo. Si en el año 1930 una de las características claves del sistema urbano de España era de tener no sólo una, pero dos ciudades (Madrid y Barcelona) perteneciendo al grupo de 27 ciudades a través del mundo con poblaciones por encima de 1 millón de

[xiii] Entendido como Madrid, Barcelona, Valencia, Sevilla, Bilbao, Zaragoza y Málaga.
[xiv] CPSV (2001) *La caracterización territorial y functional de las áreas metropolitanas españolas*, CPSV, UPC, Barcelona.

habitantes[xv], esta misma diferenciación entre las dos ciudades más grandes del país y el resto del sistema urbano es hoy igualmente válida. El sistema urbano de España se queda claramente bicéfalo en ser dominado por estas mismas dos ciudades en términos de fuerza demográfica y económica.

La Tercera Parte comienza examinando la evolución de la política territorial europea contra el fondo de una Unión Europea cada vez más grande y los cambios con respecto a la noción de la cohesión – de un concepto entendido en términos de factores económicos y sociales, a uno en que la dimensión territorial ha llegado a ser cada vez más importante. A continuación se examina de manera crítica el sistema urbano europeo mediante algunos estudios influyentes, con la consideración particular a las clasificaciones y las jerarquías de las regiones urbanas metropolitanas que derivan de estos estudios, y a los cambios en la colocación de las regiones urbanas metropolitanas españolas en dichos estudios. Tomando inspiración de la contribución seminal de Manuel Castells[xvi] en el contexto de los cambios estructurales que resultan de la revolución de información y tecnológica, la tesis trata de replicar el concepto de un 'espacio de flujos'. Esto es llevado a cabo por un enfoque de "network analysis" que utiliza los flujos de pasajeros aéreos entre unas 28 regiones urbanas metropolitanas europeas del grupo de EU15+2 países, permitiendo el análisis de la interacción entre estas 28 ciudades. Esta metodología permite desarrollar varios indicadores descriptivos que permiten, a su vez, por la aplicación de una técnica matemática de escalamiento multi-dimensional, comparar las distancias funcionales y físicas de cada una de las regiones urbanas metropolitanas del centro del 'espacio conceptual de flujos de pasajeros aéreos' y el centro de la gravedad. El mapa resultante del posicionamiento funcional de las ciudades ofrece una visión espacial de Europa metropolitana bastante diferente a la que se base en los coordinados cartesianos. Tal enfoque permite demostrar que ciudades como Barcelona, Madrid, Helsinki, Lisboa y Atenas, consideradas tradicionalmente como físicamente periféricas al área central de Europea, parecen ser posicionadas más favorablemente en términos funcionales. Además en el caso de España, los resultados indican que Barcelona queda más cerca al centro del conceptual 'espacio de flujos de pasajero aéreos' que Madrid.

A la luz de esta evidencia empírica, junto con los signos de la integración económica aumentada a través de algunas partes de España, las perspectivas de que España formará parte una más amplia concentración territorial europea de flujos y actividades,

[xv] Mumford, L. (1961) *The City in History*, Penguin, London.

y del reconocimiento de la capital territorial de Madrid y Barcelona dentro de las recientes las declaraciones de política territorial de la UE, la tesis concluye, en la Cuarta Parte que estas dos regiones metropolitanas han experimentado una clara consolidación y (re)posicionamiento dentro de la jerarquía metropolitana europea.

[xvi] Castells, M. (1989) *The Informational City: Information Technology, Economic Restructuring, and the Urban-Regional Process*, Blackwell, Oxford; and Castells, M. (1996) *The Information Age: Economy Society and Culture. Volume I: The Rise of the Network Society*, Blackwell, Oxford.

INTRODUCTION

"The chief function of the city is to convert power into form, energy into culture, dead matter into the living symbols of art, biological reproduction into social creativity. The positive functions of the city cannot be performed without creating new institutional arrangements, capable of coping with the vast energies modern man now commands: arrangements just as bold as those that originally transformed the overgrown village and its stronghold into the nucleated, highly organized city."

Lewis Mumford (1961) *The City in History*, p. 650.

metròpoli *f*

1. Ciutat principal d'una contrada, d'un estat.
2. *HIST* Per a les antigues colònies gregues, la ciutat d'origen.
3. Ciutat que té una seu arxiepiscopal.
4. L'estat colonitzador respecte a les seves colònies.

Gran Enciclopèdia Catalana

The term "metropolis" stems from the Greek
"metropolis"
Greek. *metropolis* = a parent state, a chief city;
meter = a mother; polis = a city;
the chief city or capital of a kingdom or state

Shorter Oxford Dictionary

INTRODUCTION

1. From the EU6 (1957) to the EU27 (2007)

The spatial configuration of Europe has changed enormously over the last twenty years. On the one hand this is directly due to the geopolitical changes resulting from the re-union between the former Eastern European bloc of countries and that of the Western European countries following the lifting of the iron curtain at the end of the 1980s which had fallen after the Second World War, leading to the virtual isolation of the eastern part of Europe through the more than 60 years duration of the Cold War. What began as an agreement between the six founding member countries of the European Economic Community (Belgium, France, German Federal Republic, Italy, Luxembourg and the Netherlands, the EU6) through the signing of the Treaty of Rome in 1957[1] has resulted today in a European Union (EU) of some 27 countries, with other countries waiting at the doors to be admitted. This expansion from a group of six in 1957 to a group of 27 countries, as at 1 January 2007, has taken place through some seven 'enlargements': firstly in 1973, to include the United Kingdom, Denmark and Ireland, the EU9[2]; followed in 1981 by the admission of Greece, to the then EU10[3]; in 1986 with the inclusion of Spain and Portugal, the EU12[4]; in 1990 with the incorporation of the former German Democratic Republic by way of the German reunification[5]; in 1995 with the entry of Austria, Finland and Sweden, the EU15[6]; more recently in 2004, through the admission of the Czech Republic, Estonia, Cyprus, Latvia, Lithuania, Hungary, Malta, Poland, Slovenia and Slovakia, to form the EU25[7]; and finally on 1st January 2007, with the incorporation of Bulgaria and Rumania[8]. Today's Europe, the EU27, extends over an area of some 43 million km^2 and has a population of over 489,885,300 inhabitants. Of this population some 80% live in urban areas.

However what have also had a crucial effect upon the spatial configuration of the European territory, its urban system and the relations between the largest cities of the urban system, have been the changes resulting from the restructuring of the international economic order from industrially based economies to advanced service

[1] Treaty signed 25 March 1957, entering into force on 1 January 1958, not published in the Official Journal. (See http://eur-lex.europa.eu/en/treaties/index.htm#founding)
[2] Treaty of accession signed 22 January 1972, entering into force on 1 January 1973, OJ L 73 dated 27 March 1972
[3] Treaty of accession signed 28 May 1979, entering into force on 1 January 1981, OJ L 291 dated 19 November 1979
[4] Treaty of accession signed 12 June 1985, entering into force 1 January 1986, OJ L 302 dated 15 November 1985
[5] The Länder of the former East Germany automatically became part of the EU on 3 October 1990.
[6] Treaty of accession signed 24 June 1994, entering into force 1 January 1995, OJ C 241 dated 29 August 1994
[7] Treaty of accession signed 16 April 2003, entering into force 1 May 2005, OJ L 236 dated 23 September 2003

economies, and the effects and implications produced through the increasing economic integration throughout Europe.

As a consequence all of these 27 countries are partisan to the EU's prime overall objective, announced in the *Lisbon Strategy* in 2000 (CEC, 2000), and reiterated and expanded upon in the *Gothenburg Strategy* in 2001 (CEC, 2001b) aimed at making the EU the most competitive economy in the world and achieving full employment by 2010.

Figure A: The spatial extent of the European Union as at 1 January 2007[9]

While the implicit support of these goals from the EU27 represents a 'united' Europe, as the historian Timothy Garton Ash points out, Europe is currently facing enormous challenges. An ageing population with the concomitant demands on the until now state-guaranteed welfare, economic competition from Asia, immigration and energy sources are just some of these pressing challenges which need to be faced by the Member states. Such is the nature of these challenges that Garton Ash suggests there is a clear lack of a definitive vision of where today's Europe is actually heading. He goes on to

[8] Treaty of accession signed 25 April 2005, entering into force 1 January 2007, OJ L 157 dated 21 June 2005
[9] http://europa.eu/abc/maps/index_en.htm

draw a parallel between Pirandello's play entitled *Six Characters in Search of an Author* and the European Union's 27 states in search of a story (Garton Ash, 2007).

2. Territorial models and territorial cohesion

The traditional spatial configuration of the European geography was based upon the core-periphery model. Until recently the 'pentagon', broadly comprising the area defined as lying between London, Paris, Milan, Munich and Hamburg, was seen as the area containing approximately one third of the European Union's entire population, some 164 million inhabitants. While this core area comprises just 14% of the EU territory it produces approximately 46.5% of the EU27 Gross Domestic Product. By contrast areas lying on the (far) periphery of this central area were deemed to be weaker in economic terms, deserving the injection of public resources afforded through the EU's Structural Funds in the case of the four cohesion countries of Greece, Spain, Portugal and Ireland. Such assistance was seen to be essential in order to close the spatial divide between the core and the periphery. The elaboration of the *European Spatial Development Perspective* (ESDP) (CEC, 1999) challenged this core-periphery model. European spatial planning policies, aimed at encouraging social and economic, and with ever increasing importance, territorial cohesion, seek amongst other aspects, to encourage the development of a balanced and polycentric urban system.

Spain itself has undergone significant changes in the last 30 years, breaking free in the late 1970s from being an effectively closed economy to becoming a fully fledged actor in the European and international economy. Its entry into the EU in 1986 coincided with the announcement of Barcelona's hosting of the 1992 Olympic Games. That flagship event itself and all the concomitant changes to the urban fabric of the city all contributed to the international projection of Barcelona as a modern and dynamic city. This was followed by a series of other flagship events and major cultural-related developments in some of Spain's other principal metropolitan urban regions which in turn have all led to an international projection of the cities. These included the naming of Madrid as European City of Culture in 1992; Sevilla's hosting of the 1992 International Exposition; again in Barcelona the hosting of the 2004 Universal Forum of Cultures; and the hosting of the International Expo Zaragoza 2008; together with the opening of the Guggenheim Museum in Bilbao (1997) and the City of the Arts and Sciences development in Valencia (1999). The 2004 and 2007 enlargements to the EU have both meant that Spain is no longer amongst the group of countries with the

highest regional disparities, though in strictly physical geographic terms its position is still peripheral to the central core.

The EU's Communication on *Cohesion Policy and cities: the urban contribution to growth and jobs in the regions* (CEC, 2006a) recognises that over the past two centuries, towns, cities and metropolitan urban regions have been the principal drivers of economic development in Europe, contributing to growth, innovation and employment. Today cities are essential to regions being able to achieve growth and employment, in line with the Lisbon and Gothenburg objectives. Furthermore cities "are the home of most jobs, businesses and higher education institutions and are key actors in achieving social cohesion" and "are the centres of change, based upon innovation, entrepreneurship and business growth" (CEC, 2006a, p.5).

The same Communication makes reference to the increased interest of applied research of particular relevance to cities in recent years. At the European level the 5th Research Framework Programme *City of Tomorrow and Cultural Heritage* is cited, as is the 7th Research Framework Programme (7FP) (2007-2013). Under the theme of Socio-Economic Sciences and the Humanities, within the *Cooperation* component of the 7FP the "role of cities and metropolitan regions" is specifically addressed in the context of the prioritised research relating to the "continuing evolution of European socio-economic models, and economic, social and regional cohesion in an enlarged EU" (CEC (2006d, p. 24).

In 1997 the Economic and Social Research Council of the United Kingdom, with support from the Department of the Environment, launched a major research programme – *Cities: Competitiveness and Cohesion* – with a view to funding research to provide a solid understanding of the changing mosaic of growth and decline being experimented in British cities at that time. This was in the recognition of different researchers and writers having identified cities as the locus and source of increasing difficulties relating to economic competitiveness, declining environmental quality and social exclusion, together with associated problems of crime, disorder and drug abuse. There was a similar recognition of the contribution to environmental sustainability deriving from compact cities, and the fact of cities being the key location for creative change, and culture and leisure activities, in line with individual preferences at that time. The research programme funded some 23 projects, in the areas of

competitiveness (9) and cohesion (10), as well as four integrated case studies examining Bristol, London, Liverpool and Manchester, and Central Scotland[10].

Around the same time the Oporto Declaration of the METREX Network[11] suggested that European metropolitan urban regions were all facing similar problems of economic change, social cohesion, urban sprawl, traffic congestion, city centre vitality and viability, and environmental damage and pollution. These challenges were accompanied by a host of opportunities within these same areas and regions for renewal and regeneration, high quality urban life, and economic competitiveness (METREX, 1999). Furthermore, the same Declaration highlighted the need for integrated spatial planning and development at the European metropolitan level. Examples of integrated spatial planning and development initiatives were present in a number of specific areas of Europe, such as the North Sea Region (NORVISION)[12], North-Western Metropolitan Area (NWMA)[13] and the Baltic Sea Region (VASAB)[14].

3. The territorial and functional characterisation of the Spanish metropolitan urban regions (1998-2001)

Research in this same direction was carried out by the *Universitat Politècnica de Catalunya* (UPC) in the period 1998-2001[15] forming part of a transnational exercise aimed at providing an understanding of the urban system of the South Western European spatial territory[16] through the *INTERREG IIC* Community Initiative. Here the urban system of the area in the three countries was examined at the level of the metropolitan urban regions; the medium-sized cities; and the complementary network of small towns and villages, and rural areas. The UPC coordinated the study of the metropolitan urban regions and shared a methodology it had developed to define the spatial extent of metropolitan urban regions of functional influence, based upon travel to work patterns. In Spain this methodology was applied to the seven largest cities with populations at that time of in excess of 500,0000 persons – i.e. Madrid, Barcelona,

[10] For a detailed evaluation of a number of the projects funded under the *Cities: Competitiveness and Cohesion* Programme see Begg (2002) and Boddy and Parkinson (2004).
[11] The Network was founded April 1996 by representatives from many of the 120 or so metropolitan regions and areas of Europe, bringing together practitioners with a common interest in spatial planning and development at the metropolitan level. The twin purposes of the Network are to promote the exchange of knowledge between practitioners on strategic issues of common interest and to contribute the metropolitan dimension to planning at the European level. (See http://www.eurometrex.org/)
[12] See http://www.planco.de/norvision.htm
[13] See http://www.nwmainterregiic.org/
[14] See http://www.vasab.org.pl/
[15] CPSV (2001) La caracterización territorial y funcional de las áreas metropolitanas españolas, CPSV, UPC, Barcelona.
[16] This spatial territory included the whole of Spain and Portugal, and three south western French NUTS2 regions – Aquitaine, Midi-Pyrénées and Languedoc-Roussillon.

Valencia, Sevilla, Bilbao, Málaga and Zaragoza. In turn the methodology was applied by the Portuguese and French partners of the study to define the equivalent areas of influence of the respective metropolitan case studies, namely Lisbon and Porto (Portugal), and Bordeaux, Montpellier and Toulouse (France).

Part One of that study[17] carried out a qualitative and quantitative analysis of the internal structure of the seven metropolitan urban regions, covering aspects related to population, economic activity, social composition, communications and transport, as well as offering an interpretation of the different ways of studying the metropolitan structure. Furthermore it presented an interpretation of the characterisation and role of the different metropolitan urban regions, from the local perspective, through a review of the spatial and territorial policies of each of the corresponding Regional Authorities (Autonomous Communities).

Part Two of the study[18] included an innovative aspect in the application of a series of indicators, with the object of measuring the (international) positioning of the metropolitan urban regions of the study. These indicators, agreed through a process of consensus between the Spanish and Portuguese groups, examined the notion of 'positioning' from a number of points of view: the demographic profile, the demographic evolution, a functional profile, human capital, firms, events, accessibility and infrastructure, the economic opening, the attraction of the areas, relations of diplomacy and cooperation, and finally aspects of culture and multiculturalism.

Finally Part Three contained the most analytical part of the study[19], offering a more qualitative interpretation of the overall Spanish metropolitan system. This interpretation was offered from three perspectives: from the perspective of the Spanish metropolitan urban regions, through the regional spatial planning policy guidelines; from the Brussels' perspective, through the content of documentation published by the European Commission itself; and finally from the transnational perspective. The applicability of the polycentrism concept in the Spanish context was examined, prior to entering into an analysis of the opportunities and weaknesses of the Spanish metropolitan system lying within the Southern European spatial context. This Third Volume closed with a number of global conclusions, looking towards the future and questioning themes still considered pending at that moment as indicated by the following excerpt[20]:

[17] Volumen I: La caracterización de la Áreas Metropolitanas Españolas
[18] Volumen II: El posicionamiento de las áreas metropolitanas españolas en el ámbito del Sudoeste Europeo
[19] Volumen III: El sistema metropolitano español en el contexto europeo e internacional
[20] Aunque España ocupe una posición indudablemente periférica y es uno de los cuatro países de la 'cohesión', existen razones para justificar que algunas de las áreas metropolitanas tengan una función muy importante a la escala europea

"(…) Although Spain occupies an undoubtedly peripheral position and is one of the four 'cohesion' countries, various reasons exist to justify that some of the metropolitan urban regions have a very important function at the European and international levels. Barcelona and Madrid fulfil the conditions to be considered "*European cities*", in recognition of the positioning established by each of them within the European environment. For a number of years the two areas have appeared within the listings of the highest ranking European cities, with regard to cities attracting economic activity. At same time is important to consider that at present the Spanish metropolitan system is going through a process of gathering strength, taking its own position within the European configuration, seeking to overcome certain limitations and weaknesses, and to maximize its opportunities. It is a good moment to consider another paradigm within the metropolisation processes, as this is contributing to reconfigure the identity of this area. While the physical distance between the Iberian Peninsula and the traditionally central zones of the Union Europe was disturbing, what can be perceived now is a growing acceptance of this reality, accompanied effectively by the real perspective in the middle term of the reinforcement of the axes of communication, highlighting the projects pertaining to the TEN, towards the acquisition of a proper territorial identity. Madrid as the national capital is a case aside, but is not merely coincidental that five of the seven metropolitan urban regions are located in coastal zones and that they belong to the areas of the Atlantic (Bilbao, Seville) and Mediterranean Arcs (Seville, Malaga, Valencia and Barcelona), with the very real potential to act as "gateway cities", in view of their geographical position, as well as their attributes in the form of large logistical endowments (ports, airports) and cultural facilities. Once the form of communications through the Pyrenees has been improved, Zaragoza will have the possibility to realise its aspirations of acting as a strategic point of a transnational region straddling the Pyrenees, encouraging relations with the French part of the European Southwest space and therefore overcome the current stagnant position within the Spanish metropolitan system" (CPSV, 2001, Vol. III, pp. 51-52).

e internacional. Barcelona y Madrid cumplen los criterios para ser designadas como *"ciudades europeas*", en reconocimiento del posicionamiento establecido por cada una de ellas dentro del ámbito europeo. Desde hace varios años las dos áreas se han figurado dentro de las ciudades europeas de primer orden, para localizar la actividad económica. Al mismo tiempo es importante considerar que actualmente el sistema metropolitano español está pasando por un proceso de refuerzo, tomando una posición propia dentro de la configuración europea, intentando superar ciertas debilidades y maximizar sus oportunidades, un buen momento para considerar otro paradigma dentro de los procesos de metropolitanización, también así esto está contribuyendo a reconfigurar la identidad de esta área, mientras la distancia física entre la Península Ibérica y las zonas tradicionalmente centrales de la Unión Europa era inquietante, ahora se puede percibir un creciente sentido de beneplácito sobre esta realidad, acompañado efectivamente por la verdadera perspectiva en medio plazo del reforzamiento de los ejes de comunicación, destacando los proyectos correspondientes a la TEN, hacia la adquisición de una identidad territorial propia. Madrid como capital del estado es un caso aparte, pero no es casualidad que cinco de las siete áreas metropolitanas están ubicadas en zonas litorales y que pertenecen a las áreas del Arco Atlántico (Bilbao, Sevilla) y del Arco Mediterráneo (Sevilla, Málaga, Valencia y Barcelona), con la potencia muy real de actuar como "ciudades-puerta", en vista de su posición geográfica, así como sus atributos en la forma de grandes dotaciones de equipamientos (puertos, aeropuertos) y prestaciones culturales. Una vez que haya mejorado la forma de comunicaciones a través de los Pirineos, Zaragoza tendrá la posibilidad de realizar sus aspiraciones en actuar como punto estratégico de una región interpirenaica transnacional, fomentando relaciones con la parte francesa del espacio del Sudoeste Europeo y por lo tanto superar su posición de estancamiento que actualmente ocupa dentro del sistema metropolitano español.

4. Spatial positioning

While the 'positioning' of the Spanish metropolitan system was addressed in the INTERREG IIC study within the context of the spatial territory of the Iberian Peninsula, comparing the positioning of the 'ranking' of the seven metropolitan urban regions with those of Lisbon and Porto on an albeit restricted empirical basis[21] (see Tables A and B), no such quantitative measuring of the positioning in the wider European context was carried out.

Human resources		Economic activity			Internationalisation			
Resident population 1998	Econ. active population 1999	Exports 2000	Companies 1998	Small firms <200 employees 1998	Inter. trade fairs 2001	International air movements 1998 (E)/1999 (P) Pass.	Freight	Hotel places 4* and 5* 2000 (P) 2001 (E)
Madrid (100)	Madrid (100)	Barcelona (100)	Barcelona (100)	Barcelona (100)	Madrid (100)	Madrid (100)	Madrid (100)	Madrid (100)
Barcelona (86)	Barcelona (91)	Madrid (76)	Madrid (92)	Madrid (93)	Barcelona (90)	Barcelona (57)	Lisbon (42)	Barcelona (87)
Lisbon (58)	Lisbon (75)	Lisbon (44)	Lisbon (64)	Lisbon (64)	Lisbon (57)	Lisbon (53)	Barcelona (26)	Málaga (86)
Oporto (45)	Oporto (57)	Valencia (24)	Valencia (40)	Valencia (40)	Bilbao (48)	Málaga (46)	Oporto (16)	Lisbon (67)
Valencia (30)	Valencia (40)	Oporto (23)	Oporto (35)	Oporto (35)	Oporto (36)	Oporto (16)	Saragossa (4)	Seville (40)
Seville (27)	Seville (30)	Bilbao (22)	Seville (22)	Seville (22)	Valencia (27)	Bilbao (5)	Valencia (4)	Valencia (23)
Bilbao (20)	Málaga (22)	Saragossa (13)	Vizcaya (22)	Vizcaya (21)	Seville (26)	Valencia (4)	Málaga (22)	Oporto (18)
Málaga (14)	Vizcaya (21)	Seville (4)	Málaga (21)	Málaga (21)	Saragossa (7)	Seville (2)	Bilbao (1)	Saragossa (11)
Saragossa (13)	Saragossa (15)	Málaga (3)	Saragossa (15)	Saragossa (15)	Málaga (0)	Saragossa (0)	Seville (0)	Bilbao (8)

Table A: Comparison of the Spanish and Portuguese metropolitan urban regions, on the basis of the dimensional indicators[22]

This doctoral thesis in many ways takes off from where the INTERREG IIC study terminated in so far as it seeks to examine aspects which remained pending at the conclusion of the transnational study. For instance, while it was clear from the UPC study that Spain's metropolitan system was headed by the two principal cities of Madrid and Barcelona, and that from an international standpoint both cities were of a 'European dimension', the measurement of the degree of interchange and exchange between the two Spanish metropolises and other European metropolitan urban regions was not addressed. The nearest approximation to an aspect of this nature was the (uni-directional) mapping of the air accessibility to other parts of Europe from Madrid and

[21] Later published by the Portuguese colleagues in Ferrão *et. al.* (2002).
[22] CPSV (2001) and Instituto de Ciências Sociais da Universidade de Lisboa (2002)

Barcelona, for thresholds of 1 hour, 2 hours and 2.5 hours[23], but not the (bi-directional) accessibility of Madrid and Barcelona from other parts of Europe.

Change in population 1991-1998 (%)	Ageing index 1998 >64/<15	Unemployment rate 1999 P 2000 E	GDP per head 1995 (1,000 Euros)	Change in GDP per head 1991-1995P/1996E (%)	University students 1999-2000/ pop. 15-24 (1998) (%)
Oporto 8,77%	Bilbao 1,39	Seville 13,26	Madrid 15,584	Madrid 48,85%	Lisbon 36,07
Seville 6,12%	Saragossa 1,27	Málaga 12,5	Barcelona 13,679	Oporto 40,49	Málaga 33,99
Málaga 5,72	Barcelona 1,18	Vizcaya 9,42	Vizcaya 12,531	Barcelona 37,03%	Seville 32,37
Lisbon 5,07%	Valencia 1,03	Valencia 7,73	Saragossa 12,267	Lisbon 32,38	Saragossa 27,46
Madrid 2,89%	Madrid 0,98	Madrid 7,42	Valencia 10,854	Vizcaya 30,97%	Madrid 28,79
Valencia 2,48%	Lisbon 0,97	Saragossa 7,29	Lisbon 10,286	Saragossa 26,85%	Bilbao 24,87
Saragossa 2,11%	Málaga 0,75	Barcelona 6,3	Seville 8,192	Valencia 25,77%	Valencia 23,69
Barcelona 0,56%	Seville 0,72	Lisbon 5,55	Málaga 7,819	Seville 23,13%	Barcelona 22,5
Bilbao -1,60%	Oporto 0,60	Oporto 4,69	Oporto 7,623	Málaga 19,90%	Oporto 21,00

Table B. Comparison of the Spanish and Portuguese metropolitan urban regions, on the basis of the structural and evolutionary indicators[24]

From reading the different policy documents and reports published by the European Commission since the mid-1990s, and some of the different studies aimed at a classification or ordering of the cities within Europe's urban system, intuitively it would appear that some of Spain's principal metropolitan urban regions have strengthened their positioning within this European metropolitan urban system over the last twenty years, thereby corroborating the positioning aspect identified in the excerpt quoted at the close of Section 3 above. For example, the DATAR/RECLUS study of 165 European agglomerations (Brunet, 1989) placed Madrid and Barcelona in the 3rd of the eight classes (positions 4 and 6= respectively), and Sevilla and Valencia in the 5th class (positions 30= and 41=). The revision of this study, examining 180 agglomerations and published in 2003, placed Madrid in the 2nd of seven classes (position 3); Barcelona in the 3rd class (position 6=); Valencia, Bilbao, Sevilla and Málaga all in the 5th class (positions 34=, 38= for both Bilbao and Sevilla, and 60= for Málaga); and Zaragoza in the 6th class (position 70=) (Rozenblat and Cicille, 2003).

[23] Based upon an exploitation of air transportation data from AENA (http://www14.aena.es/csee/ContentServer?pagename=Estadisticas/Home)
[24] CPSV (2001) and Instituto de Ciências Sociais da Universidade de Lisboa (2002)

The draft version of the ESDP, published by the European Commission in 1997, contained a broad reassessment of the European urban hierarchy in light of the changing urban economic opportunities. This identified three categories: i) urban areas of an international level, comprising *global cities*, *metropolitan regions* and *capital cities*; ii) cities and towns at a national level, of which the most problematic were the *peripheral cities with a weaker urban function*, and the *older industrial cities*; and iii) cities and towns at a regional level, differentiating between *regional level cities in the core area, regional level cities outside the core area* and *medium-sized cities in predominantly rural regions,* each with there respective challenges and opportunities(CEC, 1997a).

The draft ESDP recognised the capital city status of Madrid, and included Valencia and Sevilla in the category of '*peripheral cities with a weaker urban function'*, albeit recognising that they had shown signs of developing innovative development strategies and thereby indicating the limitations of the effects of inherent structural constraints, such as (in general terms) long distances, dependency on traditional activities, declining population, severe climatic conditions, etc..

Furthermore the draft ESDP made specific reference to the change experienced by Barcelona.

> "The rapidity of technological, political, social and economic change is bringing about a change of orientation in the hierarchical functional relationships of this urban system. Whereas these relationships have been the result of the development of national territories, they are now adapting to the new more competitive demands and challenges of the European Territory, the opening up of middle and Eastern Europe and to globalisation. Barcelona was a major regional centre in Spain; it is now an emerging metropolis in Southern Europe. (...) Cities and towns are having to adapt to their new relative locations and to their new positions in the European urban hierarchy. For some, the change is more radical than others; some are adapting faster than others; some are facing new disadvantages, some new opportunities. Altogether, this is a major spatial issue, which manifests itself in a number of potential opportunities and threats" (CEC, 1997, p. 18).

The hierarchy of the principal metropolitan urban regions of the EU27+2 resulting from the research studies carried out in the context of the *European Spatial Planning Observation Network* (ESPON) identifies Paris and London as two *global nodes*, and proposes four levels of *Metropolitan European Growth Areas* (ESPON, 2004). Madrid and Barcelona form part of the grouping of metropolitan urban regions classified as *European engines*, directly following on from the two global nodes. Madrid occupies the 4th= position of this hierarchy, with Barcelona sharing the 16th position. Bilbao, Valencia

and Palma de Mallorca are each classified as *Potential MEGAs*, sharing the 38th position. The only other Spanish metropolitan urban region within the MEGA classification is Sevilla, lying within the final grouping of *Weak MEGAs* sharing the 60th position.

5. *Thesis* and hypothesis

Against this background it is reasonable to make the conjecture of a gradual (re)positioning of the principal Spanish metropolitan urban regions within the European spatial configuration over the last twenty years. The hypothesis is that some of the Spanish metropolitan urban regions have increased their positioning within the hierarchy of the European urban system and as a consequence since the mid-1980s have evolved to play key roles within the changing European spatial configuration. Indeed these new roles are more in keeping with the characteristics of metropolitan urban regions lying within the central 'core' area of Europe, as opposed to metropolitan urban regions spatially detached from the central geographical area and lying within the periphery of the European spatial configuration, accepting tacitly the validity of this 'core-periphery' territorial model.

This line of enquiry led to the formulation of the following *hyothesis*:

> *From a European spatial planning perspective there has been a significant (re)positioning of the Spanish metropolitan urban regions within the European urban system since Spain's entry into the European Union in 1986. The extent of this (re)positioning has permitted a spatial integration of some of these metropolitan urban regions, to such a degree as to render the physical separation between the said metropolitan urban regions and the more traditionally higher performing central parts of the European Union inconsequential.*

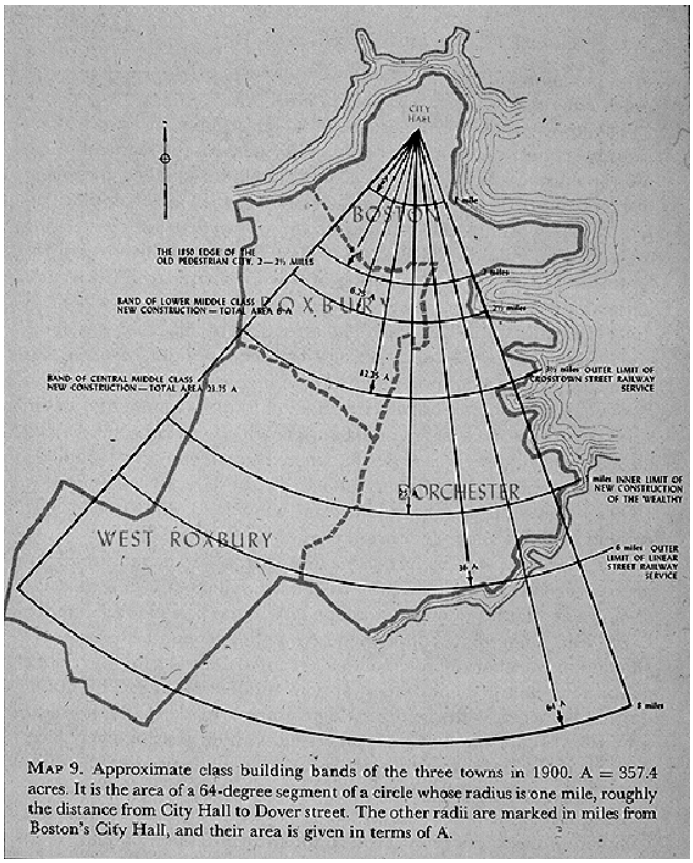
The spatial planning caveat is important as it identifies with clarity the terrain over which the hypothesis will be tested – in relation to European spatial planning policy and documentation, and to the wider European territory. Furthermore it implies a scale of inquiry or research over which the degree of detail of the components of the system plays a less significant role, in the same way as viewing a territory from a 1:50,000 scale is very different from viewing the same territory at a 1:2,500 scale. The central

issues of interest are related to questions of spatial positioning - how spatial positioning can be effected by connectivity and/or accessibility; how spatial positioning can be effected by distance in physical and functional terms; how spatial positioning based upon functional connectivity can overturn notions of core and periphery; and how spatial positioning resulting from a functional perspective might result in an enhanced competitive advantage than that from a physical perspective. However while the above *hypothesis* derives from a qualitative interpretation of the different spatial planning documentation and literature, the challenge lies in being able to summon quantitative empirical evidence to support the hypothesis, or conversely in the worst case scenario, accept its rejection.

In this respect the thesis takes inspiration from two sources associated with a changing spatial geography resulting from transportation and communications. The two sources are separated by more than 150 years but it is considered that the links between the two - on the one hand (functional) connectivity and on the other hand (physical) spatial separation – are clearly evident.

6. Cartographic representations of spatial configurations

The first source of inspiration derives from historical research carried out by Sam Bass Warner in the context of the outward spatial expansion of Boston in the mid-1850s, deriving from the development of the street railway system – i.e. tramways or streetcars as they are referred to in the United States (Warner, 1978). Warner documents how the development of the streetcar system of transport was associated with Boston's pattern of urban development and the resulting spatial segregation of neighbourhoods and suburbs for different socio-economic groups. The higher the social class, the further from the central part of the city such classes were able to choose to reside, benefiting from the ever-increasing improvements in suburban transportation, with a greater availability of land and lower building densities, as indicated by Figure B.



MAP 9. Approximate class building bands of the three towns in 1900. A = 357.4 acres. It is the area of a 64-degree segment of a circle whose radius is one mile, roughly the distance from City Hall to Dover street. The other radii are marked in miles from Boston's City Hall, and their area is given in terms of A.

Figure B. "Approximate class building bands of the three towns in 1900. A = 357.4 acres. It is the area of a 64-degree segment of a circle whose radius is one mile, roughly the distance from City Hall to Dover Street. The other radii are marked in miles from Boston's City Hall, and their area is given in terms of A."[25]

By 1900, the upper class, representing just 5% of the population, was able to live in an area some 32 times the size of the former historical centre, up to a distance of 16 km from the centre of Boston. The upper-middle class (15% of the population) was able to accede to an area of land some 20 times the size of the historical centre, up to a distance of 9.6 km from the centre of Boston. The lower middle class, just 20% of the population, could reside in an area representing 6 times that of the historical centre separated by a distance of some 5.6 km. Finally, the lower class, representing 60% of the population of Boston, was restricted to remaining within the historical core which extended to a distance of just 3.2 km from the centre. The consequences of such spatial segregation in terms of the built form, building density and open space are obvious. The geometrical representation of these divisions is clearly illustrated in Figure B.

[25] Warner (1978)

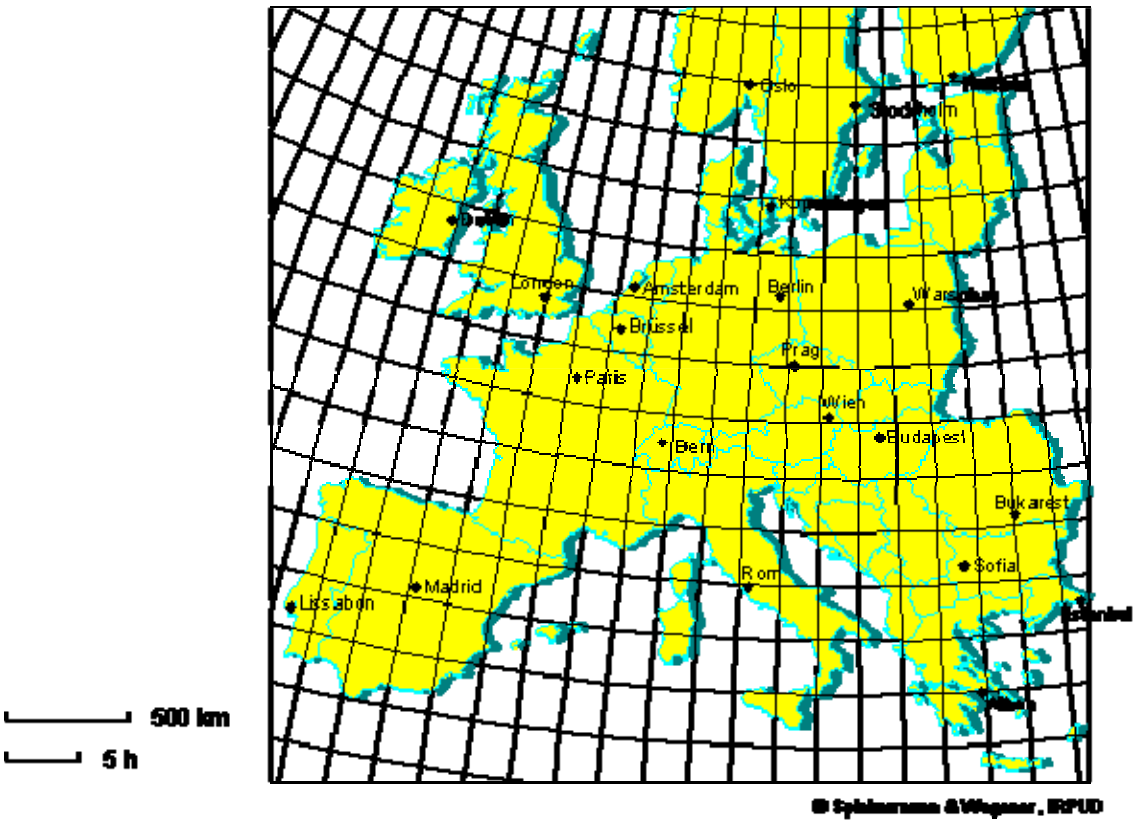


Figure C. European base map, with a velocity of 60 km/hour[26]

The second inspirational source comes from research carried out within the Department of Spatial Planning of the University of Dortmund in the mid-1990s, in the field of time-space cartography (Spiekermann and Wegener, 1994). This research was directed towards demonstrating in a cartographic way the interaction between space and time. In this cartography the distance between two points is not proportional to the physical distance, but rather proportional to the time required to travel between the two points. This change of cartographic scale leads to distortions compared with more traditional physical cartography. One of the objectives of this research was to demonstrate the possible changes to the European territorial configuration in the context of the development of the high velocity rail services forming part of the then programmed *Trans-European Network* (TEN)[27]. Figure C represents the European base map, with a standard velocity between all points on the map of 60 km/hour.

By contrast Figure D illustrates the connectivity between different parts of Europe in 1993, based upon rail times. Finally Figure E represents the spatial effects of the projected increase in connectivity through rail travel for 2020.

[26] Spiekermann and Wegener (1994)
[27] http://ec.europa.eu/ten/transport/studies/index_en.htm (date consulted 11.03.2007)

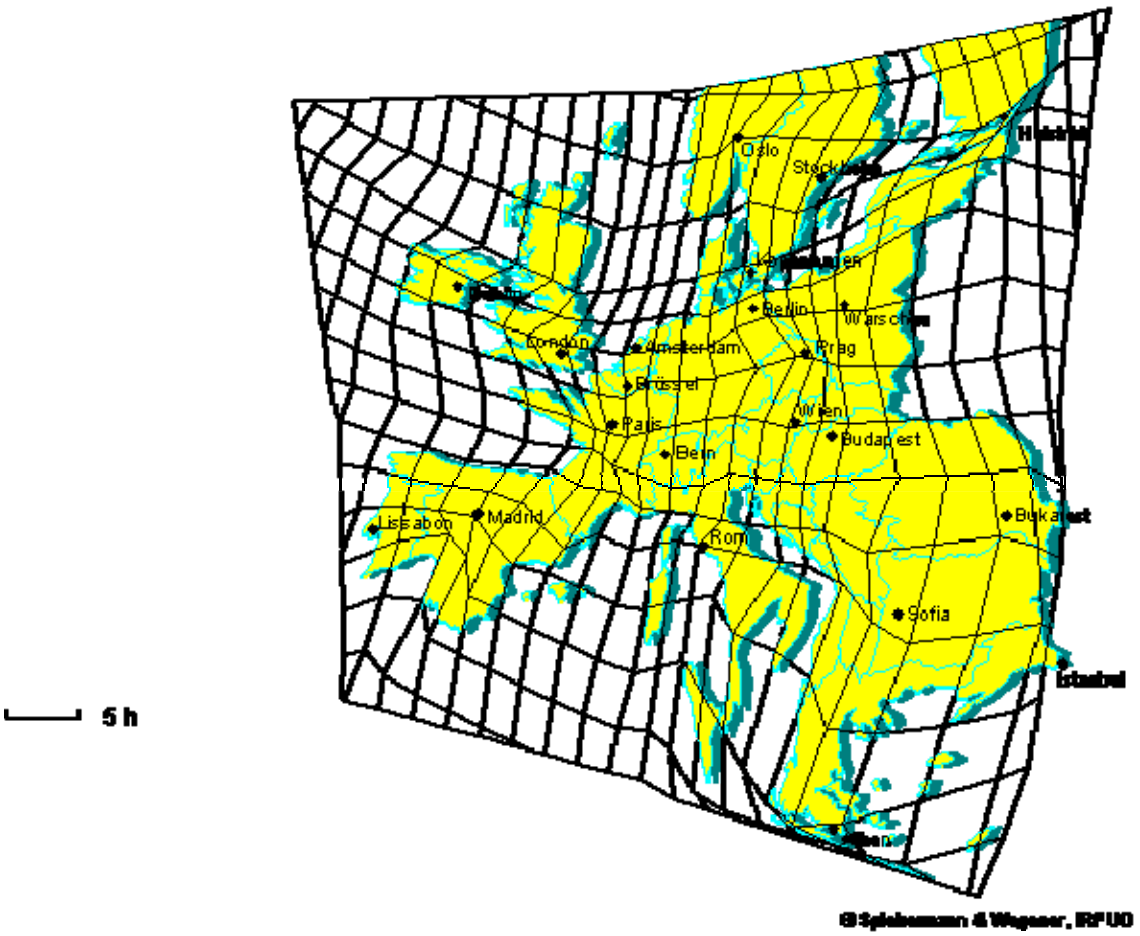


Figure D. Spatial connectivity based upon 1993 rail travel times[28]

Two of these maps were included in the *Europe 2000+* Report (CEC, 1994), the EU's official statement on spatial development within Europe prior to the publication of the *European Spatial Development Perspective* (ESDP) (CEC, 1999), highlighting the importance of the theme of territorial connectivity, especially between some of the EU's peripheral zones and the European centre.

[28] Spiekermann and Wegener (1994)

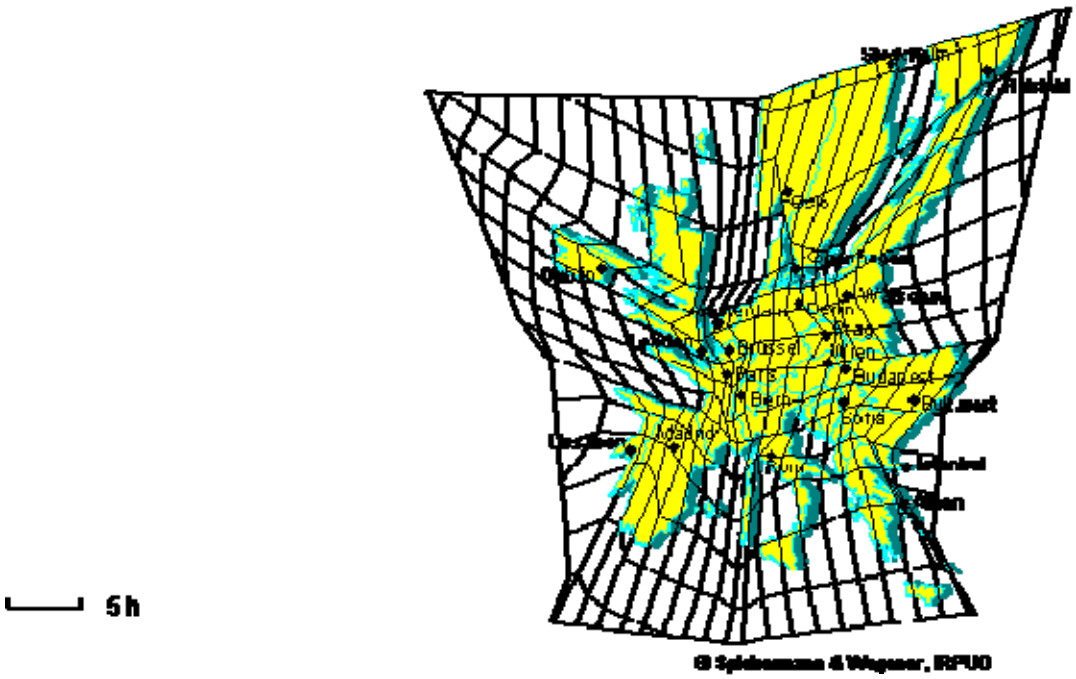


Figure E. Projected spatial connectivity based upon 2020 rail travel times[29]

The two approaches to mapping are paradigmatic of the relationship between transport and connectivity, and the spatial distribution of human activity. In the first, in the context of the human desire to escape the shackles of the industrial city and the concomitant social and physical problems associated with dense urban living in insalubrious and unsanitary conditions of the 19th Century. These conditions were replicated all over the industrialising and urbanising countries of the time, and were what gave rise to the birth of the discipline of town or urban planning on both sides of the Atlantic, in the late 19th and early 20th Centuries. In a completely different historical context, the time-space maps reflect the reduction or shrinking of space, as a consequence of the advances in modern transportation technology at a higher scale.

In this respect the two sorts of maps are the inverse of one another. On the one hand the former sort identifies the desire for placing distance between the urban problems of the industrialising city and one's place of residence. On the other hand the time-space maps indicate the shrinking of distance and the reduction of the negative aspects of not being in a better (in this case more central) location. Distance which has not yet shrunk equates with a lack of connectivity, whereas the shrinking distance equates with improved connectivity.

[29] Spiekermann and Wegener (1994)

In the current era of competitiveness between European regions and cities, the desire for connectivity is paramount, but such connectivity may quite conceivably be in the abstract sense. The important connections might not necessarily be those 'connecting' with destinations lying within the area of Europe characterised as the core. This clearly depends upon the nature and purpose of the connections. It is quite conceivable that other parts of the European spatial territory provide destinations offering competitive advantage.

7. Objectives

The principal objective lies in *seeking to measure the degree of interchange and exchange between the Spanish metropolitan urban regions and other European metropolitan urban regions*, as a means of *determining the positioning of the Spanish cities within the overall European urban system*. The link between the aforementioned graphical or cartographic representations and the central hypothesis of the thesis rests in the challenge of producing a *cartographic representation of a similar nature, capable of conveying the relationship between the key European metropolitan urban regions*.

Other secondary objectives include the following:

i) to examine the *urban growth* of the Spanish metropolitan urban regions from an *historical perspective*;

ii) to determine the *spatial extent* of the Spanish metropolitan urban regions in light of the information deriving from the 2001 Census of Population;

iii) to ascertain the actual *critical mass*, or *weighting*, of the Spanish metropolitan urban regions within the Spanish urban system, based upon demography, and economic dynamics and performance;

iv) to verify the appropriateness of continuing to make reference to the *bicephalous* nature of the Spanish metropolitan system;

v) to examine the key European legislation in detail to ascertain the moment in which the *territorial dimension of cohesion policy* began to gather weight;

vi) to compare key studies of the *European (metropolitan) hierarchy* in detail to determine the (changing) ordering therein of the Spanish metropolitan urban regions; and

vii) to proportion an alternative interpretation of an *ordering of European metropolitan urban regions*.

8. Methodology

The methodology adopted to test the hypothesis (Section 5) and respond to the aforementioned objectives (Section 7) comprises a mix of both *qualitative* and *quantitative* research techniques, applied to a variety of secondary data and documentary sources.

On the one hand, in order to determine the characterisation of the Spanish metropolitan system, a detailed quantitative analysis is first carried out of historical data sources, in the case of the Spanish Census reports dating from 1857, based upon the data collections contained within the *Centre d'Estudis Demogràfics* (CED)[30] of the Universitat Autònoma de Barcelona (UAB) (Chapter 2). This is then followed by a quantitative analysis of secondary data sources deriving from the 1991 and 2001 Census of Population, in order to determine the spatial limitations of the Spanish metropolitan urban regions from travel-to-work data flows (Chapter 3) and to lead to the construction of a series of basic and synthetic indicators to characterise the socio-demographic (Chapter 4) and economic (Chapter 5) characteristics of the metropolitan system. In the case of the socio-demographic indicators these include indicators of population density and structure, levels of education and the employment structure. In the case of the economic indicators these cover the job ratio, economic diversification and specialisation, imports and exports, and the activity rate.

As a means of exploring the interaction and dynamics between the 28 European metropolitan urban regions of the sample, a quantitative 'network analysis' is carried out based upon 2004 air-passenger flows deriving from EUROSTAT data (Chapter 8). This secondary data is then presented in the form of several synthetic indicators based upon gravity modelling as is the case of the interaction values and functional distances. The magnitude of these indicators, as well as the spatial movement of the raw flows themselves, is displayed graphically by way of Tobler's *Flow Mapper* programme[31], developed within the University of California, Santa Barbara. A mathematical technique of multi-dimensional scaling (MDS) is then drawn upon to reduce the complexity of the

[30] http://www.ced.uab.es/
[31] http://www.csiss.org/clearinghouse/FlowMapper/

functional distances between the 28 metropolitan urban regions and determine their positioning with regard to the centre of the conceptual 'space of air passenger flows'.

Fortunately the importance of research in European spatial planning has increased enormously in recent years. The allocation of funding from the INTERREG Programme to support the establishment of the European Spatial Planning Observation Network, together with the funding to support the wealth of ongoing applied research in this field, not to mention the overall transparency of the projects undertaken in the sense of the widespread diffusion of the ensuing results, means there is an abundance of transnational comparative data and outcomes which can be drawn upon. Key data and results from different projects are drawn upon extensively throughout the chapters, particularly those from Project 1.1.1 (*Potentials for polycentric development in Europe*) (ESPON, 2004) in Chapter 8, as a frame of reference for determining the sample of the 28 metropolitan urban regions upon which the 'network analysis' is carried out.

On the other hand the analysis of the wider European system depends more upon consultation of, and critical and qualitative reflection upon the European legislation and policy documentation (Chapter 6), such as the EU Treaties, the European Regional/Spatial Planning Charter (1983), the European Spatial Development Perspective (ESDP) (1999), the CEMAT's guiding principles for Sustainable Development of the European Continent (2000), the Lisbon (2000) and Gothenburg (2001) Strategies, the reports of economic and social cohesion, the Community Strategic Guidelines on Cohesion 2007-2012 (2006), the Commission's Communication on Cohesion policy and cities (2006), the Leipzig Charter on Sustainable European Cities (2007) and the Territorial Agenda of the European Union (2007). The same critical qualitative analysis is carried out in relation to the review of the hierarchies deriving from the comparative urban studies (Chapter 7) of Brunet (1989), Beaverstock et. al. (1999), Rozenblat and Cicille (2003), ESPON (2004) and Hall (2005).

The analysis and interpretation of all of this data at the two spatial scales – that of the seven metropolitan urban regions of Spain, and that of Spain within the wider European territorial context – lead to Conclusions.

9. Structure

The thesis is structured in four principal parts.

Part I of the thesis comprises an examination of processes of urbanisation from a global and historical perspective, setting out basically from the beginning of the 19th Century. This is considered useful in helping to establish a general background against which the processes of urbanisation and metropolisation in Spain can be measured, and for ascertaining the moments in which some of the Spanish metropolitan urban regions began to form part of the international metropolitan hierarchy.

Parts II and III differentiate between Spain (Chapters 2-5) and Europe (Chapters 6-9) respectively. Part II focuses upon the processes of metropolisation in Spain. Chapter 2 (*Metropolisation in Spain*) charts the evolution of urban growth in the seven principal Spanish metropolitan urban regions from the mid-1800s up until the present day. It focuses upon the historical moments which best characterise what could be termed metropolitan expansion in Spain. Chapter 3 (*Defining the Spanish metropolitan system*) discusses the ways of defining or delimiting the spatial extent of metropolitan urban regions, and presents a brief overview of the methodology utilised to define the Spanish metropolitan urban regions in the context of the INTERREG IIC and IIIB studies, carried out by the UPC between 1998-2005[32]. Drawing upon the spatial limits of the seven metropolitan urban regions, Chapters 4 and 5 respectively explore the demographic and economic structures of the Spanish metropolitan system, with a view to corroborating the bicephalous nature of the Spanish metropolitan system and indicating how the two leading metropolitan urban regions of Madrid and Barcelona are indeed of a fundamentally different scale to those of Valencia, Sevilla, Bilbao, Zaragoza and Málaga.

Part III focuses directly upon the wider European spatial territory. Here the focus is upon the gradual movement towards increased integration over the twenty year period under review. The evolution of European spatial policy is treated in Chapter 6 (*European spatial policy*), highlighting the increasing importance placed on the aspects of territorial cohesion and setting this against the changing nature of the European territory, deriving from the progressive enlargements. An analysis of the cities that can

[32] What needs to be stressed at this stage is the fact that the delimitations of the metropolitan territories used under the INTERREG IIC project (1998-2001) were dependent upon a variety of data sources. By contrast the metropolitan urban regions defined under the INTERREG IIIB project (2003-2005) benefited from the travel to work information available for the whole of Spain through the 2001 Census of Population. In this way for the first time it was possible to define the spatial extent of urban systems based upon functional criteria of travel to work mobility patterns.

realistically be considered to constitute the metropolitan hierarchy of the European urban system is carried out in Chapter 7 (*European urban system*). This addresses a number of different proposals put forward for understanding the urban classification and territorial dynamics, closing with an explanation of the hierarchy of Functional Urban Areas (FUA) and Metropolitan European Growth Areas (MEGA) deriving from the applied research carried out through the ESPON Programme. The upper echelons of this hierarchy form the basis of a sample of some 28 metropolitan urban regions over which a network analysis is carried out in Chapter 8 (*European space of air passenger flows*). This network analysis seeks to examine the nature of the air passenger flows between the 28 metropolitan urban regions to determine their positioning with one another and in particular ascertain an empirical positioning of Madrid and Barcelona. An assessment of the relative positioning of Madrid and Barcelona within the European urban system is offered in Chapter 9 (*Madrid and Barcelona in the European metropolitan hierarchy*) drawing upon the evidence produced in Chapter 8, as well as in the light of European economic integration in general and recently published future scenarios of the spatial configuration of Europe.

Finally Part IV closes with the Conclusions.

PART I: BACKGROUND

"Child of the First War, Forgotten by the Second,
We called you metro-land. We laid our schemes
Lured by the lush brochure, down byways beckoned,
To build at last the cottage of our dreams,
A city clerk turned countryman again,
And linked to the Metropolis by train."

From John Betjeman's *Metro-land*

CHAPTER 1. - PROCESSES OF URBANISATION

Introduction

It goes beyond the scope of this chapter to offer an all-embracing overview of urban growth and the processes of urbanisation at a global scale[32]. On the one hand, as set out in the Introduction, the thesis seeks to proportion empirical evidence to support the hypothesis of the Spanish metropolitan urban regions having undergone a process of (re)positioning within the wider European urban system over the specific twenty-year period 1986-2006. On the other hand, the thesis is framed entirely within the field of spatial planning and in particular spatial planning at the European level. Having said that, in order to fully understand the changes experienced in the Spanish metropolitan context, it is necessary to look beyond Spain and examine the nature of metropolitan growth as experienced in other spatial and historical contexts, all within the overall framework of urbanisation. As a consequence it is important to state categorically that the selection of events and places is deliberately limited, in order to focus upon the most relevant aspects which it is considered impinge upon the Spanish situation.

The chapter is divided in two principal sections. The first section addresses broad issues of urban growth and urbanisation[33] at a global scale. The second section examines specific aspects of urbanisation in the context of metropolitan growth, experienced principally from the latter part of the 19th Century coinciding with the urban growth of London and Paris, resulting from the industrial revolution. The chapter is intended to set the wider context for examining the specific processes of metropolitan growth as experienced in Spain, which will follow in Chapter 2.

1.1. Global trends of urbanisation

From the European perspective, the territorial reality in which the vast majority of the population lives is that of a purely urban environment. According to Rogers (1999), in

[32] For detailed analysis of these issues see for example Carter, H. (1985) *The Study of Urban Geography*, Arnold, London; Clark, D. (1996) *Urban World/Global City*, Routledge, London and New York; Davis, K.(1955) The urbanization of the human population, *Scientific American*, 213 (3), pp. 41-53; Paddison, R. (ed.) (2001) *Handbook of Urban Studies*, Sage, London; Romero, J. (coord.) (2004) *Geografía Humana*, Ariel, Barcelona; and Timberlake, M. (1985) *Urbanisation in the World-Economy*, Academic Press, London.

[33] *Urban growth* simply refers to the absolute increase in the size of the urban population, occurring through natural increase (excess of births over deaths) and net-in-migration. *Urbanisation* measures the switch from a spread-out

England at the close of the 20th Century, those living in cities accounted for 90% of the population, with some 80% living in towns of more than 1,100 inhabitants. In a similar vein, the European Commission suggested slightly earlier that some 80% of the European population, of the then EU15 block of countries[34], resided in towns or cities, contributing to make Europe the most urbanised continent in the world. Of this 80%, close to 20% of the population lived in large conurbations, in excess of 250,000 inhabitants, 20% in medium sized cities and 40% in towns in the range of 10,000-50,000 inhabitants (CEC, 1997a).

Figures deriving from Spain's *Padrón Municipal* for 1st January 2005[35] indicate that 77.85% of the population lives in urban settlements of more than 10,000 inhabitants. This overall figure can be broken down into the following components: 25.5% in settlements of 10,000-50,000 inhabitants; 11.5% in medium sized towns of between 50,000-100,000 inhabitants; 23.5% in larger cities of the 100,000-500,000 inhabitants range; and the remaining 17% in the largest cities with populations in excess of 500,000 inhabitants.

According the United Nations, the world's population was projected to have reached 6.5 billion by July 2005, representing a gain of 380 million since 2000 or an annual increase of 76 million. Medium variant projections see the world population reaching 9.1 billion by 2050, at which time the annual increases will be in the order of 34 million (United Nations, 2005). In terms of the urban rural divisions, it was estimated that the 'urban' population[36] had reached 1 billion in 1960, 2 billion in 1985 and 3 billion by 2002 to represent 48% of the total population. This 'urban' component is expected to exceed the 'rural' component in 2007, meaning that for the first time the world will have more urban than rural dwellers. (See Figure 1.1) Projections suggest that the world's 'urban' population will reach the 5 billion mark by 2030, thereby representing almost 61% of the world's population; and that between 2003 and 2050 the rural population will decline marginally from 3.3 billion to 3.2 billion. As a consequence nearly all the projected population growth will be focused in the urban areas (United Nations, 2004).

pattern of human settlement to one in which the population is concentrated in urban centres. It very basic terms it can be seen as the relative shift in the distribution of population from the countryside into the towns and cities. (Clark, 1996)

[34] Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, The Netherlands, Portugal, Spain, Sweden and the United Kingdom.

[35] Total population estimated to be 44,108,530 persons. Inebase of the National Statistics Institute (www.ine.es/inebase)

[36] A concept which is methodologically fraught with difficulties at a global scale, owing to the dependence upon local interpretation. The UN Population Division homepage defines the concept as the "de facto population living in areas classified as urban according to the criteria used by each area or country. Data refer to 1 July of the year indicated …".

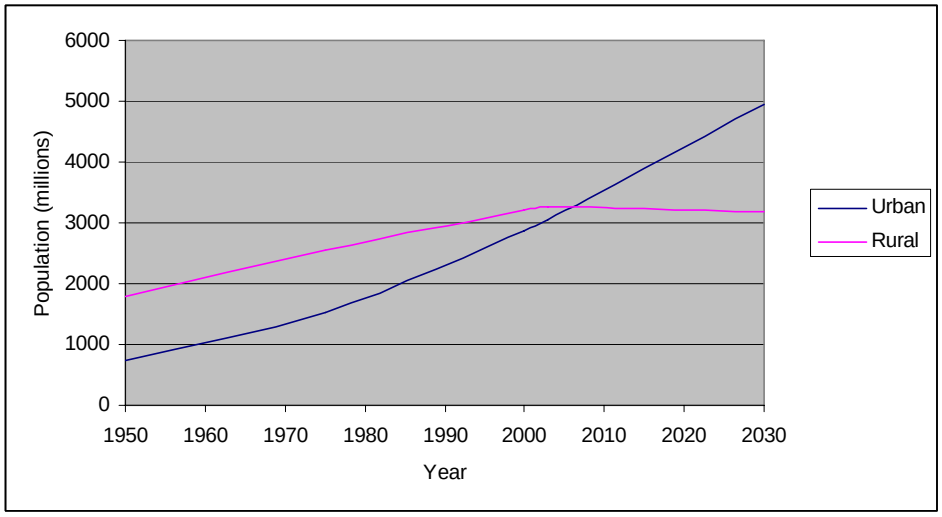


Figure 1.1. Urban and rural populations of the world: 1950-2030[37]

Clearly a strong differentiation can be made for these projections between the more and less developed regions of the world. On the one hand, it is expected that virtually all the world's population between 2000 and 2030 will be absorbed by the urban areas of the less developed regions and indeed here the 50% split between urban and rural dwellers will be attained in 2007. On the other hand, the projections indicate that the urban population of the more developed regions will increase gradually, from 0.9 billion in 2003 to 1 billion in 2030. Over this period, the annual growth rate will be around 0.5%, compared with an annual increase of 1.5% over the period 1950-2000 (United Nations, 2004).

These differences are further appreciated by looking at the spatial distribution of these broad trends among the major geographical areas of the world. (See Table 1.1) In Europe and North America, the proportion of the population residing in urban areas is expected to increase from the current levels of around 73% and 80% respectively, to almost 80% and 87% by 2030. The countries of Oceania are expected to experience a marginal increase in the population living in urban areas, from current levels of 73% to almost 75% by 2030. Of the less developed regions, Latin America and the Caribbean are by far the most urbanised, with some 77% of the population currently living in urban settlements. This compares with proportions of 39% for both Africa and Asia. These two major geographical areas are expected to witness rapid rates of urbanisation during the period 2000-2030, such that some 54% of the inhabitants of Africa are likely to be living in urban areas by 2030, compared with a figure of 55% for Asia.

[37] Reproduced from United Nations (2004)

Development group	Percentage urban					Rate of urbanisation (%)		
	1950	1975	2000	2003	2030	1950-1975	1975-2000	2000-2030
Africa	14.9	25.3	37.1	38.7	53.5	2.12	1.54	1.22
Asia	16.6	24.0	37.1	38.8	54.5	1.47	1.75	1.28
Europe	51.2	66.0	72.7	73.0	79.6	1.02	0.38	0.30
Latin America and the Caribbean	41.9	61.2	75.5	76.8	84.6	1.52	0.84	0.38
Northern America	63.9	73.8	79.1	80.2	86.9	0.58	0.28	0.31
Oceania	60.6	71.7	72.7	73.1	74.9	0.67	0.06	0.10

Table 1.1. Percentage urban and rate of urbanisation by major geographical area: 1950-2030[38]

This accelerated urban growth of recent years has been accompanied by the rapid increase in the number and size of the world's largest cities, as well as the proliferation of metropolitan centres experiencing the highest rates of growth (Clark, 1996). This emerging pattern of concentration of population in large cities has led to the development of mega-cities[39], which as Clark rightly suggests are found to be increasing most rapidly in the countries of the developing or less developed world (Clark, 1996). In 1950 just two cities of the more developed regions of the world merited being classified as mega-cities (New York and Tokyo) and twenty five years later, the number had doubled with the addition of Shanghai and Mexico City, both in the less developed regions. By 2003 there were some twenty mega-cities, five in the more developed regions, with the incorporation of Los Angeles, Osaka-Kobe and Moscow to the 1975 list, and fifteen in the less developed regions, with the incorporation of São Paolo, Mumbai (Bombay), Delhi, Calcutta, Buenos Aires, Jakarta, Dhaka, Rio de Janeiro, Karachi, Beijing, Cairo, Metro Manila and Lagos. United Nations projections for 2015 estimate that there will be some 22 mega-cities, with the addition of Istanbul and Paris to the previous listings (United Nations, 2004).

What these latest trends and projections hide is the fact that the high proportional representation of the 'urban' component is a relatively recent phenomenon. However against this background, Nel·lo and Muñoz (2004) rightly indicate the need to recognise that on a global scale, in historical terms the processes of urbanisation and the ever increasing speed with which urbanisation is taking place are relatively recent.

[38] United Nations (2004)

[39] The United Nations' *World Urbanization Prospects: The 2003 Revision* (Population Division of the Department of Economic and Social Affairs, 2004) makes the distinction between "very large cities" and "mega-cities", based upon population limits of 5-10 million inhabitants and those excess of 10 million persons.

1975		2003		2015	
Urban agglomeration	Pop. (mill.)	Urban agglomeration	Pop. (mill.)	Urban agglomeration	Pop. (mill.)
Tokyo (Japan)	26.6	Tokyo (Japan)	35.0	Tokyo (Japan)	36.2
New York (USA)	15.9	Mexico City (Mexico)	18.7	Mumbai (Bombay) India	22.6
Shanghai (China)	11.4	New York (USA)	18.3	Delhi (India)	20.9
Mexico City (Mexico)	10.7	São Paulo (Brazil)	17.9	Mexico City (Mexico)	20.6
		Mumbai (Bombay) (India)	17.4	São Paulo (Brazil)	20.0
		Delhi (India)	14.1	New York (USA)	19.7
		Calcutta (India)	13.8	Dhaka (Bangladesh)	17.9
		Buenos Aires (Argentina)	13.0	Jakarta (Indonesia)	17.5
		Shanghai (China)	12.8	Lagos (Nigeria)	17.0
		Jakarta (Indonesia)	12.3	Calcutta (India)	16.8
		Los Angeles (USA)	12.0	Karachi (Pakistan)	16.2
		Dhaka (Bangladesh)	11.6	Buenos Aires (Argentina)	14.6
		Osaka-Kobe (Japan)	11.2	Cairo (Egypt)	13.1
		Rio de Janeiro (Brazil)	11.2	Los Angeles (USA)	12.9
		Karachi (Pakistan)	11.1	Shanghai (China)	12.7
		Beijing (China)	10.8	Metro Manila (Philippines)	12.6
		Cairo (Egypt)	10.8	Rio de Janeiro (Brazil)	12.4
		Moscow (Russian Federation)	10.5	Osaka-Kobe (Japan)	11.4
		Metro Manila (Philippines)	10.4	Istanbul (Turkey)	11.3
		Lagos (Nigeria)	10.1	Beijing (China)	11.1
				Moscow (Russian Federation)	10.9
				Paris (France)	10.0

Table 1.2. Urban agglomerations with 10 million or more inhabitants 1975-2015[40]

According to Kingsley Davis, at the start of the 19th Century, just 2.4% of the world's population resided in cities of 20,000 or more inhabitants, and 1.7% in cities of 100,000 or more persons. By 1850, these proportions had increased to 4.3% and 2.3% respectively, reaching proportions of 9.2% and 5.5% by 1900, and 20.9% and 13.1% by 1950 (Davis, 1955). United Nations' figures used to generate Figure 1.1 indicate the urban population accounted for 29% of the world's population in 1950, rising to 37% by 1975, and 47% by 2000.

Davis (1965) points out the curious nature of the fact that a considerable period of several thousand years elapsed between the initial appearance of small cities and the emergence of urbanised societies of the 19th Century. In addition he notes it strange that North-Western Europe, the spatial region where urbanized societies first appeared, was not region where major cities had developed historically. Rather North-Western

Europe was a region where urbanization had been at low ebb. Indeed he conjectures that perhaps the very non-urban character of these societies which "erased the parasitic nature of towns and eventually provided a new basis for a revolutionary degree of urbanization" (Davis, 1965, p. 43).

However it was the industrial revolution that changed the shape of North-Western Europe and other parts of the world *a posteriori*. At the start of the 19th Century, almost one tenth of the population of England and Wales lived in cities of at least 100,000 persons. By 1840 this proportion had doubled, and doubled yet again by 1900 to make Great Britain an urbanised society (Davis, 1965). One of Davis's key contributions was his linking of the positive correlation between industrialisation and urbanisation to a cyclical process. He suggested that the later in time a country would take to become industrialised, the faster was its pace of urbanisation. In England and Wales, the change from a population with 10% of its inhabitants living in cities of at least 100,000 persons to one in which 30% resided in urban settlements of this magnitude took about 79 years, compared to 66 years in the United States, 48 years in Germany, 36 years in Japan and 26 years in Australia. Writing in the mid-1960s Davis suggested that:

> "(…) urbanization is a finite process, a cycle through which nations go in their transition from agrarian to industrial society. The intensive urbanization of most of the advanced countries began within the past 100 years; in the underdeveloped countries it got underway more recently. In some of the advanced countries its end is now in sight" (Davis, 1965, p. 43).

Davis graphically represented the typical urbanisation cycle by a curve in the shape of an attenuated 'S', thereby forming a logistic curve. In broad terms the first bend represents very high rates of urbanisation, characteristic of the shift taking place from rural to urban areas, and the growing dominance of an urban economy. This then tends to be followed by a drawn-out period of moderate urbanisation. Once this proportion exceeds the 50% level approximately, the curve starts to level out to reach a point where there is a functional balance between the urban and rural populations.

Clearly at any one point in time different countries are at different stages in the cycle, as illustrated by Figure 1.2, and these broad characteristics can vary between different spatial and cultural contexts. The curves for Botswana and Oman both demonstrate the rapidity of urbanisation experienced in the less developed regions in recent years,

[40] United Nations (2004)

compared with the long and drawn-out processes experienced by countries of the more developed regions, as indicated by the United Kingdom, the United States and Spain.

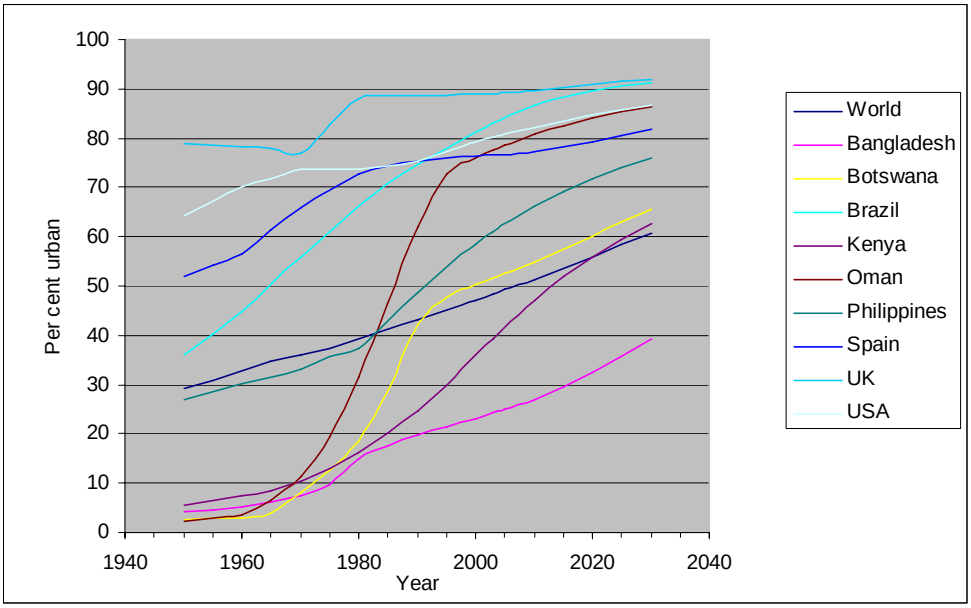


Figure 1.2. Urbanisation trends, 1950-2030[41]

As Davis rightly indicates, the end of the curve presents a number of ambiguities. A society sufficiently advanced economically can permit suburbanisation and fringe development. For this reason a reduction in urbanisation is perhaps more apparent than real, as increasingly more people who live in country areas are classified as rural dwellers, when in fact their lifestyle and economic dependence is wholly urban. In turn this leads to

At this point it would be appropriate to make reference to the theoretical debates concerning the different interpretations of physical urban growth, in the light of concepts such as *counterurbanization*, which took place on both sides of the Atlantic, precisely at the moment Davis was writing. However it is considered more appropriate to reserve such a discussion for the following section, in the context of the examination of the different periods of metropolitan growth. For the moment it is considered appropriate to hold the attention on the historical development of urbanisation and discuss the reasons lying behind the phenomenon.

It is reasonable to ask what the factors were that initiated this fundamental change in settlement patterns. As has been seen, the phenomenon of urbanisation is something extremely recent. Despite the existence of towns and cities since the Neolithic period,

the quantum shift of population from rural to urban areas has really only occurred since the mid-1900s. Chase-Dunn's analysis of the 10 largest cities of the capitalist world system indicated that even in the mid-1500s, only four cities with populations surpassing 100,000 persons: Paris, Naples, Venice and Lyon (Chase-Dunn, 1985). Low economic development effectively placed a limit on the number of inhabitants a settlement could maintain. Without any doubt, the key factor which led to this change was the Industrial Revolution, as experienced firstly in Great Britain, between the late 18th and early 19th Centuries, which as a consequence increased economic output and produced surpluses, under conditions of mercantilism, leading to the emergence of the first urban society. Such a model of industrial and urban development spread to other parts of Europe and in turn led to the creation of a core region of advanced and dominant urban industrial economies. A similar model or urban development was exported to dependent territories in peripheral locations, important for their natural resources, which remained linked to the core regions.

1550	1700	1900	2001
Paris	London	London	Tokyo
Naples	Paris	New York	São Paulo
Venice	Naples	Paris	Mexico City
Lyon	Lisbon	Berlin	New York
Granada	Amsterdam	Chicago	Mumbai (Bombay)
Seville	Rome	Philadelphia	Los Angeles
Milan	Venice	Tokyo	Calcutta
Lisbon	Milan	Vienna	Dhaka
London	Palermo	St. Petersburg	Delhi
Antwerp	Madrid	Manchester	Shanghai

Table 1.3. The world's ten largest cities in descending order of size[42], 1550-2001[43]

It was under the conditions of mercantilism that led to the establishment of the foundations of urban development in the colonial powers and the creation of strong trading links, which in turn generated and concentrated wealth in cities. In the mid 16th Century, the world's ten largest cities were all located in the core regions of Europe, whilst urban development in the peripheral locations was limited. The role of such locations was merely to supply, as opposed to process, the agricultural products and natural resources (Clark, 1996). According to Taylor (1993, cited in Clark, 1996) at the beginning of the 19th Century, the start of urban development could be seen in the Greater Caribbean (stretching from Maryland to the north-east of Brazil), the mid-Atlantic and New England areas of North America, the East Indies, and along the coastal stretches of Africa, India and China.

[41] Own elaboration based upon data from UN Population Division
[42] Chase-Dunn's analysis indicated that changes in the world city-size distribution correspond to cycles in the world-system.
[43] Updated for 2001 from Chase-Dunn (1985)

While under the mercantilism, the cities were the locations for the consumption and articulation of trade, under industrial capitalism which followed cities became the location for the establishment or organised mass production. The increased volume of trade in turn stimulated further urbanisation if the peripheral dependent locations. However these processes took place out of phase with one another, explaining the unevenness of the early stages of global urban development as illustrated by the urbanisation trends of Figure 1.2.

Owing to the industrial revolution, Great Britain was the first country to experience the phase of industrial capitalism. In the period of less than one hundred years, the country was transformed from a rural agricultural economy to an urban industrial economy, witnessing a level of population growth hitherto unknown. The first recorded census indicated a population for England and Wales of just 8.9 million, while the 1891 census recorded a population of 29 million. While the entire population of England and Wales increased by more than 9 million between 1801 and 1851, and those living in towns of less than 5,000 persons rose from 6.6 to 9.9 millions, the population of the towns increased from 2.3 to 8 millions (Weber, 1899, cited in Clark, 1996). In 1801 England and Wales had been 26% urban, however by 1851 it was 45% urban and by 1861, more people lived in the towns and cities, than those who lived in the rural areas.

At the start of the 19th Century London was the largest city in the world, with a population of 959,310 inhabitants, but no other city in Great Britain had a population exceeding 100,000 inhabitants. By 1851 the population of London had risen to almost 2.4 million, but by then both Liverpool and Manchester had populations in excess of 300,000. Birmingham, Leeds, Bristol, Sheffield and Bradford all had populations in the range of 100,000-300,000 and a further 53 cities had populations between 10,000 and 100,000.

Nevertheless despite the changes brought about by industrial capitalism to the settlement patterns of Great Britain, elsewhere the balance between the urban and rural populations remained unchanged. While by 1890 industrial capitalism had spread from Great Britain to other locations in Western Europe and North America, urban development in these core areas remained low.

What followed was a period of monopoly capitalism, leading to further urban growth and urbanisation in an expanded core, albeit that urban development in the peripheral

areas remained limited. In the first half of the 20th Century urbanisation took place most rapidly and extensively in Europe, North and South America, and in Australasia, while the rest of the world remained largely unaffected. The characteristic feature in the 1950s was that whereas in the dominant economies of the core, the cycle of urbanisation as suggested by Davis was nearing its completion, in the peripheral areas it was just on the point of commencing.

1.2. Metropolitan growth

After this broad overview of the processes of urbanisation per se, it is considered appropriate to examine in greater detail a number of key aspects of the phenomenon in an historical context, drawing upon international examples, which relate directly to the development of the notion of metropolitan urban regions at a general level and to the development of the Spanish metropolitan urban regions in particular.

As Sutcliffe (1984) indicates, the phenomenon of metropolitan development stems back to the Ancient world. In the Mediterranean area, Thebes, Memphis, Babylon, Athens and Rome were all outstanding cities which rose and fell with their respective empires over which they exerted political power. Indeed the very notion of spatial dominance is implicit in the Greek term 'metropolis', meaning a mother city from which smaller cities and colonies have been settled.

Rome, at the height of its glory in the first and second centuries AD had a population of between half a million and one million persons, but after the fall of the Roman Empire, the giant city was not encouraged by the fragmentation of political power. It is unlikely that even Constantinople, at the height of its power in the seventh century, would have exceeded half a million persons. Later Constantinople was rivalled by the centres of Islamic power, focused on Baghdad and Cordoba. During the feudal period, a dispersed system of trading and manufacturing towns was generated in Europe, and only through the emergence of large kingdoms and city states in the twelfth century did giant cities begin to appear, of a scale comparable to the imperial centres of North Africa and the East. Of this period, Paris stands out as the capital of the French kingdom, with a population of over 200,000 persons in the early 14th Century, more than twice the size of the large trading centres of Italy, Venice, Genoa and Milan. The depopulation which took place in Europe in the late medieval period discouraged large cities. However in the 16th Century, renewed population growth occurred, coinciding with the development of economic trading with the New World, leading to the emergence of large cities once again (Sutcliffe, 1984), as illustrated by Table 1.3 in the preceding section.

What was significant was the rise of London and its emergence as an imperial capital. By the mid-17th Century, the population of London, which exceeded 400,000 persons, was close to that of Paris, however during the 18th Century, London's population overtook the French capital. This point in time marks what can effectively be described

as the first period of metropolitan growth of 'modern' times, coinciding with the adoption of the term 'metropolitan' in aspects of public administration in Great Britain and in other aspects of a cultural dimension in other parts of the world.

In order to follow the course of metropolitan growth from this period up until the present day, the discussion is divided into five sub-sections, corresponding to broad historical periods. The first of these sub-sections (1.2.1) covers the period from the early 1800s up until the early 1900s, in the context of the expansion of 19th Century industrialisation and improvements in transportation, characterised to a certain extent by centralised metropolitan growth. The second sub-section (1.2.2) relates to the period showing early signs of decentralisation, in the context of the incipient metropolisation associated with further improvements in transportation, which took place during the early part of the 20th Century. This period coincided with the denomination of the term 'metropolitan districts' by the US Census Bureau in 1910, and the coinage of the term 'conurbation' by Patrick Geddes in 1915. The third sub-section (1.2.3) spans the mid-1900s with growing metropolisation and increasing suburbanisation, coinciding with the adoption of the 'metropolitan area' nomenclature by the US Census Bureau. The fourth sub-section (1.2.4) covers the period characterised by disperse metropolitan growth, with contained metropolisation during the 1970s and the emergence of the phenomenon giving rise to the notions of counterurbanization, etc. The fifth and final sub-section (1.2.5) addresses contemporary metropolitan growth in the post-1970s period, in the context of the increasing number of mega-cities and the consolidation of the notions of World cities, global cities and globalisation.

It is considered that the broad divisions of this historical approach will permit the most relevant aspects of metropolitan growth over the last two hundred years to be traced, and will allow for the identification of the principal characteristics of each of these five periods.

1.2.1. Centralised metropolitan growth: in the context of 19th Century industrialisation and increased transportation

Lewis Mumford, in his seminal work *The City in History*, suggested that the "basis for metropolitan agglomeration lay in the tremendous increase in population that took place during the nineteenth century" probably surpassing in both relative and absolute terms, the population increases witnessed in Neolithic times, enabling the original conquests of urbanism (Mumford, 1961, p. 602). According to Mumford "the peoples of European stock multiplied from about two hundred million during the Napoleonic Wars to about six hundred million at the outbreak of the First World War" (Mumford, 1961, p. 602). In 1800 not one city of the Western World had a population exceeding one million inhabitants. The largest city at that time, London, had only 959,310 inhabitants, whereas Paris had just over 500,000 inhabitants. Fifty years later, the population of London exceeded two million inhabitants and Paris had over one million inhabitants. However by 1900 there were some eleven metropolises with more than a million inhabitants, namely Berlin, Chicago, New York, Philadelphia, Moscow, St. Petersburg, Vienna, Tokyo and Calcutta (Mumford, 1961).

As has been seen, it was the Industrial Revolution and the enlargement of world trading markets that led to the quantum leap in population growth (in Europe in particular) and above all a centralisation of the said population growth. Furthermore, as Nel·lo and Muñoz (2004) indicate, it was the consolidation of the industrialisation that led to the occupation of the first places in the world ranking political and increasingly industrial centres, often capitals in fast and growing paths of industrialisation, such as Berlin, Saint Petersburg, and Tokyo. Nevertheless, the most spectacular growth occurred in the manufacturing and industrial cities, the foci of the progressive concentration of capital and finance, characterised by the monopolistic capitalism of North America, in the cities of Chicago, New York and Philadelphia, as well as in Manchester, the world capital of textile production.

The relation between the urbanization process and industrialization is paramount, and were connected not only with technological advances, but with the creation of increasingly specialised industrial areas. According to Shaw (1989, cited in Nel·lo and Muñoz, 2004) in the British case there were three periods of urbanisation associated to the new industrial economic model.

The first of these three phases (1780-1820) related to the use of steam powered energy for machinery, favouring the growth of cities with prime basic resources and material such as water and coal at their disposal. This led to the dense network of the canal system between cities and productive areas in the centre and south of England, and in turn the manufacturing development was followed large increases in the respective urban populations.

The second such phase in the urbanization process (1820-1870) relates to the growth of the urban areas with specialised functions, undergoing enormous growth in parallel with industrial production, as was the case hand with the textile industry. The commercialisation of industrial weaving looms from 1820 consolidated a system of factories which up until 1850 dominated the urban landscapes of the regions of the north of England, such as Lancashire. At the same time, other areas developed related to steel production and railway construction. During this period, the role of the large industrial centres was instrumental in the distribution of population.

The third of the urbanization phases (post-1870) was related to technical innovation, the organization of industrial production and its spatial location. The emergence of a service sector, particularly in the form of commercial activity, combined with changes in industrial work, led to the creation of a new economic map. The slump in the traditional manufacturing sectors of textile, linen and wool, was matched by the expansion of new productive sectors such as tobacco, paper, chemical and metallurgy which were much less dependent upon the coalmines. Indeed the labour force engaged in these new industrial activities increased from 22% in 1870 to over 36% in 1911. Also in 1911, some 40% of the labour force was engaged in the service sector, which was strongly concentrated London and the cities of the south of England (Shaw, 1989, cited in Nel·lo and Muñoz, 2004).

Nel·lo and Muñoz (2004) suggest that the British example exemplifies how the industrialisation process laid the foundations for the creation of wide productive regions of a purely urban character, where the productive specialisation, the concentration of capital and the exponential growth of population led to the configuration of a new type of territorial occupation. The configuration of these urban spaces which would play a leading role in the principal metropolitan urbanization processes to be experienced during the 20th Century.

London provides the ideal example to examine the changes that took place during this period. Despite the population growth experienced by London throughout the 1800s, during the first half of the 19th Century its position heading the British urban hierarchy began to be questioned. This was due on the one hand from the unprecedented growth of the provincial manufacturing centres, as well as their increasing importance in both economic and political terms; and on the other hand from the difficulties associated with understanding the form of London. Although in relative terms the growth of London had been slower than other towns and cities, its growth was still notable. Garside (1984) suggests that this difficulty was one of perception rather than remedy, requiring practical solutions to the consequences and problems of such growth. One such solution came forward in the 1820s, with the application for the first time of the term 'metropolis' to London, to denote a new type of urban form, i.e. a 'London as a whole, in contradistinction to the City'. Nevertheless this 'London as a whole' was a nebulous term which until 1851 had escaped the definition by cartographers and the Census.

The 1851 Census had for the first time defined London as a complete census division, covering an area approximating that of Inner London[44] today. Prior to that there was no common definition for 'London', although the Robert Peel's Metropolitan Police Act 1829 led to the establishment of the Metropolitan Police District, extending over an area within a 24km radius of Charing Cross, and the creation of the Metropolitan Police Force[45]. Local administration up until 1855 had been carried out by some 300 different bodies, under powers from some 250 different local Acts. However it was under the Metropolis Local Management Act 1855 that the first genuine metropolitan local authority was created in London, under the guise of the Metropolitan Board of Works (MBW). The main objective of the MBW was to improve London's sewerage system. It remained in force as the principal instrument of London-wide government up until the establishment of the London County Council in 1889, by which time it had acquired a wide range of public works' powers[46] (Wood, 1998).

However with the new world economic order resulting from the development of the railways and steamships, London once more was able to assert its position as the key focus of national and international communications. Despite problems encountered by

[44] Inner London, with an area of 319 km^2, comprises the City of London and 13 borough councils: Camden, Hackney, Hammersmith & Fulham, Haringey, Islington, Kingston & Chelsea, Lambeth, Lewisham, Newham, Southwark, Tower Hamlets, Wandsworth and City of Westminster

[45] The forerunner of the organisation responsible for the policing of London which still exists today, under the name of the Metropolitan Police (http://www.met.police.uk/).

[46] These included the construction of main drains and sewers; construction and improvement of main thoroughfares; construction of flood protections works; enforcement of building codes; naming and numbering of streets; fire protection; creation and maintenance of parks and open spaces; construction of tramways; slum clearance.; and supervisory and inspection duties with regard to water and gas supply, disease control, and noxious trades. (Wood, 1998)

differing degrees of local opposition and rivalry between different operating companies, by the end of the 19th Century, every part of the River Thames between Woolwich and the Tower of London had been developed with dock activity. Such was the intensity of this activity that by 1890 London was able to claim to be the world's number one port, providing it with an enormous hold over the entire British economy. Similarly the railways placed London at the centre of Britain's communication system. London's first passenger railway, the London and Greenwich, had in fact opened on 8 February 1836, running from Deptford to Spa Road in Bermondsey. It formed part of a longer 6 km line built between London Bridge and Greenwich which was opened in on 29 December 1836. By 1844, this line was carrying a total of 2 million passengers a year. The London and Greenwich Railway was just one of numerous lines which contributed to transform London and the country at large between the 1840s and 1860s. The first railway terminal to be built in London was opened at Euston Station in 1837, connecting the capital with Birmingham for the London and Birmingham Railway Company. Waterloo Station for the Southampton Line followed in 1846, as did Kings Cross in 1851-52 and Paddington in 1854. The opening of these and other railway terminals on the periphery of the central district increased the commercial facilities and pressures at the centre of London, while at the same time, by the end of the 19th Century, enabling for the separation of work and home by means of the suburbanization of the middle and upper classes (Garside, 1984).

The decision to build the principal mainline stations on the periphery of the central area left passengers with no easy means of crossing the capital, giving rise to enormous congestion. A Select Committee set up in 1855 to examine the matter recommended the construction of an underground railway to link the stations, leading to the establishment of the Metropolitan Railway Company and the opening of the Metropolitan Railway, the world's first underground railway[47], on 19 January 1863[48].

[47] The first 'metropolitan railway' was that of London, constructed in 1863. Initially with vapour traction, it was converted to the first electrified metropolitan railway in 1890. That of Paris was inaugurated in 1900. Budapest, 1896, was the first of Continental Europe. In Spain, the first was that of Madrid, 1919. New York 1870. The first line of the Gran Metropolità de Barcelona, SA, (Lesseps-Catalunya) was inaugurated in 1924.

[48] The following day the Manchester Guardian reported that: "Yesterday the Metropolitan (underground) Railway was opened to the public, and many thousands were enabled to indulge their curiosity in reference to this mode of travelling under the streets of the metropolis."

Figure 1.4. Gusav Dore's view of London congestion, 1872[49]

The underground line ran from Paddington to Farringdon Street, a distance of almost 5 km, via the mainline stations of Euston and Kings Cross. Reduced fares on early morning services enabled working-class people to use the underground and indeed led to the introduction of reduced fares on other railway services through the Cheap Trains Act in 1883. As a consequence, working-class people were able to move further away from the crowded centre of London.

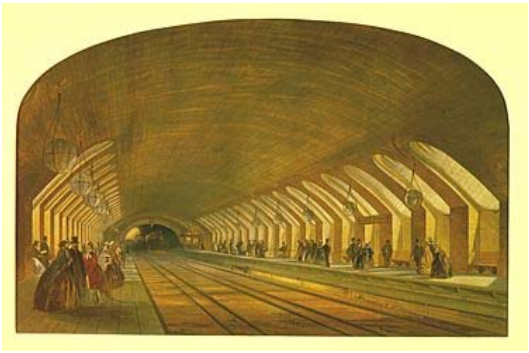
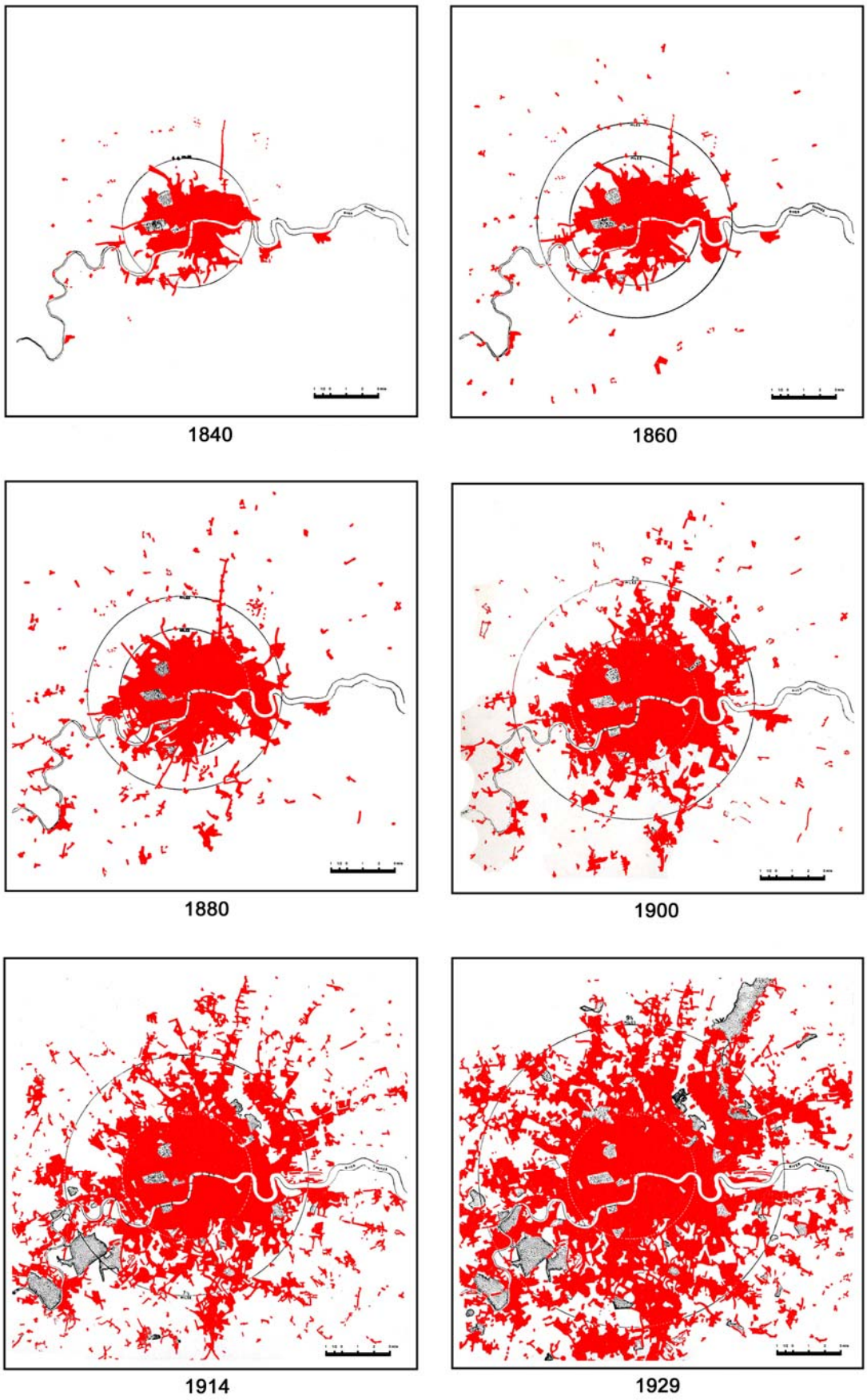


Figure 1.5. Baker Street station on the Metropolitan Railway, 1863[50]

The success of the Metropolitan Railway led to interest to construct other lines. In 1864 Parliamentary approval was granted to create an Inner Circle (today's Circle Line) connecting all the mainline terminals. The first section of this was constructed in 1868, but rivalry between the railway companies and the high construction costs of building through London prevented the Inner Circle from being completed until 1884.

[49] London Transport Museum, http://www.ltmuseum.co.uk/
[50] London Transport Museum, http://www.ltmuseum.co.uk/

London continued to grow in all directions with the construction of the Victorian suburbs. The introduction of working men's fares and the advent of the horse tram made transport much more accessible. Middle class migration continued in an outward direction and with the greater affordability of public transport, this was followed by working class outward migration as well. At first many of the mainline railway companies were only interested in longer distance travel. They were prepared to make concessions to serve the suburban developments, but only for the wealthier travellers. Some offered free season passes to new residents to encourage the building of more expensive new homes, near new stations. However other companies, such as the Great Eastern Railway, were keen to attract working class passengers. In 1883 the Cheap Trains Act was passed, which encouraged railway companies to provide cheap early morning and evening workmen's fares, which in turn contributed to the development of new suburbs (London Transport Museum, 2005).



Figures 1.6 a, b, c, d, e and f London, 1840, 1860, 1880, 1900, 1914 and 1929, after Abercrombie (1945)

The continued physical expansion of the built-up area of London was matched by an increase in population decline at the centre. However this suburban growth was not a direct result of the commercial expansion in the centre. Rather the construction of suburban development and the servicing they required created employment and generated income, with the emergence of a lower-middle class in suburban commerce, in the form of shopkeepers, clerks and teachers (Garside, 1984).

The paramount social problem of London, and other cities such as Paris, Berlin and New York, at the end of the 19th Century was that deriving from the atrocious unsanitary conditions and poverty of overcrowded housing of the working classes. Indeed the growing public awareness of these conditions came as a considerable shock for the middle and upper classes of Victorian society of the time[51]. As Hall (2002) succinctly points out, "the root of the problem was simple economics. The people were overcrowded because they were poor, and because they were poor they could not afford the obvious remedy: to move out where house room was cheaper." (p. 18) These issues were addressed by the 'Royal Commission on the Housing of the Working Classes', which sat between 1884-85. The Commission concluded that there was a need for public investment to ensure the provision of adequate working-class accommodation. This was followed by the Housing Act 1885, the creation of the directly elected London County Council (LCC) in 1889 and a further Housing Act in 1890. This latter Act allowed for the clearance and rebuilding of slum areas (Part I), and the compulsory purchase of land to construct working class accommodation (Part III). In practice however, the lack of political agreement prevented the scale of the problem from being fully dealt with in a satisfactory way.

The British solution to the problem of overcrowded housing was diametrically opposed to that of the United States, arising from the recommendations of the Tenement House Commissions (1894 and 1900) addressing the state of New York's tenements. While in Britain the solution lay with the public sector, in the United States the "physical regulation of the private developer was to provide the answer" (Hall, 2002, p. 39), leading to the situation that "in comparison with Europe, it was to set the cause of public housing back for decades" (Lubove, 1962, cited in Hall, 2002, p. 41). By contrast a lower tier of 28 metropolitan boroughs[52] was created as part of the London County Council in 1899. These metropolitan boroughs were provided with the powers of

[51] These conditions are graphically described in 'The City of the Dreadful Night', Chapter 2 of Peter Hall's *Cities of Tomorrow* (2002).
[52] City of London, Holborn, Finsbury, Shoreditch, Bethnal Green, Stepney, Bermondsey, Southwark, City of Westminster, St. Marylebone, St. Pancras, Islington, Hackney, Poplar, Deptford, Camberwell, Lambeth, Battersea,

compulsory purchase and the construction of working class accommodation under Part III of the 1890 Housing Act. In 1900 the LCC was granted powers to purchase and develop land for housing lying outside its boundaries.

Although these remedies were different, the reality on both sides of the Atlantic was similar, in the case of both London and New York being the seats for enormous concentrations of extremely poor people, in close proximity to the middle and upper socio-economic groupings of the day. In this sense industrialization and urbanization led to the creation of new social relationships and a new set of social perceptions (Hall 2002). Moreover it is within this overall socioeconomic context that social reformers such as Charles Booth, William Morris and Ebenezer Howard all came forward with different proposals to alleviate the worsening social and economic conditions of cities[53] (Hall, 2002; and Garside, 1984).

Chelsea, Kensington, Paddington, Hampstead, Stoke Newington, Woolwich, Greenwich, Lewisham, Wandsworth, Fulham and Hammersmith.

[53] For example Howard's proposal lay in the development of the garden city model, which he saw as a vehicle enabling the social transformation of industrial society, enabling the union between the natural surroundings and the population. While the 'town' represented the worst possible aspects of the then Victorian city, despite the economic and social opportunities, and the 'country' was characterised by the depression of the agricultural sector, unable to offer sufficient employment, reasonable wages and social life, the salvation was offered by the 'town-country', embodied within the social and physical organisation of the garden city, which would provide its residents with liberty and cooperation Howard (1898, 1902).

1.2.2. Early indications of decentralisation, in the context of growing suburbanisation, incipient metropolisation and further improvements in the provision of transport

By 1900 Mumford indicates that there were some eleven metropolises with more than a million inhabitants, namely Berlin, Chicago, New York, Philadelphia, Moscow, St. Petersburg, Vienna, Tokyo and Calcutta, in addition to those of London and Paris (Mumford, 1961). At this stage, the population of Greater London had reached 6.5 million and that of New York 3.4 million. As from the start of the 1900s:

> "(…) the giant city was city changing, (…) The city dispersed and deconcentrated. New homes, new factories were built at its suburban periphery. New transportation technologies – the electric tram, the electric commuter train, the underground railway. The motor bus – allowed this suburbanisation process to take place. New agencies – building societies, public and non-profit housing agencies – exploited the opportunities thus offered. Cheap labour and cheap materials reduced the real costs of new housing, especially in the late 1920s and early 1930s. Better, more subtle planning and development regulations curbed the congestion and also some of the tedium of the nineteenth-century cities. The result was an extraordinary and quite sudden improvement in the housing standards of a wide spectrum of the population" (Hall, 2002, p. 49).

It is against this background that by 1930 Mumford suggests "as the result of a feverish concentration of capital and financial direction, along with the profitable mechanical means for urban congestion and extension" (p. 602), some 27 metropolises with populations exceeding one million inhabitants were to be found on every continent, including Australia, and ranging from New York, the largest, to Birmingham, England, the smallest (Mumford, 1961).

The 1901 British Census had highlighted the degree of London's problems of congestion and overcrowding. In the following years, the London County Council undertook the initiative to develop a number of suburban residential development schemes, with differing degrees of success, depending upon their integration with public transport systems. The classic LCC schemes include those of Totterdown Fields site at Tooting, south London (1903) coinciding with the electrification of the tramway; the Norbery peripheral estate; White Hart Lane at Tottenham in north London; and Old Oak in west London.

As seen previously in the mid-19th Century, legislation was passed to encourage lower pricing on the trains (Penny Trains Act 1844) however there was little response from the railway companies on this front. The Government had approved the extension of

the Great Eastern Railway to London's Liverpool Street in 1864, on the condition that the company would provide cheap trains. As a result, only in north-east London had it been possible to see the development of large-scale working-class suburbs (Hall, 2002).

Municipal trams and subsequently buses were provided in the provincial capitals such as Birmingham, Liverpool and Manchester, with the underground and commuter railways in London. The growth of speculative housing around London, leading to a threefold rise in the capital's area in 20 years, was dependent upon rail transit. This system was provided by the private sector, following the North American example which had quickly latched onto the notion of the commercial potential arising from land development following new rail or tram (streetcar) lines. Indeed a number of the earliest examples of the North American planned streetcar suburbs, such as Llewellyn Park at West Orange, New Jersey (1853), Chestnut Hill in Philadelphia (1854), Lake Forest, Illinois (1856) and Riverside, Illinois (1869) had all preceded the first British experiment at Bedford Park in west London (1876) (Hall, 2002).

As mentioned earlier, in Section 1.2.1, the first train of the London underground ran on 19 January 1863. However the world's first electric underground train did not run until December 1890. The City and South London Railway operated the service from King William Street in the City of London to Stockwell, on the south side of the River Thames, extending to the Angel in Islington and Clapham in 1900. In 1907 it was extended to King's Cross and Euston, coming an early part of the Northern Line in 1926. New technologies and foreign investment from the United States around the start of the 20th Century led to the electrification of the Inner Circle and District lines, and the opening of the Waterloo and City line 1898, followed by the Bakerloo and Piccadilly lines in 1906, and the Northern in 1907. Therefore by 1907 the very heart of London's underground system was in place with electric trains operating (London Transport Museum, 2005).

After the First World War (1914-1918) there was a worsening in the housing crisis and the Government made allocations to meet the demand, through the "homes fit for heroes" campaign[54]. This led to a new phase in suburban expansion. In an attempt to alleviate the conditions of the poor, the LCC constructed subsidised ("council") housing both in and outside London. Private developers followed suit through the purchase of

[54] The 1919 Housing Act attempted to provide "homes fit for heroes to live in". Local authorities were required to provide schemes on how they would achieve this in working class areas. Central government gave financial help for this between 1919 to 1923.

large areas of land around London, providing housing for middle-class owner occupiers. The success of all these developments was facilitated and encouraged by improvements in the road systems and public transport. Advertising campaigns of the railway companies and the London underground all contributed to sell the "suburban" dream.

Perhaps the most-famous of these campaigns was the Metropolitan Railway Company's "Metro-Land" campaign, bestowing the advantages of suburban living and the new commuter lifestyle in the 1920s and 1930s[55]. Railway stations and the interiors of the trains were adorned with posters aimed at persuading people to 'come and live in Metro-Land'. The name had first appeared in a publicity booklet in 1915 and in 1919 the Metropolitan Railway established metropolitan Railway Estates Limited subsidiary company, in order to purchase land and build housing estates along its line. During this period thousands of homes were built in 'Metro-Land', from Baker Street to Neasden, Wembley and Rickmansworth.

Figures 1.7 a, b and c. Publicity booklets (a and b) and poster (c) for Metro-Land[56]

Such was the vogue for suburban living that in the in the absence of central planning and regulation, concern began to increase during the 1930s relating to the encroachment of London's continuing urban development into the surrounding countryside. As a result the LCC and other rural local authorities began to purchase land surrounding London to protect it from development. With time the Greater London

[55] This new lifestyle was celebrated in the verse of the late Sir John Betjeman, poet laureate between 1972 and 1984, and in the film made for the BBC in 1971.
[56] London Transport Museum, http://www.ltmuseum.co.uk/

Plan (1943) and the Town and Country Planning Act (1947) would both be the instruments for restricting the further outward expansion of London.

1.2.2.1. Metropolitan districts and conurbations

What is perhaps most striking about this second of the five broad periods outlined here, is the growing recognition of the function of large cities extending beyond their own strict municipal limits and as a consequence requiring a special form of treatment. In both the United States and the United Kingdom, two key developments stand out, which were complementary, albeit that they occurred in isolation from one another, which in turn would have crucial ramifications for the study and planning of large urban areas. The first of these is related to the incorporation of the very term "metropolitan" within the U.S. Census, in 1910. The second key development was the designation of the term "conurbation" to relate to the large groupings of continuous urban development in the United Kingdom, by Patrick Geddes around the very same time. Both events, linked to the growth of cities, permitting peripheral development in the form of the suburbs, as a consequence of the increased mobility facilitated by the development of public transport at that time, would with time be influential in the study and analysis, and management of large urban areas on a global scale.

1.2.2.2. The first "metropolitan districts" in the United States

Looking first to the events which took place in the United States, it is fitting to refer to the contribution made by the U.S. Census Bureau in terms of offering definitions and methodologies for dealing with the measurement of large-scale urbanisation and metropolitan phenomena. In the context of the United States, interest in seeking to develop a robust definition of the metropolitan phenomenon goes back to the start of the 20th Century. The concept itself stems from "the common observation that the physical extent of a large urban concentration often overflows the official limits of any single city" (Bureau of the Census, 1994, p. 13-2). It is interesting to note that statistical publications dating from prior to the American Civil War referred to suburban territory existing beyond the limits of major cities, as indicated by the following extract from The New England Gazetteer in 1846, relating to Boston:

> "Owing to the almost insular situation in Boston, and its limited extent, its population appears small. But it is must be considered that the

> neighbouring towns of Quincy, impossible in 1984 Owing to the almost insular situation of Boston, and its limited extent, its population appears small. But it must be considered that the neighboring towns (…) although not included in the city charter, are component parts of the city, and are as much associated with it in all its commercial, manufacturing, literary, and social relations and feelings, as Greenwich, Manhattanville, and Harlem are with the city of New York; or Southwark and the Northern Liberties with Philadelphia" (Hayward, 1846, cited in Bureau of the Census, 1994).

In the 1905 *Census of Manufacturers*, industrial districts were identified for New York, Chicago, Boston and St. Louis. However it was in the *Thirteenth Census of the United States 1910* that the Census Bureau for the first time officially recognised the metropolitan concept, through the definition of *metropolitan districts*. The General Report and Analysis of the 1910 Census, in analysing "Cities and their suburbs" states that:

> "In its general tables dealing with the population of cities, the Bureau of the Census must necessarily deal with political units, or, in other words, with the population contained within the municipal boundaries of each city. It is a familiar fact, that in some cases, the municipal boundaries give only an inadequate idea of the population grouped about one urban center, and as regards the large cities in very few cases do these boundaries exactly define the urban area. In the case of many cities there are suburban districts with a dense population outside the city limits, which, from many standpoints, are as truly a part of the city as the districts which are under the municipal government. These suburbs are bound to the cities by a network of transportation lines. Many of the residents in the suburbs have their business or employment in the city, and, to a certain extent, persons who reside in the city are employed in the suburbs.
> It seems desirable to show the magnitude of each of the principal population centers taken as a whole. Statistics have, therefore, been compiled for each city in the United States with a population of 100,000 inhabitants or more, which, in addition to the population within the city limits, show the population in adjoining communities that may be considered as intimately associated with the urban center" (Bureau of the Census, 1913, p. 73).

The full text of this section "Cities and their suburbs" is reproduced in Appendix 2.

As a consequence, two sets of computations were carried out. Firstly, for cities with at least 100,000 inhabitants within their municipal boundaries, the total population within civil divisions lying within 10 miles (16 kilometres) of the city boundaries, to determine "cities and adjacent territory"; and secondly, in the case of cities with at least 200,000 inhabitants within their municipal boundaries, the Bureau determined a "metropolitan

district" incorporating the city itself and those sections of the adjoining territory which could be considered of an urban character[57].

The distinction between the "metropolitan district" and the "adjacent territory" is best appreciated by the following extract:

> "The 'metropolitan district', which as previously noted, has, as its nucleus, a city of at least 200,000 inhabitants, includes the population and area of the central city itself and of all minor civil divisions lying within the 'adjacent territory' except, as a rule, those which had a density of population of less than 150 per square mile (58 per square kilometre). Where the density was less than that the division was considered as rural rather than urban in character, and as not properly a part of the metropolitan district. This limit of density, however, was not always rigidly applied. In some instances for special reasons divisions having a somewhat higher density, perhaps as high as 200 per square mile (77 per square kilometre), have been omitted, and in a few instances a minor civil division has been included within the metropolitan district, even though it had a lower density than that just stated, because that division was completely or almost surrounded by other civil divisions having a density which would require them to be included. The exception in such cases seems justified in order to avoid undue irregularity in the shape of the districts, or gaps lying wholly within their area.
> (…)
> In general, the city with its 'adjacent territory', as here defined, includes the central city, and in addition all cities, towns, villages, or other divisions located within 10 miles (16 kilometres) of the boundary of the central city; while the metropolitan district includes, besides the central city, only those divisions within the 10-mile (16 kilometre) limit which had a density of population of not less than 150 persons per square mile (58 persons per square kilometre)" (Bureau of the Census, 1913, p. 73).

It is of passing interest to note that these definitions led to the identification of some 25 metropolitan districts[58], with a combined population of 22,088,331 inhabitants, of which 17,099,904 inhabitants resided in the central cities (77%) and 4,988,427 resided outside the central cities, in the suburban areas, representing almost 30% of the cities' populations. The "metropolitan district" populations of New York, Chicago, Philadelphia, Boston and Pittsburgh all exceeded 1 million inhabitants, with only three cities - New York, Chicago and Philadelphia - indicating a population superior to the 1 million mark.

However what is of critical interest is the fact that as from this point in time, the U.S. Census Bureau applied the "metropolitan district" concept consistently, for the

[57] It is necessary to make a comment upon the morphological nature of the definition and draw out the fact that this will be elaborated upon in the section dealing with metropolitan delimitations. See Chapter 3

[58] In descending order: New York, Chicago, Philadelphia, Boston, Pittsburgh, St. Louis, San Francisco-Oakland, Baltimore, Cleveland, Cincinnati, Minneapolis-St. Paul, Detroit, Buffalo, Los Angeles, Milwaukee, Providence, Washington, New Orleans, Kansas City (Mo. and Kans.), Louisville, Rochester, Seattle, Indianapolis, Denver and Portland (Oregon).

decennial censuses of 1920, 1930 and 1940. The definition used for the 1910 Census was applied again in the 1920 Census, however the 1930 and 1940 Censuses, allowed for the identification of metropolitan districts for cities with a minimum population of 50,000 inhabitants. As a consequence, the 1930 and 1940 Census identified 97 and 140 metropolitan districts respectively (Thompson, 1947). Throughout this period the Census Bureau defined the metropolitan districts in terms of minor civil divisions, defining their boundaries based upon density of population[59]. A change would come about in 1949 with a marked shift from the until then morphological/density approach to the definition of the metropolitan areas, to one based more upon functional criteria of economic and social integration around a central place, through the introduction of a definition for the "standard metropolitan area" (SMA). This change will be addressed in Section 1.2.3.

1.2.2.3. *Conurbations*: part of the legacy of Patrick Geddes

In parallel to the events in the United States leading to the identification of "metropolitan districts" related to the largest cities, it seems appropriate to draw attention to the work of Patrick Geddes, irrefutably one of the founding fathers and pioneers of the "modern" Anglo-Saxon town planning movement. Geddes, a biologist by training and a botanist by profession, wrote his urban and regional theories very much from a life sciences perspective, with emotively charged descriptions of the phenomena he was studying. In *Cities in Evolution*, which was published in 1915, Geddes analysed the population change at a nation-wide scale, based upon the then recent appearance of the Royal Geographical Society's Atlas of England and Wales. In this work Geddes makes an implicit reference to metropolitan growth, making use of other more explicit terminology. For example in his discourse on Greater London, Geddes speaks of "its vast population streaming out in all directions" (Geddes, 1915, p.25), going on to suggest that:

> "This octopus of London, polypus rather, is something curious exceedingly, a vast irregular growth without previous parallel in the world of life – perhaps likest to the spreadings of a great coral reef. Like this, it has a stony skeleton, and living polypes – call it, then, a "man-reef if you will. Onward it grows, thinly at first, the pale tints spreading further and faster than the others, but the deeper tints of thicker population at every point steadily following on. Within lies a dark and crowded area; of which, however, the daily pulsating centre calls on us to seek some fresh comparison to higher than coralline life. Here, at any rate, all will agree, is an approximation to the

[59] The 1950 Census would mark a change as being the first effort to define metropolitan areas based upon functional criteria of economic and social integration around a central place. See Section 1.2.3.

real aspect of Greater London as distinguished from Historic London" (Geddes, 1915, p.26).

Figure 1.8. Greater London[60]

Geddes goes on to question the purpose of county boundary divisions, on the basis that the reality (of recent population growth) shows a great part of the South-East of England being converted into a "house-province" (Geddes, 1915, p. 27). He introduces a metaphor of connectability, deriding the usefulness of the old lines of (administrative) division and their replacement with the "new lines of union" in the form of the railways, i.e. the "throbbing arteries, the roaring pulses of the intensely living whole", as well as the telegraph wires transmitting "the impulses of idea and action either way" (Geddes, 1915, p. 26-27).

In looking at other parts of England and Wales, which had been subject to similar urban population growth to the extent of forming city-regions, Geddes refers to the need for new descriptive vocabulary. Rejecting both "constellations" and "conglomerations", he proposes "conurbations" which " may serve as the necessary word, as an expression of this new form of population-grouping, which is already, as it were subconsciously, developing new forms of social grouping and of definite government and administration (…)" (Geddes, 1915, p.34).

This analysis leads Geddes to announce the New Heptarchy of England and Wales, comprising the conurbations of Greater London (adopting the accepted terminology of the day); "Lancaston" (for the vast conurbation and world-metropolis of cotton of the Lancashire millions); "West Riding" (to denote Huddersfield, Bradford and their neighbours, the world-metropolis of wool); "South Riding" (for the conurbation centring around the steel and coal of Sheffield); "Midlandton" (referring to the Greater and

growing Birmingham); "(South) Waleston" encompassing Greater Cardiff); and "Tyne-Wear-Tees" (for the regional community of the Tyne towns, as well as those of Wear and Tees); being complemented by Clyde-Forth in Scotland (referring to the bi-polar city-regions comprising Glasgow and Edinburgh).

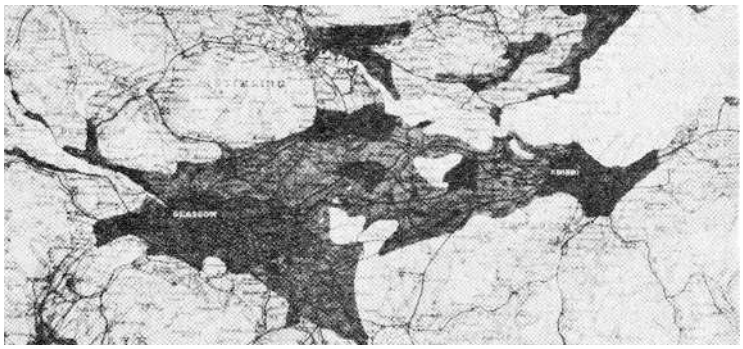


Figure 1.9. Clyde and Forth towns agglomerating as "Clyde-Forth"[61]

It is legitimate to ask at what stage these 'conurbations' first began to appear in Great Britain. Lloyd (1992) makes the point that the increase in population of England and Wales during the 19th Century was extremely uneven. While London expanded vastly, areas where different industries had developed in the early years of industrial change continued to expand throughout the Victorian period (1830-1900). The large towns grew into great cities, the smaller towns into larger ones and for different reasons a few new towns were established. Many adjoining towns consolidated into what became to be known as the 'conurbations', of which Lloyd makes special reference to the conurbations of Birmingham and the Black Country; Manchester and much of Lancashire; Leeds and the West Riding; Sheffield and South Yorkshire; Liverpool and Merseyside; Newcastle and Tyneside; Cardiff and South Wales.

While the principal advances of the Industrial Revolution in cotton manufacturing had taken place by about 1840, it was not until the 1860s that wool manufacturing had become mechanized making use of steam power. By then however the settlement pattern of the cotton region around Manchester, and the wool region around Bradford and Leeds had become fully established. Further development led to the larger and monumental mills where the textile industry was clearly a success. It is reasonable to trace these events as the precursors for the development of the two conurbations Geddes identified as "Lancaston" and "West Riding".

[60] Geddes (1915)
[61] Geddes (1915)

Some of the most important advances in technology during the Victorian period were those seen in steel-making. Sheffield was already renowned for steel manufacture, but following several technological advances in the mid-1800s, the steel industry in the proper sense of the word started to develop. Soon steel replaced iron in the fields of engineering, shipbuilding, railways and building construction and a number of until then iron-manufacturing companies, for example in the Black Country, around Birmingham, made the successful change to steel manufacture. Clearly these events contributed to the development of the conurbations of South Riding and Midlanfton.

The evolution of events leading to the formation of the "Tyne-Wear-Tees" conurbation rested upon the shipbuilding industry. Newcastle and Tyneside had enjoyed centuries of tradition in wooden shipbuilding as well as in iron manufacture, when the first iron ship built on the River Tyne was launched in 1842. Subsequently shipyards were developed along the river, producing ships of all types. In Newcastle from the 1850s onwards, there was a strong tradition of armament manufacture and warship manufacturing, and in Sunderland, on the mouth of the River Wear, coal export, wooden and then iron shipbuilding and glass-making all became successful industries.

By the Victorian period, Liverpool had achieved the position as Britain's chief transatlantic port, for cargo, for embarkation of the countless emigrants and as the terminus for the world's busiest oceanic passenger service with New York.

From this brief review, one can conclude that it was basically from the mid-1800s that the British conurbations began to grow significantly, resulting from advances in different aspects of specialised industrialisation as a wave over the entire country. Responding to the wave of growing opportunities and employment and economic development deriving from industrialisation.

	1891-1901	1901-1911	1911-1921-	1921-1931	1931-1951
Greater London	16.8	10.2	3.1	9.9	0.8
South-East Lancashire	11.8	10.0	1.4	2.8	-0.1
West Midlands	16.9	10.2	8.3	9.0	7.6
West Yorkshire	8.1	4.3	1.5	2.6	1.1
Merseyside	13.4	12.3	9.0	6.7	1.3
Tyneside	23.1	12.3	7.0	1.4	0.5

Table 1.4. Population growth of the conurbations of England and Wales 1891-1951[62]

[62] Hall (1973), p. 64

The nature of the term conurbation would change over time, as discussed by Hall (1973, pp. 62-68), but nevertheless hold an important place in the metropolisation process, coinciding with the similar experience of the United States, as discussed in the preceding section of this broad discussion, of growing signs of metropolitan growth.

1.2.3. Growing metropolisation and increasing suburbanisation

In 1950, just 30% of the world population lived in urban areas, making it principally rural in character. Certainly as indicated by Table 1.1 there were strong regional differences, in that North America and parts of Europe, South America and Australasia were more urban than rural, but this was countered by most of Africa and Asia, and the rest of South America, which were all rural, with less than 20% of their population living in towns and cities. Nevertheless, according to Mumford, by 1950, a host of new metropolitan areas had appeared, "with bulging and sprawling suburban rings that brought many more within the general metropolitan picture" (Mumford, 1961, p. 602).

	1950	1960	1970	1980	1990	2000	2010	2020	2030
World	29.1	32.9	36.0	39.2	43.2	47.1	51.3	55.9	60.8
Africa	14.9	18.6	23.2	27.5	31.9	37.1	42.4	47.8	53.5
Asia	16.6	19.8	22.7	26.3	31.9	37.1	42.7	48.5	54.5
Europe	51.2	56.7	62.9	68.6	71.5	72.7	74.2	76.6	79.6
Latin America and the Carribean	41.9	49.3	57.4	64.9	71.1	75.5	79.4	82.3	84.6
Northern America	63.9	69.9	73.8	73.9	75.4	79.1	82.3	84.8	86.9
Oceania	60.6	65.9	70.6	71.1	70.1	72.7	73.7	74.2	74.9

Table 1.5. Percentage urban population of the world, by major area: 1950-2030[63]

The third of these five broad phases dealing with urbanisation processes associated with metropolitan growth starts around the middle of the 20th Century and is marked by the growing refinement of the definitions given to reflect urban development of an increasingly metropolitan character in the United States. The 1950 Census of the United States was the first to include a specific definition of a Statistical Metropolitan Area (SMA). It will be recalled that between 1910 and 1940 the US Census Bureau consistently applied the metropolitan district concept in the Census, leading to the identification of some 140 such metropolitan districts and outlying areas in the 1940 Census, accounting for a combined population of 62,965,773 persons, representing 47.8 % of the total population of the United States[64].

In order to meet certain criticisms and widen the applicability of the information collected through the Census and provide it in a form able to be used by other interested agencies, changes were made in the collection of the data representing the metropolitan phenomena. At the same time there were concerns over the Census Bureau's classification of urban and rural areas. Therefore in 1949 two new statistical measures were introduced. Firstly the "standard metropolitan area" (SMA) concept was

[63] Reproduced from United Nations (2004)
[64] 1940 Census population of 62,965,773 persons. (Hobbs and Stoops, 2002)

established “to define the metropolitan extent around large cities” and secondly the Census Bureau developed the urbanized area (UA) definition to define the densely settled agglomerations around large cities. The standard metropolitan area provided a means of delimiting a functional zone of economic and social integration around a central place or places, whereas the urbanized area represented a measure of the extent of an urban agglomeration, including the built-up portion of a core place and the densely settled surrounding area. Both these concepts were applied for the 1950 Census and led to the identification of some 174 SMA in the United States. These metropolitan areas contained 84.5 million inhabitants, representing 56.1% of the total population of the United States and for the first time accounting for a greater proportion of the total population than the non-metropolitan areas (Hobbs and Stoop, 2002).

The notion of integration was determined principally by commuting or journey to work trips. The metropolitan areas were defined as counties or county equivalents, including a densely settled urban core with a population of at least 50,000 inhabitants, the remainder of the county in which the greater part of this core was located, and any contiguous counties meeting the criteria of metropolitan character and integration with the core. In real terms this meant that for the adjacent counties 50% of the population was living in minor civil divisions with a density of at least 150 persons per square mile and less than one third of labour working in agriculture, 15% working in the central city county of 25% commuting from the central county.

Clearly the concept of the metropolitan area, as contained in the 1949 definition, matched the settlement patterns that existed prior to 1950, in the sense that the functional areas could be attributed with physical attributes, areas contained a dense central city with spreading areas declining in density. Criticisms of this definition have rested on the premise that the US settlement pattern has since evolved in ways not matched by the original concept. Some argue that a metropolitan area should be an autonomous economic area and that most of the official metropolitan areas are underbounded by including all the population dependent upon the area for certain services, such as public services, retailing activity, health and education and other personal services. Others argue that metropolitan character should be associated with size, density and the performance of a number of key functions (Frey and Zimmer, 2001). What needs to be stressed is that over time the definition of metropolitan areas and the name given to them by the U.S. Census Bureau have evolved. These changes will be addressed specifically in Chapter 3 dealing with metropolitan delimitations, but the essential point that needs to be made at this point is that the 1949 definition was a

landmark, in the sense of offering a clear public response to capture the nature of the urban and metropolitan at the time[65].

[65] Responding to the clear insufficiency of the definitions to capture the evolving urban reality in the ensuing period, the Census Bureau initiated the first of a number of important changes in the definitions of the areas under metropolitan influence as well as the names used to refer to these areas, starting in 1959 with the change to "standard metropolitan statistical area" (SMSA), followed in 1983 by "metropolitan statistical area" (MSA). In 1990 the "metropolitan area" (MA) term was introduced to refer collectively to "metropolitan statistical areas" (MSAs) "consolidated metropolitan statistical area" (CMSAs) and "primary metropolitan statistical areas" (PMSAs). In 2000 the term was changed yet again to "core based statistical area" (CBSA) to refer to both metropolitan and micropolitan statistical areas. These last two changes had important ramifications for understanding what was happening within urban systems in general, but both will be discussed in detail respectively in the following two sections.

1.2.4. Disperse metropolitan growth

To a certain extent the two last phases of processes of urbanisation to be examined here overlap, in the sense that they cannot be positioned in time blocks as easily as the three preceding phases. This is due to the fact that what was happening in the cities and in the large cities in particular resulted from events and circumstances at different scales of analysis. Indeed what could be observed were different events which were affecting the cities and large urban agglomerations at an intra-urban scale as well as an inter-urban scale.

In contrast to the marked periods of centralisation in the 19th Century and decentralisation towards the end of the 19th Century and the beginnings of the 20th Century, deriving from the improvements in public transport, and suburbanisation through the first part of the 20th Century, what became clear from the mid part of the 20th Century was a commencement in the decrease of the population of the principal urban agglomerations on both sides of the Atlantic, firstly in the United Kingdom and then later in the United States. The majority of the English conurbations and urban agglomerations (Birmingham, Greater London, Newcastle and Sheffield) began to lose population following the 1951 Census, with Leeds beginning to lose population after the 1961 Census. Liverpool and Manchester had both begun to lose population prior to this period. In the case of the United States, with the notable exceptions of Los Angeles, Houston, San Diego, Dallas, Phoenix, San Antonio San Jose, Columbus and Memphis which showed continued upward growth, losses of population in the principal US cities were detected following the 1960 Census – as in the case of New York[66], Chicago, Philadelphia, Detroit, Baltimore, San Francisco, Jacksonville, Washington D.C. and Boston. Similar losses were detected in Milwaukee following the 1970 Census and in Indianapolis in the 1980 Census.

These shifts in population from states of greater to lesser were deemed by Berry (1976) to comprise *counterurbanisation*, in that the more traditional processes favouring population growth of towns and cities were in fact seen to be reversing. In the period between 1960 and 1970 the metropolitan areas of the United States increased five times as quickly as the rural areas. However during the 1970s this pattern was reversed, with rural areas indicating gains of population one and a half times that of the cities. Berry's research drew attention to the fact that almost half of the new non-metropolitan growth was adjoining cities leading to suburban sprawl over excessively

tightly drawn boundaries. Approximately half of the non-metropolitan growth was taking place in locations some distance from and not adjacent to the existing cities, thereby representing a non-metropolitan revival. More specific research focused on the changing metropolitan structure of Northern Ohio in the period 1960-70 indicated population growth in inter-metropolitan areas, showing that the growth derived from counterurbanisation, in that it had taken place in areas some distance from the more traditional urban core, with which no effective regular ties could be determined (Berry and Gillard, 1977, cited in Clark, 1996).

[66] The 1970 Census indicated a 1% increase in New York's population over the previous decade, but then the 1980 Census indicated a 10% decrease over the ten year period 1970-1980.

City	1891	1911	1921	1931	1951	1961	1971	1981	1991	2000
Birmingham	429	840	922	1,003	1,113	1,107	1,014	1,021	1,007	977
Leeds		734	754	781	798	806	789	718	717	715
Liverpool	518	746	805	856	789	747	607	517	481	439
Greater London	5,572	7,160	7,387	8,110	8,348	8,172	8,119	6,696	6,680	7,172
Inner	4,228	4,522	4,485	4,397	3,348	3,195	3,045	2,498	2,504	2,766
Outer	1,344	2,639	2,902	3,713	5,000	4,977	5,074	4,198	4,175	4,406
Manchester	505	714	736	766	703	661	541	463	439	393
Newcastle		267	275	283	292	270	222	284	278	26059
Sheffield		455	512	512	513	494	520	548	529	513

Table 1.6. Population (in thousands) of England's largest cities 1891-2000[67]

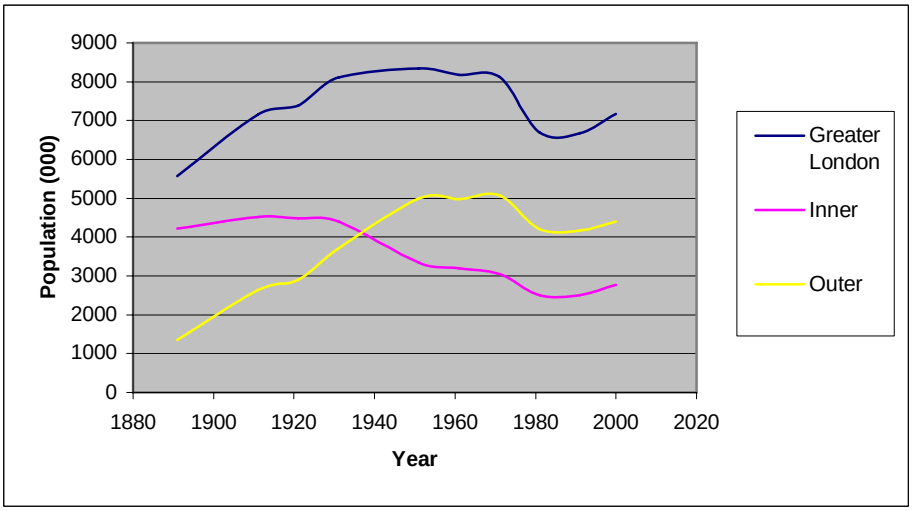


Figure 1.10. Population growth of Greater London:1890-2000[68]

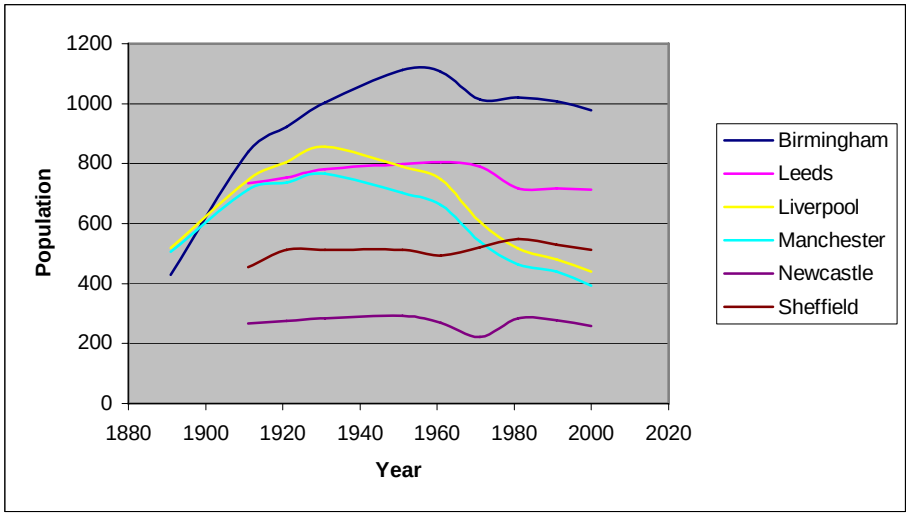


Figure 1.11. Population growth of principal English conurbations:1890-2000[69]

[67] http://www.demographia.com
[68] http://www.demographia.com
[69] http://www.demographia.com

City	Population (in thousands)				Change in population			
	1950	1960	1970	1980	1940-1950	1950-1960	1960-1970	1970-1980
New York	7,892	7,781	7,895	7,071	1,24	0,99	1,01	0,90
Los Angeles	1,97	2,479	2,816	2,966	1,59	1,26	1,14	1,05
Chicago	3,621	3,550	3,367	3,005	1,07	0,98	0,95	0,89
Houston	596	938	1,233	1,595	2,04	1,57	1,31	1,29
Philadelphia	2,072	2,003	1,949	1,688	1,06	0,97	0,97	0,87
San Diego	334	573	697	876	2,26	1,72	1,22	1,26
Detroit	1,850	1,670	1,511	1,203	1,18	0,90	0,90	0,80
Dallas	434	680	844	904	1,67	1,57	1,24	1,07
Phoenix	107	439	582	790		4,10	1,33	1,36
San Antonio	408	588	654	787	1,76	1,44	1,11	1,20
San Jose		204	446	629			2,19	1,41
Baltimore	950	939	906	787	1,18	0,99	0,96	0,87
Indianapolis	427	476	745	701	1,17	1,11	1,57	0,94
San Francisco	775	740	716	679	1,22	0,95	0,97	0,95
Jacksonville	205	201	529	541	1,58	0,98	2,63	1,02
Columbus	376	471	540	565	1,29	1,25	1,15	1,05
Milwaukee	637	741	717	636	1,10	1,16	0,97	0,89
Memphis	396	497	624	646	1,57	1,26	1,26	1,04
Washington, DC	802	764	757	638	1,65	0,95	0,99	0,84
Boston	801	697	641	563	1,03	0,87	0,92	0,88

Table 1.7. Population and population change of cities in the United States (1950-1980)[70]

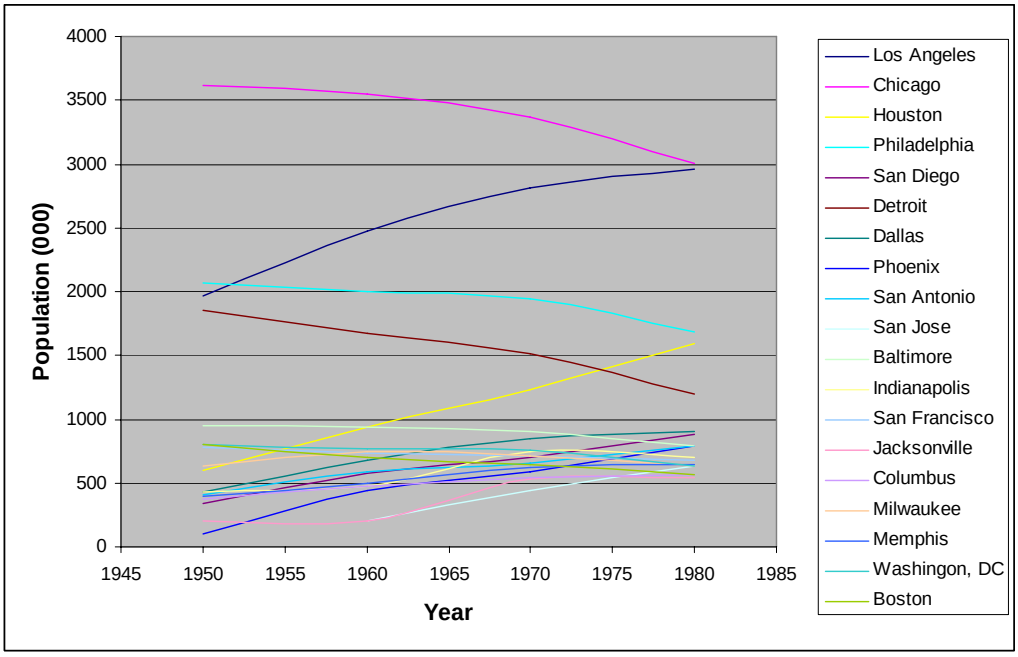


Figure 1.12. Population of cities in the United States 1950-1980[71]

[70] US Census Bureau
[71] US Census Bureau

City	1890	1910	1920	1930	1950	1960	1970	1980	1990	2000
New York	1,515	4,767	5,620	6,390	7,892	7,781	7,895	7,071	7,323	8,008
Los Angeles	50	319	577	1,238	1,970	2,479	2,816	2,966	3,485	3,695
Chicago	1,100	2,185	2,702	3,376	3,621	3,550	3,367	3,005	2,784	2,896
Houston		79	138	292	596	938	1,233	1,595	1,631	1,954
Philadelphia	1,046	1,549	1,824	1,951	2,072	2,003	1,949	1,688	1,586	1,518
San Diego			75	148	334	573	697	876	1,111	1,223
Detroit	286	466	993	1,569	1,850	1,670	1,511	1,203	1,028	951
Dallas	38	92	159	260	434	680	844	904	1,007	1,189
Phoenix					107	439	582	790	983	1,321
San Antonio	38	97	161	232	408	588	654	787	936	1,145
San Jose		77				204	446	629	782	895
Baltimore	434	558	734	805	950	939	906	787	736	651
Indianapolis	105	234	314	364	427	476	745	701	731	782
San Francisco	299	417	507	634	775	740	716	679	724	777
Jacksonville		58	92	130	205	201	529	541	635	736
Columbus	88	182	237	291	376	471	540	565	633	711
Milwaukee	204	374	457	578	637	741	717	636	628	597
Memphis	64	131	162	253	396	497	624	646	610	650
Washington, DC	230	331	438	487	802	764	757	638	607	572
Boston	448	671	748	781	801	697	641	563	574	589

Table 1.8. Population (in thousands) of the largest cities of the United States (1890-2000)[72]

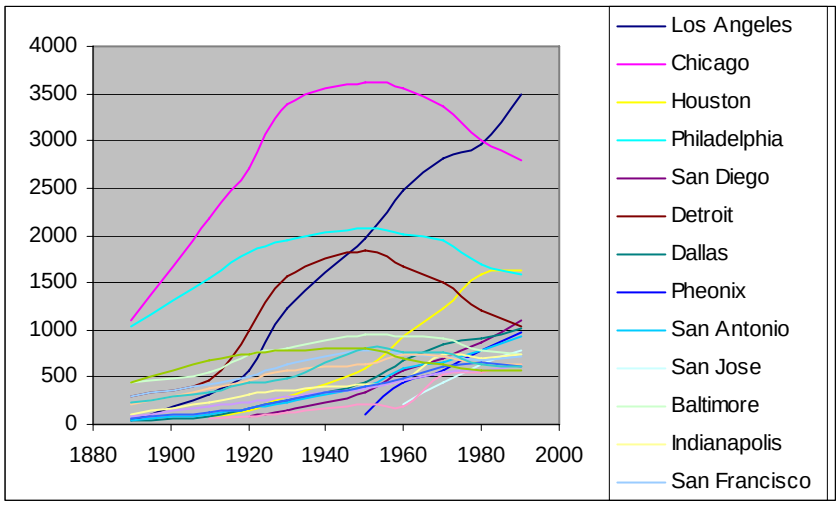


Figure 1.13. Population (in thousands) of a selection of the largest cities of the United States (1890-2000)[73]

[72] US Census Bureau
[73] US Census Bureau

This process of counterurbanisation was mirrored in other parts of the world and it was confirmed to represent a "distinctive and advanced stage of urban development" (Clark, 1996, p. 52). While Hall and Hay (1980) concluded that up until the 1970s, there was no general tendency visible in Europe with regard to the deconcentration of population, subsequent studies provided evidence of urban decline being well established in the Atlantic region (Great Britain and Ireland) and in parts of north, west and central Europe. At that time Spain, Portugal and Italy were still characterised by continuing urban growth. A study of 14 western European countries found that urban population growth had ceased between 1950 and 1980. In seven of those countries, by the end of this period the principal cities were in states of decline, while rural and smaller towns were gaining in population (Clark, 1996). Further research (Champion, 1989) indicated the prevalence of counterurbanisation within the then contemporary processes of urban change in the UK. According to Champion (1989) there was plenty of evidence to demonstrate that deconcentration had replaced concentration as the prime force giving form to the redistribution of urban population in Britain. Furthermore Champion highlighted the fact that these developments were "as important as the major changes in population distribution which took place during the nineteenth and early twentieth centuries" (Champion, 1989, p. 52). More recently Champion has suggested that with retrospect, there is a temptation amongst urban analysts to see 'urbanisation' predominating the in the 1950s, with the acceleration of 'suburbanisation' in the 1960s, and the 1970s emerging as the decade of 'counterurbanisation. While "urbanisation has been seen variously as the increasing concentration of national populations into towns, as the increasing concentration of a country's urban population into the largest cities, and as the increasing concentration of an urban region's population into its core, at the expense of its surrounding ring (…) in effect during the 1950s all three processes were operating side by side quite commonly across the developed world" (Champion, 2001, p. 141).

Other research at the time carried out by Berg *et. al.* (1982), developing the ideas of Hall *et. al.* (1973) resulted in the elaboration of a conceptual model of urban development. This model took into account the dynamic shifts and changes in population within what Berg termed the overall *functional urban region* (FUR). Berg suggested that in the first stage, i.e. *urbanisation*, the central city (or core) grows rapidly, while the suburban (in this case rural) ring around the central city (or core) declines in population or remains constant. In the second stage (*suburbanisation*) the growth of the central city starts to reduce while the population of the suburban ring gradually increases. The proportion of the population living in the ring increases

considerably. In the third stage of the model, ie. *desurbanisation*, the point has been reached where the population of the central city starts declining to such an extent that it results in an absolute decline of the population of the whole *Functional Urban Region* (FUR). *Reurbanisation* might take place when the share of the core population in the total population of the FUR starts to increase once again, wither because the core declines at a slower rate than the ring, or because the core starts to grow again while the ring is still in decline. This overall model can be appreciated schematically in Table 1.9.

Stage of development		Classification type	
I	Urbanisation	1	Absolute centralisation
		2	Relative centralisation
II	Suburbanisation	3	Relative decentralisation
		4	Absolute decentralisation
III	Desurbanisation	5	Absolute decentralisation
		6	Relative decentralisation
IV	Reurbanisation	7	Relative centralisation
		8	Absolute centralisation

Table 1.9. Schematic interpretation of Berg *et.al.*'s model of urban development[74]

Because this model is based upon variations in the direction and rate of population change between the core and the ring, there are two intrinsic types of change – absolute and relative. These changes are absolute when the directions of population change in the two areas are different, such as for example when the core is growing while the ring is declining. On the other hand, the shift is relative when each area has the same direction of change but the rate of change is different. Therefore, a relative shift in the core would occur when both the core and the ring are growing but the population of the core is increasing at a faster rate.

What is important to highlight from this period is that the suburbanisation process reached its zenith in the middle of the 20th Century, generally from the 1950s and 1960s in the United Kingdom and from the 1970s in the United States, giving way to these new phases of urban development analysed in depth through different research projects in both the United States and Europe. These resulted in the identification of a myriad of concepts differing semantically from one another: *counterurbanisation* (Berry, 1976); *absolute* and *relative decentralisation* (Hall and Hay, 1980); *desurbanisation* and *reurbanisation* (Berg et. al., 1982); *desurbanisation* and *urban decline* (Cheshire and Hay, 1986 and 1989). In due course these interpretations would be elaborated upon and carried forward from more Latin-Mediterranean geographical regions with concepts of the *diffuse city* (Indovina et. al., 1990); *periurbanisation* (Dezert, Metton and

[74] Berg *et. al.* (1982)

Steinberg, 1991); *reticular city*, *city without a centre* and *periphery without a centre* (Dematteis, 1991 and 1998); and *metapolis* (Ascher, 1995).

Another key event from this post-war period was that associated with the notion of the *megalopolis*, a notion in reality revisited or at least re-presented by Jean Gottmann in his 1961 treatise of the same name (Gottmann, 1961). However this discussion pertains more to the examination of the dynamics between large cities and the changing role of the world's largest cities, it is considered more appropriate to address attention to these events in the following section, which deals with the notions of world cities, globalization and the inter-city, as opposed to intra-city relations.

1.2.5. Contemporary metropolisation, in the context of mega-cities, World Cities and globalisation

This final section of this chapter addresses issues of metropolitan growth in the context of contemporary urban phenomena. According to Beaverstock *et. al.* (1999) the richness in the variety of the terminology used to describe large and significant cities is indicative of both the diversity in the nature of the cities themselves, and the differences in the approaches used to study such cities. The demographic tradition is largely focused on the size of the cities, while in the functional tradition the focus is upon the cities forming part of a larger system.

The current mega-cities project[75], is aimed towards the human and ecological implications of current and future massive concentrations of population, and clearly falls within the former demographic tradition; whereas studies of world and global cities, interpreted as forming part of the contemporary globalization processes, belong to the latter functional tradition. The issues relating to mega-cities have already been discussed in Section 1.1, highlighting the exponential growth in the number cities of mega-proportions over the last twenty-five years and their preponderance in the less developed regions of the world. On that basis, it seems appropriate to close this broad review of urban processes with a detailed review of a number of trends which have taken place in parallel over the closing stages of the 20th Century, which continue to dominate today and which will undoubtedly carry on being key issues of debate in the near future at least. These trends are related to the development of the notions of world and global cities, under the more functional tradition.

[75] See http://www.megacitiesproject.org/ (consulted 16 October 2005)

1.2.5.1. From *Megapololis* to functional trans-metropolitan geographies

While the *Megalopolis* is frequently cited as being a concept given definition by the French geographer Jean Gottmann (1961), Patrick Geddes had in fact made an oblique reference to it much earlier in his 1915 treatise *The City in Evolution* (Geddes, 1915). Here Geddes suggested that "the expectation is not absurd that the not very distant future will see practically one vast city-line along the Atlantic Coast for five hundred miles, and stretching back at many points; with a total of (…) many millions of population." (Geddes, 1915, pp. 48-49). Baigent (2004) notes that while Geddes indeed used the term 'conurbation' rather than 'megalopolis' to describe this organic form, he had in fact previously made use of the term 'megalopolis' in 1904 in an essay addressing new approaches to education.

As a disciple of Patrick Geddes, Lewis Mumford adopted the term 'magalopolis' and developed it through his writings. Chapter 4 of *The Culture of Cities*, Mumford (1938), is entitled "The rise and fall of Magalopolis" in which the section "A brief outline of Hell" modifies and extends Geddes's ideas concerning the evolution of cities. Here Mumford identified six stages of evolution: i) 'eopolis' (village); ii) 'polis' (association of villages); iii) 'metropolis' (emergence of a capital city); iv) 'megalopolis' (beginning of the decline); v) 'tyrannopolis' (the overexpansion of the urban system based upon economic exploitation); and finally vi) 'nekropolis' (war and famine, city abandoned). Mumford further develops this same somewhat fatalistic interpretation of the "oft-repeated urban cycle of growth, expansion and disintegration" (Mumford, 1961, p.599) in *The City in hi45*

story in Chapters 8 ('Megalopolis into Necropolis') and 17 ('The Myth of Megalopolis'). Here Mumford suggests that "every overgrown megalopolitan centre today, and every province outside that its life touches, exhibits the same symptoms of disorganisation, accompanied by no less pathological symptoms of violence and demoralisation. Those who close their eyes to these facts are repeating, with exquisite mimicry, the very words and acts, equally blind, of their Roman predecessors" (Mumford, 1961, pp. 277-278).

In 1961 Jean Gottmann took inspiration from the term *Megalopolis* used for the proposed new city-state of Ancient Greece and the hope vested therein that it would become the largest of the Greek cities, suggesting that it could be applied to "the unique cluster of metropolitan areas of the Northeastern seaboard of the United States"

where “if anywhere in our times, the dream of those ancient Greeks has come true” (Gottmann, 1961, p. 4).

For Gottmann

> “The Northeastern seaboard of the United States is today the site of a remarkable development – an almost continuous stretch of urban and suburban areas from southern New Hampshire to northern Virginia and from the Atlantic shore to the Appalachian foothills. The process of urbanization, rooted deep in the American past, have worked steadily here, endowing the region with unique ways of life and of land use. No other section of the United States has such a large concentration of population, with such a wide average density, spread over such a large area. And no other section has a comparable role within the nation or a comparable importance in the world. Here has been developed a kind of supremacy, in politics, in economics, and possibly even in cultural activities, seldom attained by an area of this size” (Gottmann, 1961, p.3).

Figure 1.14. Diagram of *Megalopolis* according to Gottmann (1961)[76]

Gottmann suggested that the “almost continuous system of deeply interwoven urban and suburban areas, with a total population of about 37 million people in 1960” provided “the whole of America with so many essential services, of the sort a community used to obtain in its ‘downtown’ section, that it may well deserve the nickname of ‘Main Street of the nation’” (Gottmann, 1961, pp. 7-8).

It is clear from the apocalyptic tone of Mumford’s writings that the arrival of the Megalopolis was far from being something to be applauded. By contrast Gottmann viewed it in very different terms. Indeed he welcomed it as being “the cradle of a new order in the organization of inhabited space” (Gottmann, 1961, p. 9). While Mumford

refers to the Megalopolis as the stage of urban development signifying a point of no return, Gottmann openly acknowledges "the long list of brilliant civilizations that have sunk under pressure of internal decay and external jealousy" (Gottmann, 1961, pp. 12-13). Furthermore he admits that "the type of urban growth experienced here (in the Megalopolis urban region) generates many contrasts, paradoxes, and apparently contradictory trends" but that the challenge was to overcome these: "Megalopolis stands indeed at the threshold of a new way of life, and upon solution of its problems will rest civilizations ability to survive" (Gottmann, 1961, p. 16).

Hall *et. al.* (1973) rightly indicate that the notion of urban continuity has to be seen in functional terms, as not all the territory lying within the megalopolis had to be urbanised in the physical sense. Rather it was a question of contiguous commuting areas interacting in complex ways, with many areas falling under the influence of more than one city. Furthermore the interactions took place at higher levels, resulting in a weave of multitudinous visible and invisible functional linkages, exchanging people, goods and information. In this sense the Northeastern seaboard megalopolis was, at the time of writing, a unique functional and spatial entity both in the United States and at an international level representing "the most complex urban form to appear in world history" (Hall *et. al.*, 1973, p. 47).

Research later carried out and led by Hall during the 1960s and early 1970s led to the identification of just five *megalopolitan* areas around the world, based upon the criterion of contiguous functional urban areas with a minimum population of 20 million inhabitants. All five of these areas shared one essential attribute of a Megalopolis: the notion of their being areas where the functional urban regions which impinge closely upon one another and which might even interpenetrate (Hall *et. al.*, 1973). These examples included a revision of Gottmann's Megalopolis on the East Coast of North America[77]; the Great Lakes Megalopolis in the mid-west of the United States[78]; a Japanese Megalopolis[79]; a north-western European Megalopolis[80]; and finally an English Megalopolis[81] (Hall *et. al.*, 1973).

[76] Source: http://usinfo.state.gov/products/pubs/geography/map3.htm (consulted14.03.06)
[77] 34.2 million inhabitants.
[78] Encompassing Chicago, Detroit and Cleveland, with 19.7 million inhabitants in 1960.
[79] along the main urbanised axis of Honshu, embracing Tokyo, Yokohama, Nagoya and Osaka-Kobe, with approximately 40.5 million inhabitants
[80] This started out from the mouth of the Rhine, extending up the river into the Netherlands and into the industrial Ruhr and beyond, up the Neckar to Stuttgart and beyond, embracing the cities of Amsterdam, Rotterdam, Essen, Dortmund, Duisberg, Düsseldorf, Frankfurt, Mainz, Mannheim and Stuttgart, with a population of some 29.1 million persons in 1960-61.
[81] Termed as the area stretching from the south coast and extending northwards through London and the Midlands, up to Lancashire and Yorkshire, including the cities of London, Birmingham, Manchester, Liverpool, Leeds, Bradford, Sheffield, Nottingham and Leicester. This area had a population of around 32.1 million in 1961.

Gottmann's 1987 revision of his work on the Megalopolis recognised the possibility of other regions of the United States qualifying as *Megalopolitan*: the Midwest and the West Coast, as well as a nascent megalopolis in the South around Atlanta (Gottmann, 1987; and Gottmann and Harper, 1990; both cited in Lang and Dhavale, 2005). However much more contemporary research has suggested the existence of ten "Megalopolitan Areas" stretching across different parts of the United States: Northeast, Midwest, Southland, Piedmont, I-35 Corridor, Peninsula, NorCal, Gulf Coast, Cascadia and Valley of the Sun (Lang and Dhavale, 2005)[82].

Figure 1.15. The spatial distribution of the ten Megapolitans[83]

Figure 1.16. The inter-state connectivity of the ten Megapolitans[84]

[82] Interestingly these same authors cite European publications relating to the cluster of networked metropolitan areas in the form of the EU's global integration zone or "Pentagon", formed by the cities of London, Hamburg, Munich, Milan and Paris – see Chapters 6 and 7 for further details relating to the EU core area.
[83] Lang and Dhavale (2005)
[84] Lang and Dhavale (2005)

These ten areas all fulfil the following criteria: i) the combination of at least two existing metropolitan areas; ii) a projected 2040 population of at least 10 million inhabitants; iii) deriving from contiguous metropolitan and micropolitan areas; iv) constituting an "organic" cultural region with a distinct history and identity; v) occupying a roughly similar physical environment; vi) the linkage of large centres through major transportation infrastructure; vii) forming a functional urban network via goods and service flows; viii) creating a usable geography that is suitable for large-scale regional planning; ix) lying within the United States; and finally x) consisting of counties as the most basic territorial administrative unit.

Megapolitan Areas	2000 Pop.	2003 Pop. Rank	2003 Pop.	2000-2003 Growth	2000-2003 Growth rank	% of 2000 US pop.	% of 2003 US pop.
Northeast	49,182,941	1	50,427,921	2.5	9	17.5	17.3
Midwest	39,489,865	2	40,082,288	1.5	10	14.0	13.8
Southland	20,962,590	3	22,173,291	5.8	4	7.4	7.6
Piedmont	18,391,495	4	19,318,992	5.0	5	6.5	6.6
I-35 Corridor	14,465,638	5	15,315,317	5.9	3	5.1	5.3
Peninsula	12,837,903	6	13,708,165	6.8	2	4.6	4.7
NorCal	11,568,172	7	12,024,173	3.9	8	4.1	4.1
Gulf Coast	11,533,241	8	12,064,600	4.6	6	3.7	3.7
Cascadia	7,115,710	9	7,412,248	4.2	7	2.5	2.6
Valley of the Sun	4,095,622	10	4,486,206	9.5	1	1.5	1.5
Megapolitan Total	189,643,177		197,013,201	3.9		67.4	67.8
United States*	281,421,906		290,788,976	3.3			

Table 1.10. Megapolitan population and growth in the United States[85]

As can be seen from Table 1.10, these ten *Megapolitan* areas together comprise over two-thirds of the population of the United States, amounting to some 200 million persons. However this population lies concentrated within a spatial extension representing just under 20% of the total land area. Figure 1.16 emphasises the importance of the interstate highway networks of the Megapolitan areas, facilitating the inter-connectivity between the large centres.

The authors of this research argue of the current need for a formal institutional recognition of the Megapolitan concept, at least as it stands within the United States. They suggest that Gottmann's 1961 treatise had little policy impact on spatial definition, owing principally to the fact that his work was focused on just one area. However "the combination of fast growth and massive decentralization (has) transformed once distant cities into galaxies and corridors of linked urban space" (Lang and Dhavale, 2005, p.

[85] Lang and Dhavale (2005)

24). The clear existence of these ten Megapolitan geographies adds weight to the need for an institutional response from the U.S. Census Bureau.

1.2.5.2. From de-industrialisation to globalisation

In general terms it is reasonable to say that as from the 1970s, the cities of the western world began to lose their traditional productive functions, which in the 1980s gave way to urban economic restructuring and new forms of global competition. In the context of a major shift in the economic order, the notion of the World-city (Friedmann and Wolff, 1982) gained acceptance as did that of the global cities (Sassen, 2001a dn 2001b), all giving rise to the notions of globalisation, and the emergence of the post-Fordist (Lever, 2001) or post-industrial (Shaw, 2001) cities.

While as early as 1915 Patrick Geddes had given indications of the existence of 'world cities' (Geddes, 1915), Peter Hall's analysis of London, Paris, Randstad, Rhine-Ruhr, Moscow, New York and Tokyo (Hall, 1966) is often citied as the first study of the global urban hierarchy. These cities were at the top of the global hierarchy owing to their importance of their functional capabilities, relating to power and influence in politics, trade, communications, finance, education, culture and technology.

However more than 30 years later in providing his overview of the rise of the global-informational city, Hall himself pays homage to Manuel Castells and Saskia Sassen for their respective contributions to understanding the changes in the international economic order in the closing stages of the 20th Century. To Castells, Hall acknowledges his contribution in examining the nuances of the informational mode of development, by way of the convergence between the interaction of information technologies and information-processing activities into an articulated techno-organizational system. Indeed for Castells "informational technology advances have powerfully boosted the system, contributing to increasing rates of profit, accelerating internationalisation, and engendering a new policy agenda on the part of governments, to foster capital accumulation at the expense of social redistribution" (Hall, 2004, p. 405). The emerging regional and urban geography became characterised by clear divisions of labour, with the decentralisation of productive functions and with informational industries staying in highly concentrated innovative urban locations. As a consequence high-level decision making became ever more centralised, with other activities being decentralised locally, within major metropolitan urban regions, or more widely further a field (Hall, 2004).

Sassen's analysis was similar, in the sense of identifying the dispersal of productive manufacturing out of the former industrial centres (de-industrialisation), matched by the

local decentralisation of office based activities, but with the enormous increase throughout the 1980s in international financial activity and service transactions, concentrated in a few countries and cities. However for Sassen the geographical dispersal of factories and offices, and service outlets and the reorganization of the financial services industry led to the creation of a need for centralised management and regulation in a few key locations, characterised by the existence of banks and corporate headquarters, corporate service firms and non-bank financial institutions. Moreover what was seen throughout the 1980s was the change in the nature of the financial services industry to become a commodity, with the exchange of instruments becoming an end in itself. The leading centres of this new spatial configuration were the three global cities of New York, London and Tokyo, functioning "as a single transnational marketplace" (Sassen, 1991, cited in Hall, 2004, p. 407).

Hall interprets this change as the emergence of a new division of labour on a global scale – a change from the division based upon the manufactured product characteristic of the British industrial conurbations seen previously under Section 1.2.2.2 for example cotton from Lancashire and steel from Sheffield) to one based upon process (such as the global finance (London and New York), back office activities characteristic of many secondary cities (Berkshire and Westchester) and direct telephone sales (Leeds and Omaha). The decentralisation to a lower-cost location or the wholesale relocation of economic activity, whether it be in the form of manufacturing or services activities, has resulted in the clustering of extremely specialised activities based upon access to information, such as speculative financial services, specialized business services, media services to name a few, all characteristic of contemporary era of globalisation (Hall, 2002).

1.2.5.3. Re-metropolisation

A number of authors have suggested that the world's largest metropolitan are now entering into a new phase of urbanisation which can be termed re-metropolisation, in the light of population increases of some of the world's largest metropolitan urban regions. For example, the population of Greater London increased by some 8.1% over the twenty year period between 1981 and 2001. In a similar vein, the population of New York rose from a low point of 7.071 million persons in 1981 to an estimated 8.104 million persons in 2004, representing a 14.6% increase.

Champion and Fischer (2004) do not deny the upturn in the demographic dynamism of the English metropolitan cities since the 1970s. In that period, Greater London and the six metropolitan counties witnessed the loss of 1.25 million people, while up until 2001 the projections were for an estimated increase in population of some 25,000 persons. Greater London has gained a population of 500,000 persons in the period 1981-2001, compared with the loss of 750,000 during the 1970s. However the six metropolitan counties lost some 480,000 persons over the 1981-2001 period, with combined losses of some 214,000 persons in their principal cities.

	Population (thousands)		Change (% for period)
Area	1981	2001	1981-2001
Greater London	*6,805.6*	*7,307.9*	*7.4*
Metropolitan counties	*11,353.5*	*10,876*	*-4.2*
Greater Manchester	2,609.1	2,512.3	-4.1
Merseyside	1,522.2	1,365.6	-10.3
South Yorkshire	1,317.1	1,266.5	-3.8
Tyne and Wear	1,155.2	1,077.9	-6.7
West Midlands	2,673.1	2,570.1	-3.9
West Yorkshire	2,066.8	2,083.6	0.8
Principal cities	*3,550.1*	*3,336.6*	*-6.0*
Birmingham	1,020.6	985.9	-3.4
Leeds	717.9	715.6	-0.3
Liverpool	517.0	442.3	-14.4
Manchester	462.7	418.6	-9.5
Newcastle upon Tyne	284.1	261.1	-8.1
Sheffield	547.8	513.1	-6.3

Table 1.11. Population change since 1981 for England's main conurbations and principal cities, based on revised estimates for 2001[86]

By way of comparison, looking at the populations of the ten most populous metropolitan areas of the United States over the same 1980-2000 period, it can be seen that all of

[86] Champion and Fisher (2004)

these underwent population increases. However of the ten principal cities pertaining to these metropolitan areas, only New York, Los Angeles, Houston, Dallas, San Francisco and Boston gained population over the twenty year period. The remaining four cities all lost population: with losses of 0.4% in Chicago; 10.1% in Philadelphia; 10.3% in Washington DC and 24% in Detroit.

City	Population (thousands) 1980	2000	Change (% for period) 1981-2001
New York	7,071	8,008	13.3
Los Angeles	2,966	3,695	24.6
Chicago	3,005	2,896	-0.4
Washington, DC	638	572	-10.3
San Francisco	679	777	14.4
Philadelphia	1,688	1,518	-10.1
Boston	563	589	4.6
Detroit	1,203	951	-21
Dallas	904	1,189	31.5
Houston	1,595	1,954	22.5

Table 1.12. Population change of the 10 most populous cities of the United States (1980-2000)[87]

Clearly is the contemporary era of globalisation, with the breakdown of international trade barriers, the transnational and international movement of financial and human capital, and the ever-increasing importance place upon the collective strengths of macro-regional trading blocs in terms of international competitiveness[88], the interaction between cities, and especially between large cities, has taken on new importance of an hitherto unwitnessed nature. While the study of intra-city relations continues to be of fundamental importance, there is a growing research agenda addressing the nuances and subtleties that can be found operating at the inter-city scale in this 21st Century. Taylor and Lang (2004) identified some 100 concepts for describing what they termed recent urban change, distinguishing between new metropolitan form, for describing the morphological agglomerations of metropolitan 'urbs' as they exist at the start of the 21st Century, and inter-city relations. This list is reproduced in Table 1.13. The authors make no claim that this list be considered exhaustive. However it is indicative of the richness and diversity of the terminology in current usage to express the form and function of cities, and in particular large cities, and the functional intercity relations.

[87] US Census Bureau
[88] See the weight placed upon the comparative statistics between the United States and the European Union in Section I.3 Territorial cohesion: towards a more balanced development, in the *Second report on economic and social cohesion* (CEC, 2001c)

A.	Names given to new metropolitan form	B.	Names given to intercity relations
1	Anticity	1	Archipelago economy
2	Boomburb	2	Chain of metropolitan areas
3	Cities à la carte	3	Cities in global matrices
4	Concentrated decentralization	4	Cross-border network of global cities
5	Countrified city	5	Functional world city system
6	Disurb	6	Global city network
7	Edge city	7	Global city system
8	Edge county	8	Global competition among cities
9	Edgeless city	9	Global grid of cities
10	Exit ramp economy	10	Global metropolitanism
11	Exopolis	11	Global network of cities
12	Galactic city	12	Global network of financial centres
13	Limitless city	13	Global network of major metropolitan management centres
14	Major diversified centre	14	Global network of nodes and hubs
15	Megacentre	15	Global system of cities
16	Megacounty	16	Global urban hierarchy
17	Megalopolis unbound	17	Global urban network
18	Metrapolitan-level core	18	Global urban system
19	Metropolitan suburb	19	Global web of cities
20	Metrotown	20	Hierarchical global system of urban places
21	Mini-city	21	International global-local networks
22	Miny-downtown	22	International hierarchy of cities
23	Multicentred net	23	International systems of interlinked cities
24	Net of mixed beads	24	International urban system
25	Nrw downtown	25	Internationally networked urban spaces
26	Outer city	26	Lynchpins in the spatial organization of the world economy
27	Outtown	27	Metropolitan hierarchy exercised throughout the world
28	Penturbia	28	Neo-Marshallian nodes in global networks
29	Regional city	29	Network of world cities
30	Regional town centre	30	Nodal centres of the new global economy
31	Rururbia	31	Nodes in global networks of institutional arrangements
32	Servurb	32	Planetary urban networks
33	Slurbs	33	System of major world cities
34	Spillover city	34	System of world cities
35	Spread city	35	Transnational system of cities
36	Sprinkler city	36	Transnational urban system
37	Stealth city	37	Transnational urbanism

38	Subcentre	38	World city actor network
39	Suburban business centre	39	World city hierarchy
40	Suburban downtown	40	World city network
41	Suburban employment centre	41	World city system
42	Suburban freeway corridor	42	World hierarchy of financial centres
43	Suburban growth corridor	43	World relations of cities
44	Suburban nucleation	44	World system of cities
45	Technourb	45	World system of metropolises
46	The new heartland	46	World urban hierarchy
47	Urban core	47	World urban system
48	Urban galaxy	48	World-systems city system
49	Urban realm	49	Worldwide grid of global cities
50	Urban village	50	Worldwide grid of strategic places

Table 1.13. 100 concepts describing recent urban change[89]

[89] Taylor and Lang (2004)

Concluding remarks

This chapter has sought to highlight some of the principal processes of urbanisation from the beginning of the 19th Century up until the present day, as they impinge upon metropolitan growth and dynamics across the western world. Many of these processes have tended to repeat themselves, but in different cultural contexts and periods, and rarely obeying the same rhythm. Of prime interest within the framework of the thesis is the surge in metropolitan growth – the moment when cities experienced an unprecedented level of growth and evolved from large expanding cities to metropolitan urban regions.

As will be seen in Chapter 2, this process occurred later in Spain than in the rest of Western Europe, and even within Spain itself there were marked differences between the different cities and regions.

As a final comment, Table 1.14 seeks to contextualise these processes in a rudimentary chronology of the principal events and theoretical contributions in the evolution of metropolitan urbanisation processes and metropolitan thought over the period studied within this chapter.

Year	Observations
1800	Population of London reached 959,310 persons and that of Paris exceeded 500,000 persons
1829	Robert Peel's *London Metropolitan Police Act*
1836	Inauguration of London's first passenger railway 29 December
1855	Metropolis Local Management Act in London, leading to the creation of the Metropolitan Board of Works (MBW)
1863	London's Metropolitan Railway opened 19 January
1884	London's Inner Circle underground line completed
1898	Ebenezer Howard published *Tomorrow: a Peaceful Path to Real Reform*
1899	Creation of *London County Council* and the lower tier of 28 metropolitan boroughs
1900	Population of Greater London and New York had reached 6.5 mill. persons and 3.4 mill. persons respectively
1902	Ebenezer Howard reissued *Tomorrow: a Peaceful Path to Real Reform* under the title *Garden Cities of Tomorrow*
1904	First segment of New York's *Interborough Rapid Transit Subway* (IRT) opened on 27 October 1904
1909	First properly planning legislation in the England and Wales – the Housing and Town Planning Act – and the publication of the first metropolitan plan in the United States – the Plan of Chicago by Daniel Burnham
1910	U.S. Census Bureau formally recognised the notion of *metropolitan districts*
1915	Patrick Geddes published *Cities in Evolution*
1922	Inauguration of the *Regional Plan of New York*, under the direction of Thomas Adams.
1931	Final volume published of the multi-volume *Regional Plan of New York*
1944	Publication of Patrick Abercrombie's *Greater London Plan*
1947	Landmark 1947 Town and Country Planning Act for England and Wales
1950	U.S. Census Bureau introduces the concept of 'metropolitan statistical area' (1950) UN estimates that 29% of the world's population is of an urban nature
1960	World's urban population reached 1 billion persons
1961	Jean Gottmann published *Megalopolis: the urbanised north-eastern seaboard of the United States*
1965	Kingsley Davis published 'The Urbanisation of the Human Population', suggesting that world urbanization obeys a simple logistic curve
1966	Peter Hall published *The World Cities*
1973	Peter Hall published *The Containment of Urban England*

1975	UN name 4 world urban agglomerations[90] of *megacity* proportions UN estimate that 37% of the world's population is of an urban nature
1985	World's urban population reached 2 billion persons
1991	Joel Garreau published *Edge City: Life on the New Frontier* and Saskia Sassen published *The Global City: New York, London, Tokyo*
2000	United Nations estimate that 47% of the world's population is of an urban nature UN names 20 world urban agglomerations[91] of *megacity* proportions
2002	World's urban population reached 3 billion persons
2007	UN projections suggested that the urban proportion of the world's population would exceed the rural proportion
2015	UN projections suggest that there will be 22 world urban agglomerations[92] of *megacity* proportions

Table 1.14. Thematic chronology of principal events and theoretical contributions in the evolution of metropolitan urbanisation processes and metropolitan thought 1800-2015

[90] Tokyo, New York, Shanghai and Mexico City
[91] Tokyo, Mexico City, New York, São Paulo, Mumbai, Delhi, Calcutta, Buenos Aires, Shanghai,, Jakarta, Los Angeles, Dhaka, Osaka-Kobe, Rio de Janeiro, Karachi, Beijing, Cairo, Moscow, Metro Manila and Lagos.
[92] Tokyo, Mumbai, Delhi, Mexico City, São Paulo, New York, Dhaka, Jakarta, Lagos, Calcutta, Karachi, Buenos Aires, Cairo, Los Angeles, Shanghai, Metro Manila, Rio de Janeiro, Osaka-Kobe, Istanbul, Beijing, Moscow and Paris.

PART II: SPAIN: THE PROCESSES OF METROPOLISATION

"(…) cal destacar la bicefàlia del sistema urbà espanyol, amb una marcada semblança poblacional entre les dues regions metropolitans més importants del país, i que en l'àmbit europeu se situen a nivell poblacional per darrera de Londres, París, el Randstad holandès i el Ruhr, i per davant d'altres capitals importants com Berlín, Roma, Lisboa, Atenes (…)"

Antonio Font (2004) *The explosion of the city: morphologies, observations and motions* (pp. 240-241).

CHAPTER 2. – METROPOLISATION IN SPAIN

Introduction

The key distinguishing feature of the urbanisation processes experienced in Spain throughout the 20th Century was that delay with which it occurred compared with other Western and Northern European countries. Planners and urban geographers alike agree that this delay was caused by a number of interconnected and overlapping reasons, principally revolving around a slower modernisation of agriculture and a slower pace of industrialisation (Arias and Borja, 2007; Font, 2004; Nel·lo, 2004; Nel·lo and Muñoz, 2004; and Reher, 1994). Indeed the modernisation of industry did not begin to take place in Spain until the mid-1950s and as a consequence even by the end of the 1950s, close to half the Spanish population still resided in towns with populations of less than 20,000 inhabitants (Reher, 1994).

Font (2004) asserts that the ensuing urbanisation from this period changed Spain's historical urban system, i.e. from an urban system comprising a number of old historic cities as well as much more recent cities, to one in which the formation of the metropolitan urban regions of Madrid, Barcelona, Valencia, Sevilla, Bilbao, Málaga and Zaragoza all stand out. The polarisation of industrial growth witnessed in the mid to late-1950s and 1960s in a number of urban areas led to the formation of Madrid and Barcelona as "metropolises on a European level" with the other five representing "main urban regions on a national level" (Font, 2004, p. 240).

Indeed the similarities between Spain's two most significant urban regions prompts Font to describe the urban system as *bicephalous* (Font, 2004). There would appear to be certainty in this description, in light of an initial interpretation of the scale of the population of the metropolitan urban regions[93], from a functional perspective, according to the 2001 Census. These figures indicate populations of 5.8 million and 4.5 million inhabitants for Madrid and Barcelona, with considerably lower populations for the remaining five urban regions[94].

[93] The definition of the spatial extent of these metropolitan urban regions will be provided in Chapter 2 (The spatial dimensions of the Spanish metropolitan system) with analyses of their respective social and economic structures in Chapters 4 and 5.
[94] Valencia = 1.75 mill. inhab.; Sevilla = 1.4 mill. inhab.; Bilbao = 1.1 mill. inhab; Zaragoza = 772,000 inhab. and Málaga = 727,000 inhab.

Against this general background, this chapter takes an historical approach to examine the institutional recognition of the growing metropolitan dynamics in Spain, through the establishment of public bodies and organisations with planning and development responsibilities at a metropolitan scale, i.e. stretching beyond the administrative limits of the largest and most important cities. This approach looks back to the 1940s when the first public responses were made to the evolving needs for public management at a wider than strictly municipal scale. The chapter also examines the historical growth of the larger parts of what would become Spain's principal metropolitan urban regions, in order to determine the precise historical moment of this metropolitan expansion. This is carried out by examining population data from the mid-19th Century and over the successive Census periods up until 2001, and comparing the growth of the central cities of each of the metropolitan urban regions, with that of the immediately wider urban regions and the Provinces.

2.1. Early metropolitan 'governance'

It is appropriate to indicate that by 1930 the city populations of both Madrid and Barcelona had surpassed the levels 1 million inhabitants, thereby falling within the category of 27 such cities at a global level identified by Mumford (Mumford, 1961). By 1930, Madrid had a population of 1,137,943 inhabitants, compared with Barcelona's population 1,005,565 inhabitants, having increased by 97% and 84% respectively since 1900. Over the same 30 year period the populations of the other principal Spanish cities all noted significant increases in population, albeit to lesser degrees - Bilbao (74%); Zaragoza (72%); Sevilla (54%); Valencia (49%); and Málaga (38%).

By the 1940s, the concern over planning and development issues in Spain's large cities led to specific legislation being passed relating to wider territorial areas beyond the strict administrative limits of the central municipalities. The *Ley de 25 de noviembre de 1944*, later articulated by the *Decreto de 1 de marzo de 1946* led to the creation of *Gran Madrid*. This Decreto in turn led to the elaboration of planning law for the *Gran Madrid* area. Bilbao was the next large city to benefit from being subjected to similar special legislative treatment, with the creation of *Gran Bilbao* through the *Ley de Gran Bilbao* dated 1 March 1946. The *Ley de la Corporación Administrativa del Gran Valencia* of 14 October 1949 created *Gran Valencia*. Then in 1953, the *Ley de Ordenación de Barcelona y su Comarca* (3 December1953) approved a Plan affecting Barcelona and the 26 other municipalities contained within its *Comarca* (County) (MAP, 2001).

Some 10 years later the *Ley 121/1963, de 2 de diciembre* made use of the term *Área Metropolitana de Madrid*, through the creation of the *Comisión de Planteamiento y Coordinación del Área Metropolitana* (COPLACO) (MAP, 2001). Around the same time the revision of the 1953 *Pla Comarcal* for Barcelona led to the creation of an *Esquema de Pla Director de l'Àrea metropolitana de Barcelona*, widening the area of coverage to include all the 162 municipalities lying within the *Regió I* (Barcelonès, Baix Llobregat, Vallès Occidental, Vallès Oriental and Maresme) as well as Garraf and l'Alt Penedès (Roca et.al., 1997).

In 1974 the *Corporació Metropolitana de Barcelona* (CMB) was created, albeit for a reduced spatial area, comprising that of the 27 municipalities coming under the jurisdiction of the 1953 *Pla Comarcal*, but nevertheless in recognition of the need for a form of metropolitan governance. The CMB was the driving force behind the 1976 *Pla General Metropolità* (Roca et.al., 1997).

However following the return to democracy after the 1978 Spanish Constitution, what was witnessed was a gradual suppression of the multifunctional metropolitan institutions by the recently established Autonomous Communities, as occurred in Madrid, Barcelona, Valencia and Bilbao. In the case of Madrid the *Real Decreto 1992/1983, del 20 de julio de 1983*, transferred the responsibilities of spatial planning, urbanism and the environment from the COPLACO directly to the Autonomous Community (MAP, 2001).

In the case of Valencia, the new era of Autonomous Government also witnessed the transferral of the responsibilities of planning from the *Corporación Administrativa Gran Valencia* to the *Comunidad Valenciana*, by way of the *Real Decreto 299/1979, de 26 de enero*. Later in 1986 the *Corporación Administrativa Gran Valencia* was extinguished by the Ley de las Cortes Valencianas 5/1986, de 19 de noviembre, substituting it with the *Consell Metropolità de L'Horta* (MAP, 2001).

In the case of Bilbao, the *Ley 3/1980, del 18 de diciembre* of the Basque Parliament extinguished the *Corporación Administrativa Gran Bilbao* (CAGB) metropolitan entity (MAP, 2001).

With regard to Barcelona and the fate which the CMB was forced to face, parallels with London easily come to mind to mind in the context of the abolition of the *Greater London Council*, in 1986, and the *Corporació Metropolitana de Barcelona*, in 1987, by the respective conservative political forces of the times (Burns, 2003). With the election of the British Labour Government in 1997 the reconstitution of the GLC in the form of the Greater London Authority (GLA)[95] was one of the first priorities. One of the electoral pledges of the Catalonian Socialist Party (PSC) in the Regional Government Campaign of 2003 was the restoration in some form of a body, similar in its constitution to the former Metropolitan Corporation, with a range of responsibilities for Barcelona and its adjoining municipalities. Regrettably this was not achieved during the period of the 2003-2006 legislatures and ironically it was one of the lamentations of the outgoing President of the PSC contained in a letter published in the press in June 2007[96] (Maragall, 2007).

[95] http://www.london.gov.uk

[96] "(…) Y todavía falta la recuperación total del Área Metropolitana de Barcelona, en mala hora suprimida el año 1987 por las leyes territoriales del gobierno convergente - poco después de la supresión del Greater London Council por la señora Thatcher-. (...) Inmediatamente después de la victoria subsiguiente de Tony Blair, el Greater London Council de

Suffice to say that to this day Spain is devoid of any sort of publicly elected body with responsibilities for metropolitan governance. In all parts of the country the public administration is divided principally between the regions, the provinces and the municipalities, and local planning and development issues are the responsibilities of the municipalities. It seems ironic that the early signs of visionary outlooks in the era of the expansion of the largest cities, as reflected in the legislation of the times, were so short lived and in the long-term resulted in their complete suppression.

Ken Livingstone fue reinstaurado. Pero el Área Metropolitana de Barcelona aún no ha sido recuperada. El PSC no quiso hacer un gesto similar en su momento. (...)" Maragall (2007).

2.2. Comparative metropolitan dynamics

At this stage it is appropriate to take an historical approach and systematically examine the evolution in the demographic growth of the seven principal metropolitan urban regions on a decade by decade basis, starting from the mid-1880s up until the most recent Census of 2001, to determine exactly when the surges in population took place. Did all the metropolitan urban regions experience a rupture in population growth around the same time? Was there a clear differentiation between the cases of Madrid and Barcelona, with the other metropolitan regions lagging behind? Was there a north-south divide? For this purpose the demographic dynamics of the central cities of each of the seven metropolitan urban regions are traced against the population dynamics within each of the corresponding Provinces, as well as against wider urban agglomerations representing early approximations of metropolitan governance.

Starting with Madrid, the metropolitan agglomeration used is that of the *Área Metropolitana de Madrid*[97] dating from 1963. This territorial unit was established under the *Ley 121/1963, de 2 de diciembre* which also created the Comisión de Planeamiento y Coordinación del Área Metropolitana (COPLACO).

In the case of Barcelona, two wider territorial agglomerations are referred to – the agglomeration known as *Barcelona de les Rondes* and that which fell under the jurisdiction of the *Corporació Metropolitana de Barcelona* (1953). The former of these includes Barcelona and some 12 adjoining municipalities[98], with a total land area of 222.65 km^2, lying within the wider-Barcelona's outer ring-roads. This designation is still in usage today, referring in broad terms to the most-immediate built-up area or urban continuity of Barcelona. The latter designation comprises 27 municipalities in total, the 13 of the *Barcelona de les Rondes* grouping as well as 14 other adjoining municipalities[99]. The RMB comprises a total of 164 municipalities, covering Barcelona, the entire CMB and some 137 municipalities lying beyond the fringe of the CMB.

[97] Alcobendas, Alcorcón, Boadilla del Monte, Brunete, Colmenar Viejo, Coslada, Getafe, Leganés, Madrid, Majadahonda, Mejorada del Campo, Paracuellos de Jarama, Pinto, Pozuelo de Alarcón, Rivas-Vaciamadrid, Rozas de Madrid (Las), San Fernando de Henares, San Sebastián de Los Reyes, Torrejón de Ardoz, Velilla de San Antonio, Villanueva de la Cañada, Villanueva del Pardillo and Villaviciosa de Odón.

[98] Badalona, Barcelona, Cornellà de Llobregat, Esplugues de Llobregat, l'Hospitalet de Llobregat, Montgat, El Prat de Llobregat, Sant Adrià de Besòs, Sant Feliu de Llobregat, Sant Joan Despí, Sant Just Desvern, Santa Coloma de Gramenet and Tiana.

[99] Badalona, Barcelona, Castelldefels, Cerdanyola del Vallès, Cornellà de Llobregat, Esplugues de Llobregat, Gavà, Hospitalet De Llobregat (L'), Molins de Rei, Montcada i Reixac, Montgat, Pallejà, Papiol (El), Prat de Llobregat (El), Ripollet, Sant Adrià de Besos, Sant Boi de Llobregat, Sant Climent de Llobregat, Sant Cugat del Vallès, Sant Feliu de Llobregat, Sant Joan Despí, Sant Just Desvern, Sant Vicenç dels Horts, Santa Coloma de Cervelló, Santa Coloma de Gramenet, Tiana and Viladecans.

With regard to Valencia, the *Horta* designation is used, comprising 45 municipalities[100], which was created in 1986.

In the case of Sevilla, the unit of territorial analysis is the *Aglomeración Urbana de Sevilla* (Junta de Andalusia, 1996a) which covers some 22 municipalities[101].

For Bilbao the 26 municipalities[102] of the *Bajo Nervión* designation are drawn upon, corresponding in general terms to the spatial extent of the *Bilbao Metropolitano* designation in usage today.

Given the enormous weight of the municipality of Zaragoza within the wider spatial configuration, both in demographic and spatial extension terms, no wider territorial agglomeration is used against which to gauge the growth of the municipality throughout the period under review.

Finally the *Aglomeración Urbana de Málaga* (Junta de Andalusia, 1996b), incorporating 10 municipalities[103], is the wider territorial unit used for comparison between the central municipality and the outer limits of the Province.

The corresponding populations of these wider territorial agglomerations, summarised in Table 2.1, are all examined in turn in Sections 2.1.-2.2., together with the populations of the central municipalities and the Provinces within which they lie. What needs to be emphasised is that the populations of the central municipalities are taken as those populations lying within the territories corresponding to the administrative limits as they stood in 2001 – i.e. they take account of all the modifications which have taken place since 1857 with regard to step-by-step incorporation of previously free-standing municipalities. Details of the exact composition of the central municipalities are provided in each case.

[100] Alaquàs, Albal, Albalat dels Sorells, Alboraya, Albuixech, Alcácer, Aldaia, Alfafar, Alfara del Patriarca, Almàssera, Benagéber, Benetússer, Beniparrell, Bonrepòs i Mirambell, Burjassot, Catarroja, Emperador, Foios, Godella, Lugar Nuevo de La Corona, Manises, Massalfassar, Massamagrell, Massanassa, Meliana, Mislata, Moncada, Museros, Paiporta, Paterna, Picanya, Picassent, Pobla de Farnals (La), Puçol, Puig, Quart de Poblet, Rafelbuñol/Rafelbunyol, Rocafort, Sedaví, Silla, Tavernes Blanques, Torrent, València, Vinalesa and Xirivella.

[101] Alcalá de Guadaira, Algaba (La), Almensilla, Bormujos, Camas, Castilleja de Guzmán, Castilleja de la Cuesta, Coria del Río, Dos Hermanas, Espartinas, Gelves, Gines, Mairena del Aljarafe, Palomares del Río, Puebla del Río (La), Rinconada (La), Salteras, San Juan de Aznalfarache, Santiponce, Sevilla, Tomares and Valencina de la Concepción.

[102] Abanto y Ciervana/Abanto Zierbena, Alonsotegi, Arrigorriaga, Barakaldo, Basauri, Berango, Bilbao, Derio, Erandio, Etxebarria, Galdakao, Getxo, Larrabetzu, Leioa, Lezama, Loiu (Lujua), Muskiz, Ortuella (Santurzi), Portugalete, Santurtzi, Sestao, Sondika, Valle De Trapaga-Trapagaran (San Salvador), Zamudio, Zaratamo and Zierbena.

[103] Alhaurin de la Torre, Alhaurin el Grande, Almogia, Benalmadena, Cártama, Casabermeja, Málaga, Rincon de la Victoria, Totalan and Torremolinos.

It needs to be pointed out that the order of the treatment of each of the analysis of these seven Spanish cities corresponds to the descending order of the magnitude of their populations according to the 2001 Census, details of which as referred to earlier, will be fully explored in Chapter 4 (*The social structure of the Spanish metropolitan system*).

The exploration of this chapter is aimed fundamentally at determining the historical peaks in the population in the metropolitan urban regions, as well as the peak moments of demographic change, in both absolute and relative terms. In order to aid in the understanding of the metropolitan dynamics, clear differentiations are made the central municipalities, the territorial 'approximations' to the metropolitan urban regions as illustrated in Table 2.1, the remainder of the Provincial areas, i.e. the areas within the ring lying between the outer limits of the Province and beyond the outer limits of the territorial 'approximations', as well as the Provinces themselves.

City	Wider territorial (metropolitan) agglomeration	No. of municipalities	Land area (km^2)
Madrid	Área Metropolitana de Madrid	23	1,701
Barcelona	Corporació Metropolitan de Barcelona	27	476
Valencia	Horta	45	690
Sevilla	Aglomeración urbana de Sevilla	22	1,387
Bilbao	Bajo Nervión	26	386
Zaragoza		1	1,063
Málaga	Aglomeración urbana de Málaga	10	971

Table 2.1. Summary of the wider territorial (metropolitan) agglomerations

2.2.1. Madrid[104]

Examining Madrid, one finds tendencies for the phasing of the peak populations of the central municipality and the surrounding metropolitan urban region, albeit that these were concentrated entirely within the period between 1960-1981. The highest increase of population in the central municipality[105] in absolute terms (886,140 persons) took place in the decade leading up to 1970, marking the highest relative increase (39%) since 1900. The periods between 1857 and 1877, and 1877 and 1900 had seen relative increases of 40% and 38% respectively, though in absolute terms these increases were comparatively low.

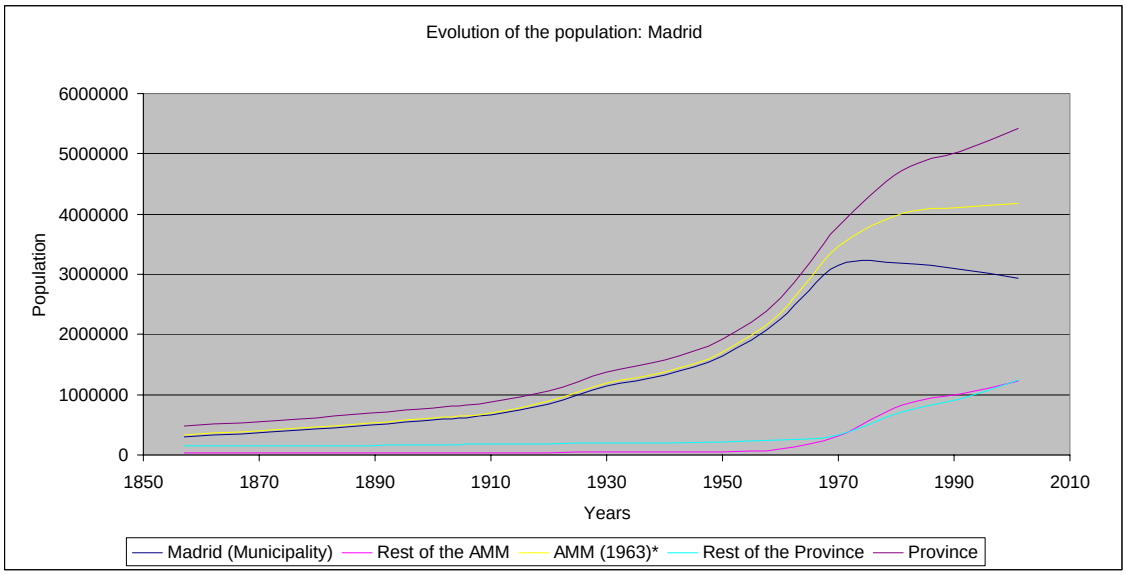


Figure 2.1. Evolution of the population of Madrid (1857-2001)[106]

The peak in the evolution of the population within the wider territorial agglomeration, corresponding to the area which would come under the jurisdiction of the *Área metropolitan de Madrid* in 1963, took place over the 1960-1970 period, witnessing an increase of more than 1.1 million persons and thereby representing a 47% increase over the decade. The following three decades also saw a decline in the level of population growth within the wider territorial agglomeration, but at more moderate levels than those experienced in the central municipality – increases of just 16%, 2% and 2% once again in the decades 1970-81, 1981-1991 and 1991-2001 respectively.

[104] The central municipality of Madrid; the rest of the Área Metropolitana de Madrid; the Área Metropolitana de Madrid; the rest of the Province; and the Province of Madrid.
[105] Madrid includes the former municipalities of La Alameda, Aravaca, Barrajas de Madrid, Canillas, Canillejas, Carabanchel Alto, Carabanchel Bajo, Chamartín de la Rosa, Fuencarril, Hortaleza, Pardo (El), Vallecas, Vicalvaro and Villaverde.
[106] INE (own elaboration)

However what is of particular interest is to observe the dynamics that took place within the wider territorial agglomeration itself. In the outer area of this agglomeration, ie. the are beyond the administrative limits of the central municipality of Madrid ('rest of the AMM' in Table 2.2), the decade 1960-1979 saw an increase of over 220,000 persons which represented a 219% relative increase over the previous decade.

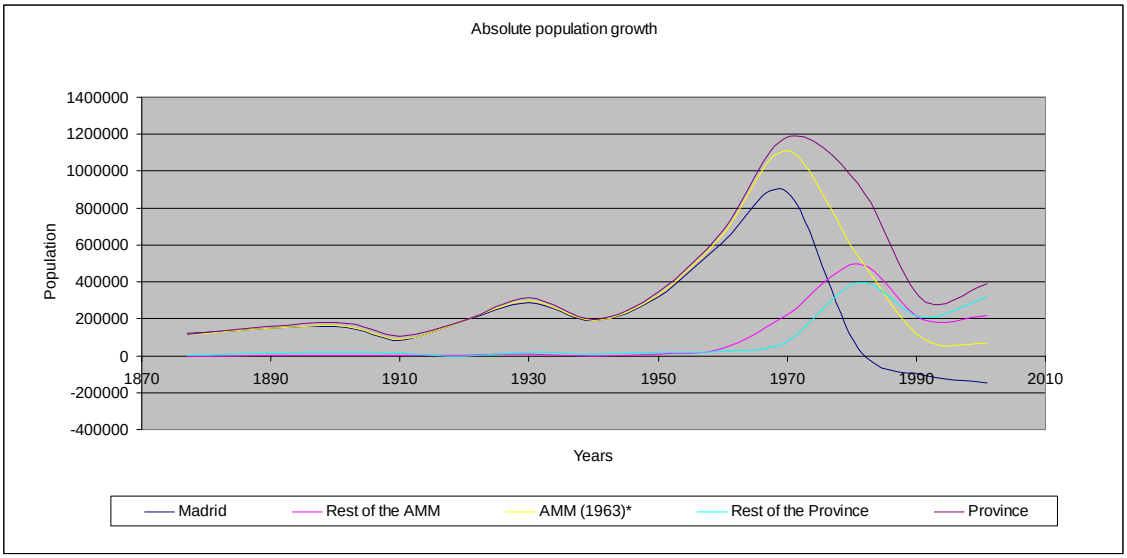


Figure 2.2. Absolute increase in the population of Madrid (1857-2001)[107]

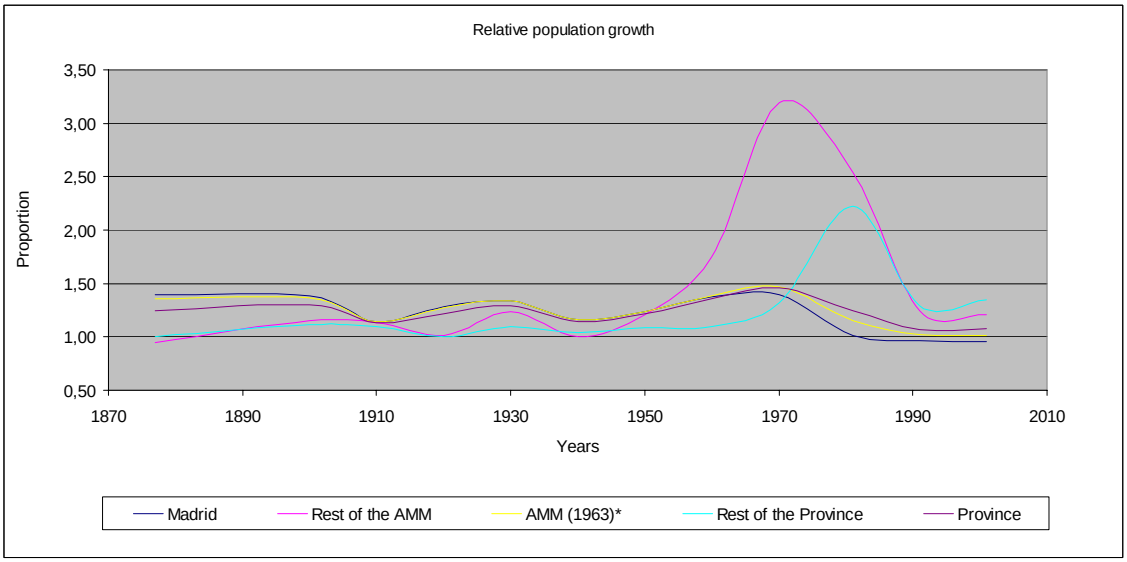


Figure 2.3. Relative increase in the population of Madrid (1857-2001)[108]

[107] INE (own elaboration)
[108] INE (own elaboration)

MADRID	1857	1877	1900	1910	1920	1930	1940	1950	1960	1970	1981	1991	2001
Madrid (Municipality)	298638	417424	576538	659775	848383	1137943	1326674	1645215	2259931	3146071	3188297	3084673	2938723
% of Province	62,77	70,25	74,39	75,09	79,46	82,22	83,98	85,41	86,71	82,95	67,45	61,31	54,19
Evolution (relative)		*1,40*	*1,38*	*1,14*	*1,29*	*1,34*	*1,17*	*1,24*	*1,37*	*1,39*	*1,01*	*0,97*	*0,95*
Evolution (absolute)		*118786*	*159114*	*83237*	*188608*	*289560*	*188731*	*318541*	*614716*	*886140*	*42226*	*-103624*	*-145950*
Rest of the AMM	31100	29592	34012	38411	38730	47806	47802	57922	101180	323140	820765	1018824	1234557
% of Province													
Evolution (relative)		*0,95*	*1,15*	*1,13*	*1,01*	*1,23*	*1,00*	*1,21*	*1,75*	*3,19*	*2,54*	*1,24*	*1,21*
Evolution (absolute)		*-1508*	*4420*	*4399*	*319*	*9076*	*-4*	*10120*	*43258*	*221960*	*497625*	*198059*	*215733*
AMM (1963)*	329738	447016	610550	698186	887113	1185749	1374476	1703137	2361111	3469211	4009062	4103497	4173280
% of Province	69,30	75,23	78,78	79,46	83,09	85,68	87,00	88,41	90,59	91,47	84,81	81,56	76,95
Evolution (relative)		*1,36*	*1,37*	*1,14*	*1,27*	*1,34*	*1,16*	*1,24*	*1,39*	*1,47*	*1,16*	*1,02*	*1,02*
Evolution (absolute)		*117278*	*163534*	*87636*	*188927*	*298636*	*188727*	*328661*	*657974*	*1108100*	*539851*	*94435*	*69783*
Rest of the Province	146047	147178	164484	180455	180524	198202	205317	223174	245143	323350	717924	927461	1250004
% of Province	30,70	24,77	21,22	20,54	16,91	14,32	13,00	11,59	9,41	8,53	15,19	18,44	23,05
Evolution (relative)		*1,01*	*1,12*	*1,10*	*1,00*	*1,10*	*1,04*	*1,09*	*1,10*	*1,32*	*2,22*	*1,29*	*1,35*
Evolution (absolute)		*1131*	*17306*	*15971*	*69*	*17678*	*7115*	*17857*	*21969*	*78207*	*394574*	*209537*	*322543*
Province	475785	594194	775034	878641	1067637	1383951	1579793	1926311	2606254	3792561	4726986	5030958	5423284
% of Province	100	100	100	100	100	100	100	100	100	100	100	100	100
Evolution (relative)		*1,25*	*1,30*	*1,13*	*1,22*	*1,30*	*1,14*	*1,22*	*1,35*	*1,46*	*1,25*	*1,06*	*1,08*
Evolution (absolute)		*118409*	*180840*	*103607*	*188996*	*316314*	*195842*	*346518*	*679943*	*1186307*	*934425*	*303972*	*392326*

Table 2.2. Demographic dynamics of the Province of Madrid (1857-2001)[109]

[109] INE (own elaboration)

However what is of particular interest is to observe the dynamics that took place within the wider territorial agglomeration itself. In the outer area of this agglomeration, i.e. the are beyond the administrative limits of the central municipality of Madrid ('rest of the AMM' in Table 2.2), the decade 1960-1979 saw an increase of over 220,000 persons which represented a 219% relative increase over the previous decade. Nevertheless it was the following decade (1970-1981) which saw the peak increase in absolute terms of population within this territory, of 497,625 persons, which represented a 154% increase in relative terms.

It was during the same decade (1970-1981) that the highest absolute increase in population was experienced in the outer limits of the Province, i.e. the peripheral territory lying between the outer limits of the wider territorial agglomeration but within the Province of Madrid ('rest of the Province' in Table 2.2). This increase was of a magnitude of 394,574 persons, which represented a 122% increase in relative terms over the decade.

The overall peak change in the population of the Province of Madrid coincided with the peaks in the central municipality and the wider territorial agglomeration, in the period 1960-1970, with an absolute increase of almost 1.2 million persons representing an increase of 46% in relative terms.

What can also be observed from Table 2.2 is the extent to which the central municipality has embraced and continues to embrace, a substantial share of the population of the Province. In 1857 the central municipality accounted for over 62% of the total population of the Province, rising to a peak of over 86% in 1960, falling from almost 83% in 1970 to over 67% in 1981, and reducing a share of just over 54 in 2001. The wider territorial agglomeration accounted for over 69% of the provincial population in 1857, increasing to over 91% in 1970 and decreasing to a share of almost 77% in 2001. Conversely the share of the remainder of the Province has increased from a low point of less than 9% in 1970 to just over 23% in 2001.

2.2.2. Barcelona[110]

Turning to the case of Barcelona, it is clear from Table 2.3 that it was during the period from 1950 to 1970 that the largest increases in population took place in broad terms in the central city, the wider surrounding area and the Province. With regards to the central municipality[111], the highest relative increases in population throughout the 20th Century occurred over the two decades 1920-1930 and 1950-1960, with relative increases of 39% and 22% respectively, and with absolute population increases of 283,696 and 277,684 persons over the same two periods. In relative terms the final half of the 19th Century stands out for the increases of 51% and 54% in the population of the central city between 1857-1877 and 1877-1900 respectively.

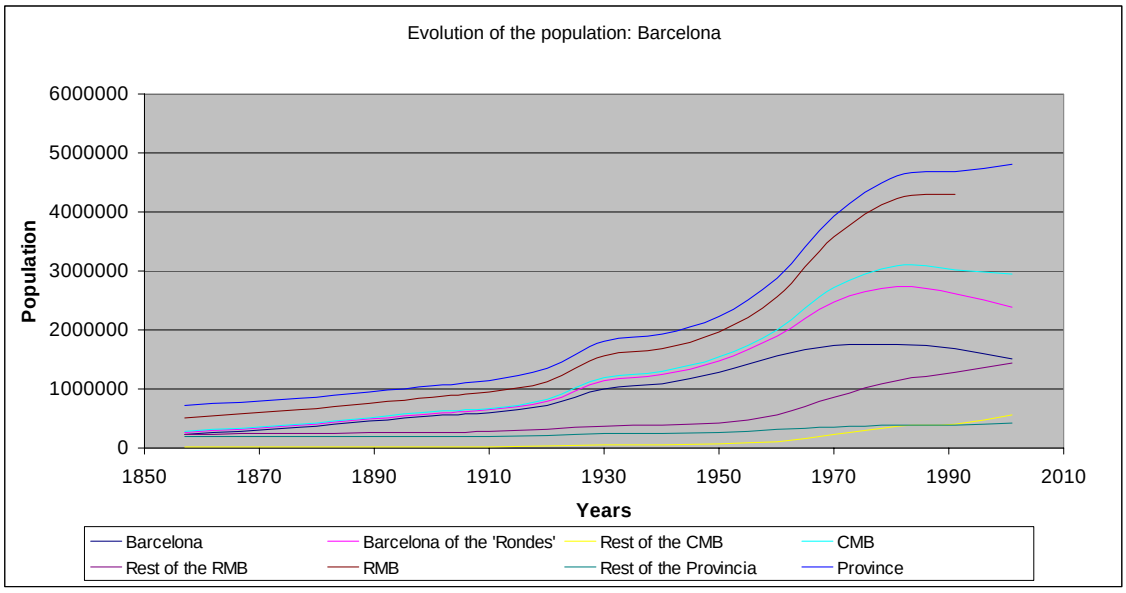


Figure 2.4. Evolution of the population of Barcelona (1857-2001)[112]

As far as the immediately surrounding wider area is concerned, the *Barcelona de les Rondes* area experienced a peak increase in absolute terms between 1960-1970 of 579,121 persons, representing a 30% increase over the previous decade, though the largest relative increase of this area took place in the decade 1920-1930. These same characteristics took place in relation to the slightly wider surrounding wider area (the CMB). Here there was an increase of 708,649 persons between 1960-1970, representing a 35% relative increase. While the highest relative increase in the area

[110] The central municipality of Barcelona; Barcelona of the 'Rondes'; the rest of the Corporació Metropolitana de Barcelona, Corporació Metropolitana de Barcelona; the rest of the Regió Metropolitana de Barcelona; Regió Metropolitana de Barcelona; the rest of the Province; and the Province of Barcelona.
[111] The area lying within the administrative limits of the city accounts for some 98.21 km^2 and includes the former free-standing municipalities of Corts (Las), Grácia, Horta, San Andrés de Palomar, San Gervasi de Casolas, San Martín de Provensals, Sans and Sarrià.
[112] INE (own elaboration)

corresponding to the CMB (45%) had taken place in the decade 1920-1930, the absolute increase in the 1960-1970 period was the highest experienced throughout the entire period under review.

It was also during the decade between 1960 and 1970 that saw the peak increase in the population of the RMB both in relative terms (39%) and in absolute numbers, rising by more than 1 million persons. By 1970 the RMB accounted for over 90% of the population of the Province and this is the proportion at which its share of the Provincial population has hovered since then. By contrast the central city's share of the Provincial population has decreased from 44% in 1970 to just 31% in 2001, as have the corresponding shares of the population of both *Barcelona de les Rondes* and the CMB, whereas the remainder of the RMB, beyond the limits of the CMB, has increased in its proportional share. The demographic dynamics over the remainder of the Province, i.e. the area lying beyond the RMB, were less significant over the period, though as with the central city, the most significant change in population in the latter part of the 20th Century occurred in the period 1950-1960, with a relative increase of 17% and an absolute increase of 45,405 persons. For the entire Province of Barcelona however, Table 2.3 illustrates a 37% increase in population of more than 1.05 million persons between 1960-1970.

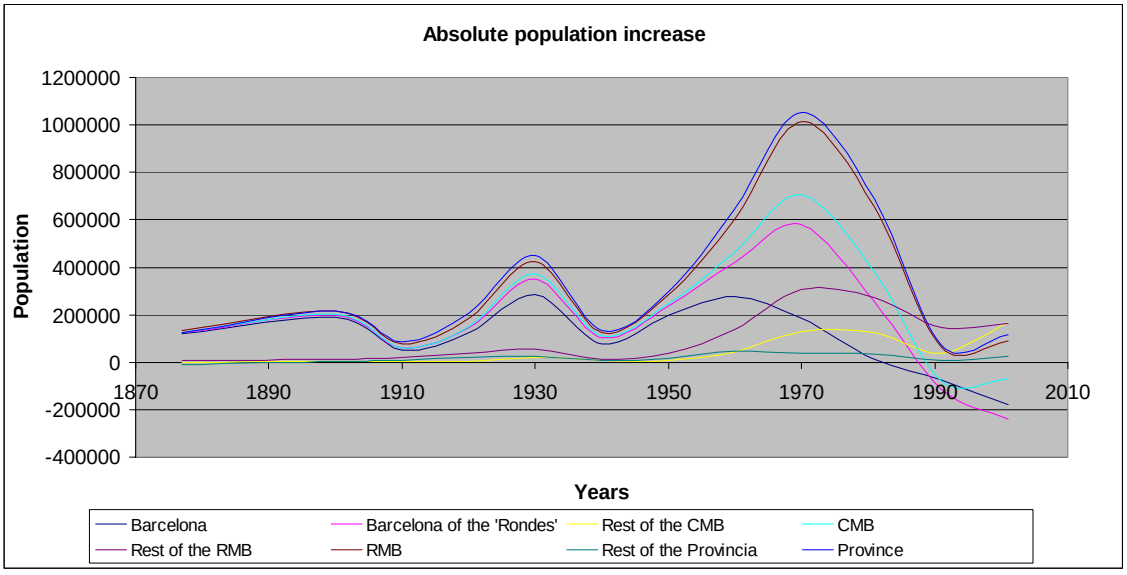


Figure 2.5. Absolute increase in the population of Barcelona (1857-2001)[113]

[113] INE (own elaboration)

BARCELONA	1857	1877	1900	1910	1920	1930	1940	1950	1960	1970	1981	1991	2001
Barcelona	234477	353656	543930	595484	721869	1005565	1081175	1280179	1557863	1745142	1754900	1681132	1503884
% of Province	32,85	42,26	51,58	52,16	53,50	55,84	55,97	57,35	54,13	44,41	38,00	35,84	31,29
Evolution (relative)		*1,51*	*1,54*	*1,09*	*1,21*	*1,39*	*1,08*	*1,18*	*1,22*	*1,12*	*1,01*	*0,96*	*0,89*
Evolution (absolute)		*119179*	*190274*	*51554*	*126385*	*283696*	*75610*	*199004*	*277684*	*187279*	*9758*	*-73768*	*-177248*
Barcelona de les 'Rondes'	259989	384713	584028	641945	786673	1138393	1242637	1482152	1899861	2478982	2734531	2618979	2377695
% of Province	36,43	45,97	55,38	56,23	58,30	63,22	64,32	66,40	66,01	63,09	59,21	55,83	49,47
Evolution (relative)		*1,48*	*1,52*	*1,10*	*1,23*	*1,45*	*1,09*	*1,19*	*1,28*	*1,30*	*1,10*	*0,96*	*0,91*
Evolution (absolute)		*124724*	*199315*	*57917*	*144728*	*351720*	*104244*	*239515*	*417709*	*579121*	*255549*	*-115552*	*-241284*
Rest of the CMB	19378	20229	22727	24339	29310	49320	56056	63156	107087	234815	361464	397366	567138
% of Province	2,72	2,42	2,16	2,13	2,17	2,74	2,90	2,83	3,72	5,98	7,83	8,47	11,80
Evolution (relative)		*1,04*	*1,12*	*1,07*	*1,20*	*1,68*	*1,14*	*1,13*	*1,70*	*2,19*	*1,54*	*1,10*	*1,43*
Evolution (absolute)		*851*	*2498*	*1612*	*4971*	*20010*	*6736*	*7100*	*43931*	*127728*	*126649*	*35902*	*169772*
CMB	279367	404942	606755	666284	815983	1187713	1298693	1545308	2006948	2713797	3095995	3016345	2944833
% of Province	39,14	48,39	57,54	58,36	60,48	65,96	67,22	69,23	69,73	69,07	67,03	64,30	61,28
Evolution (relative)		*1,45*	*1,50*	*1,10*	*1,22*	*1,46*	*1,09*	*1,19*	*1,30*	*1,35*	*1,14*	*0,97*	*0,98*
Evolution (absolute)		*125575*	*201813*	*59529*	*149699*	*371730*	*110980*	*246615*	*461640*	*706849*	*382198*	*-79650*	*-71512*
Rest of the RMB	236392	245392	259418	278518	315164	369095	383133	420983	559785	865275	1138730	1283445	1445557
% of Province	33,12	29,32	24,60	24,39	23,36	20,50	19,83	18,86	19,45	22,02	24,65	27,36	30,08
Evolution (relative)		*1,04*	*1,06*	*1,07*	*1,13*	*1,17*	*1,04*	*1,10*	*1,33*	*1,55*	*1,32*	*1,13*	*1,13*
Evolution (absolute)		*9000*	*14026*	*19100*	*36646*	*53931*	*14038*	*37850*	*138802*	*305490*	*273455*	*144715*	*162112*
RMB	515759	650334	866173	944802	1131147	1556808	1681826	1966291	2566733	3579072	4234725	4299790	4390390
% of Province	72,26	77,71	82,14	82,75	83,83	86,46	87,06	88,09	89,19	91,09	91,69	91,66	91,35
Evolution (relative)		*1,26*	*1,33*	*1,09*	*1,20*	*1,38*	*1,08*	*1,17*	*1,31*	*1,39*	*1,18*	*1,02*	*1,02*
Evolution (absolute)		*134575*	*215839*	*78629*	*186345*	*425661*	*125018*	*284465*	*600442*	*1012339*	*655653*	*65065*	*90600*
Rest of the Province	197975	186553	188368	196931	218135	243830	250049	265828	311233	350122	384009	391206	415537
% of Province	27,74	22,29	17,86	17,25	16,17	13,54	12,94	11,91	10,81	8,91	8,31	8,34	8,65
Evolution (relative)		*0,94*	*1,01*	*1,05*	*1,11*	*1,12*	*1,03*	*1,06*	*1,17*	*1,12*	*1,10*	*1,02*	*1,06*
Evolution (absolute)		*-11422*	*1815*	*8563*	*21204*	*25695*	*6219*	*15779*	*45405*	*38889*	*33887*	*7197*	*24331*
Province	713734	836887	1054541	1141733	1349282	1800638	1931875	2232119	2877966	3929194	4618734	4690996	4805927
% of Province	100	100	100	100	100	100	100	100	100	100	100	100	100
Evolution (relative)		*1,17*	*1,26*	*1,08*	*1,18*	*1,33*	*1,07*	*1,16*	*1,29*	*1,37*	*1,18*	*1,02*	*1,02*
Evolution (absolute)		*123153*	*217654*	*87192*	*207549*	*451356*	*131237*	*300244*	*645847*	*1051228*	*689540*	*72262*	*114931*

Table 2.3. Demographic dynamics of the Province of Barcelona (1857-2001)[114]

[114] INE (own elaboration)

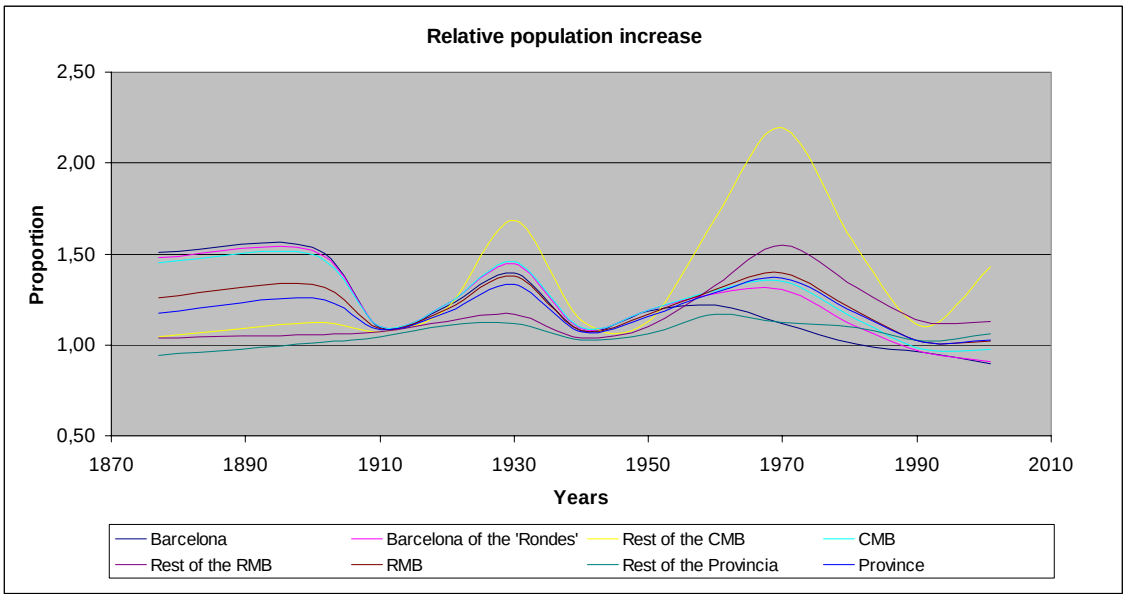


Figure 2.6. Relative increase in the population of Barcelona (1857-2001)[115]

What is also interesting to note is the weight of Barcelona and the different metropolitan agglomerations or groupings of municipalities, relative to the overall population of the Province. The population of the city accounted for almost 33% of the population in 1857, rising to over 57% in 1950, and then steadily reducing over the following 50 years to just over 31% in 2001. It is significant that the largest change took place in the period 1960-1970, which was matched by the largest increase in the population of the immediate environs of the City within the *Barcelona de les Rondes*. Having said that, clearly the *Barcelona de les Rondes* area contained a much larger share of the provincial population, rising from more than 36% in 1857 to a high point of 66.40% in 1950, and then decreasing to just over 49% in 2001. The share of the CMB followed a similar pattern, rising from over 39% in 1857 to 69.73% in 1960, reducing to 61,28% in 2001. The wider RMB has accounted for a much higher share of the total population of the Province over the period studied, rising from 72.26% in 1857 to a maximum of 91.66% in 1991.

[115] INE (own elaboration)

2.2.3. Valencia[116]

Turning to the case of Valencia, as in the case of Barcelona it was during the final 50 years of the 19th Century that the central city experienced the highest relative increases in population, of 35% and 46% during the periods 1857-1877 and 1877-1900 respectively. However it was during the twenty year period between 1960 and 1980 that the largest surge in population in both absolute and relative terms took place, for the central municipality as well as the wider territorial agglomeration. Throughout the first half of the 20th Century, Valencia's population rose steadily to reach over half a million persons by 1950, with a marginal decline in the decade between 1950-1960. This decline was compensated for by the highest absolute increase in population over the period under review of almost 149,000 persons in the decade leading up to 1970, representing a 29% relative increase. Throughout the 1960-1970 period the central city came to contain 37% of the population of the Province.

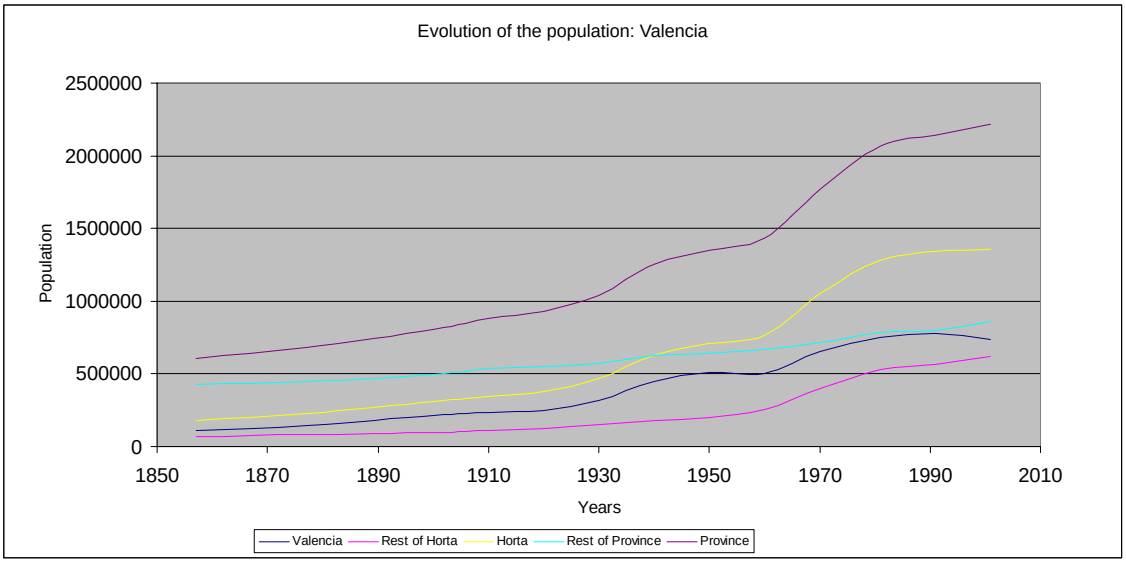


Figure 2.7. Evolution of the population of Valencia (1857-2001)[117]

Over the same decade the population of the wider surrounding territory (Horta) increased by 38% to reach over 1 million persons, representing almost 60% of the population of the entire Province. However it was in the rest of Horta, beyond the administrative limits of the central city, that witnessed a higher relative increase of 55%, or over 140,000 persons in absolute terms during this period. These increases contributed to an overall surge in the population of the province of almost 340,000 persons representing a 24% increase over the previous decade. It was throughout the

[116] The central municipality of Valencia; the rest of Horta; Horta; the rest of the Province; and the Province of Valencia.
[117] INE (own elaboration)

decade 1970-1981 that the remaining area of the Province, i.e. that part lying beyond the immediately surrounding metropolitan agglomeration of Horta, which witnessed the highest increase of population in absolute numbers of almost 71,000 persons, with a relative increase of 10% matching a level which had previously been achieved in the period 1930-1940. This outer area's share of the population of the Province was in the order of 38% and was of a level which was maintained up until 2001.

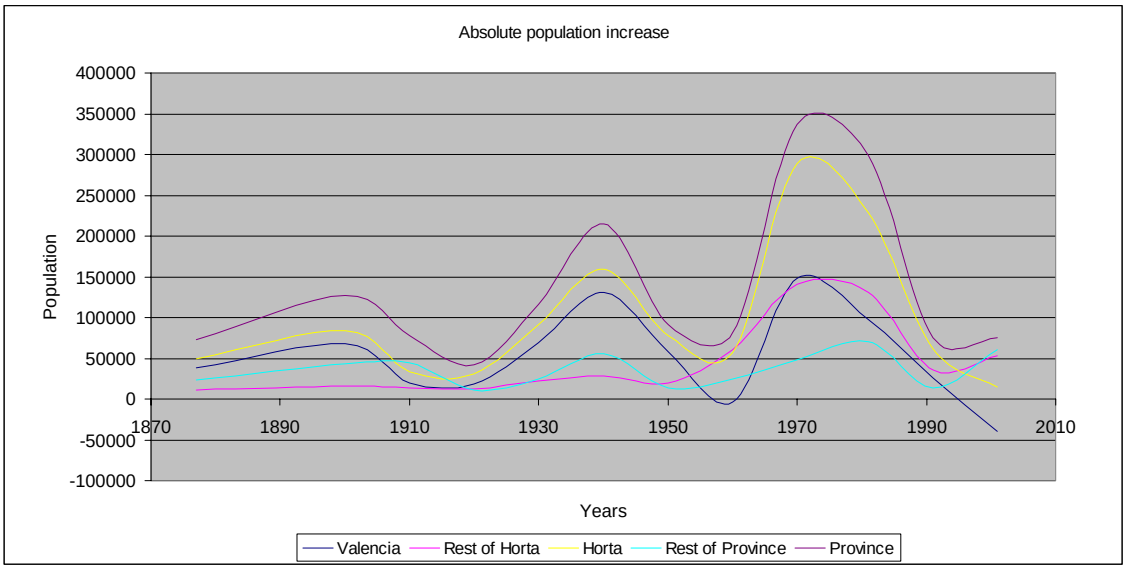


Figure 2.8. Absolute increase in the population of Valencia (1857-2001)[118]

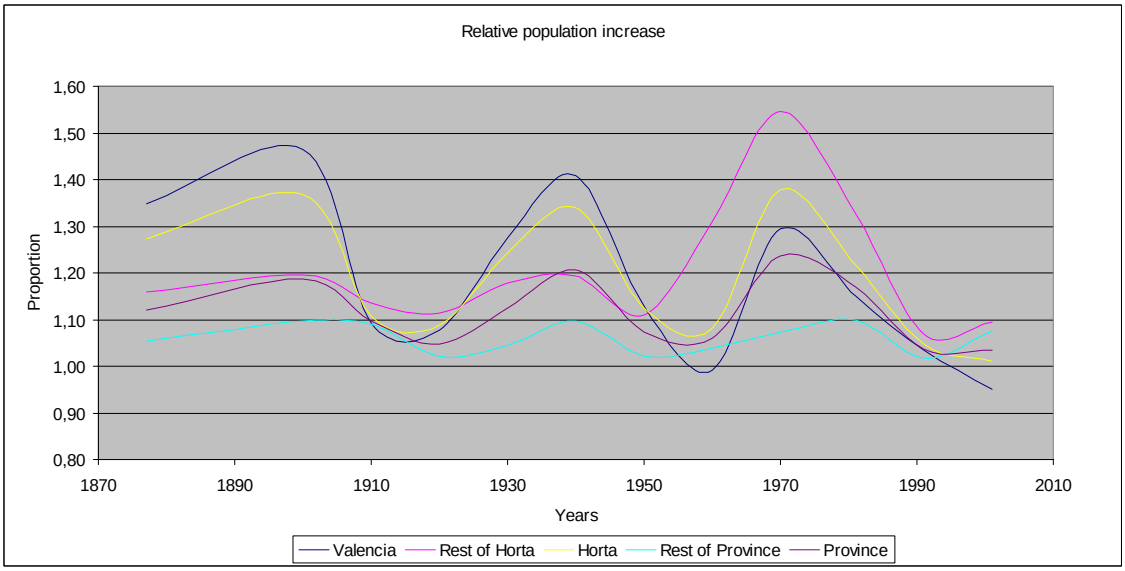


Figure 2.9.Relative increase in the population of Valencia (1857-2001)[119]

[118] INE (own elaboration)
[119] INE (own elaboration)

VALENCIA	1857	1877	1900	1910	1920	1930	1940	1950	1960	1970	1981	1991	2001
Valencia	108105	145782	213550	233348	251258	320195	450756	509075	505066	653690	751734	777427	738441
% of Province	17,82	21,47	26,48	26,39	27,12	30,72	35,87	37,77	35,33	36,99	36,38	36,31	33,32
Evolution (relative)		*1,35*	*1,46*	*1,09*	*1,08*	*1,27*	*1,41*	*1,13*	*0,99*	*1,29*	*1,15*	*1,03*	*0,95*
Evolution (absolute)		*37677*	*67768*	*19798*	*17910*	*68937*	*130561*	*58319*	*-4009*	*148624*	*98044*	*25693*	*-38986*
Rest of Horta	71973	83442	99754	113372	126298	148726	177496	196921	257966	398652	529086	565032	618441
% of Province	11,86	12,29	12,37	12,82	13,63	14,27	14,12	14,61	18,04	22,56	25,60	26,39	27,90
Evolution (relative)		*1,16*	*1,20*	*1,14*	*1,11*	*1,18*	*1,19*	*1,11*	*1,31*	*1,55*	*1,33*	*1,07*	*1,09*
Evolution (absolute)		*11469*	*16312*	*13618*	*12926*	*22428*	*28770*	*19425*	*61045*	*140686*	*130434*	*35946*	*53409*
Horta	180078	229224	313304	346720	377556	468921	628252	705996	763032	1052342	1280820	1342459	1356882
% of Province	29,69	33,76	38,84	39,21	40,75	45,00	49,99	52,38	53,37	59,54	61,98	62,70	61,22
Evolution (relative)		*1,27*	*1,37*	*1,11*	*1,09*	*1,24*	*1,34*	*1,12*	*1,08*	*1,38*	*1,22*	*1,05*	*1,01*
Evolution (absolute)		*49146*	*84080*	*33416*	*30836*	*91365*	*159331*	*77744*	*57036*	*289310*	*228478*	*61639*	*14423*
Rest of the Province	426530	449822	493252	537578	548886	573233	628381	641916	666676	714985	785593	798655	859403
% of Province	70,31	66,24	61,16	60,79	59,25	55,00	50,01	47,62	46,63	40,46	38,02	37,30	38,78
Evolution (relative)		*1,05*	*1,10*	*1,09*	*1,02*	*1,04*	*1,10*	*1,02*	*1,04*	*1,07*	*1,10*	*1,02*	*1,08*
Evolution (absolute)		*23292*	*43430*	*44326*	*11308*	*24347*	*55148*	*13535*	*24760*	*48309*	*70608*	*13062*	*60748*
Province	606608	679046	806556	884298	926442	1042154	1256633	1347912	1429708	1767327	2066413	2141114	2216285
% of Province	100	100	100	100	100	100	100	100	100	100	100	100	100
Evolution (relative)		*1,12*	*1,19*	*1,10*	*1,05*	*1,12*	*1,21*	*1,07*	*1,06*	*1,24*	*1,17*	*1,04*	*1,04*
Evolution (absolute)		*72438*	*127510*	*77742*	*42144*	*115712*	*214479*	*91279*	*81796*	*337619*	*299086*	*74701*	*75171*

Table 2.4. Demographic dynamics of the Province of Valencia (1857-2001)[120]

[120] INE (own elaboration)

2.2.4. Sevilla[121]

In contrast to the cases of Madrid, Barcelona and Valencia examined previously, Sevilla indicates somewhat different characteristics of metropolitan expansion over the period under review. The central municipality had a population in 1857 of over 100,000 persons, peaking to over 700,000 persons in 1991 and decreasing to over 680,000 persons in 2001. The highest absolute increase in population, of over 105,000 persons, took place in the ten year period leading up to 1981, representing a 19% increase over that period, at which point the central city contained over 44% of the population of the Province. However it was during the decade between 1930-1940 when the city experienced the highest relative increase (36%) in population. The population of the wider urban agglomeration surpassed the 1 million level after 1981, but it was in the ten year period leading up to 1981 which saw the surge in this wider metropolitan urban region in absolute terms of almost 170,000 persons, representing a 22% relative increase. The highest noted relative increase (33%) had taken place previously in the decade 1930-1940.

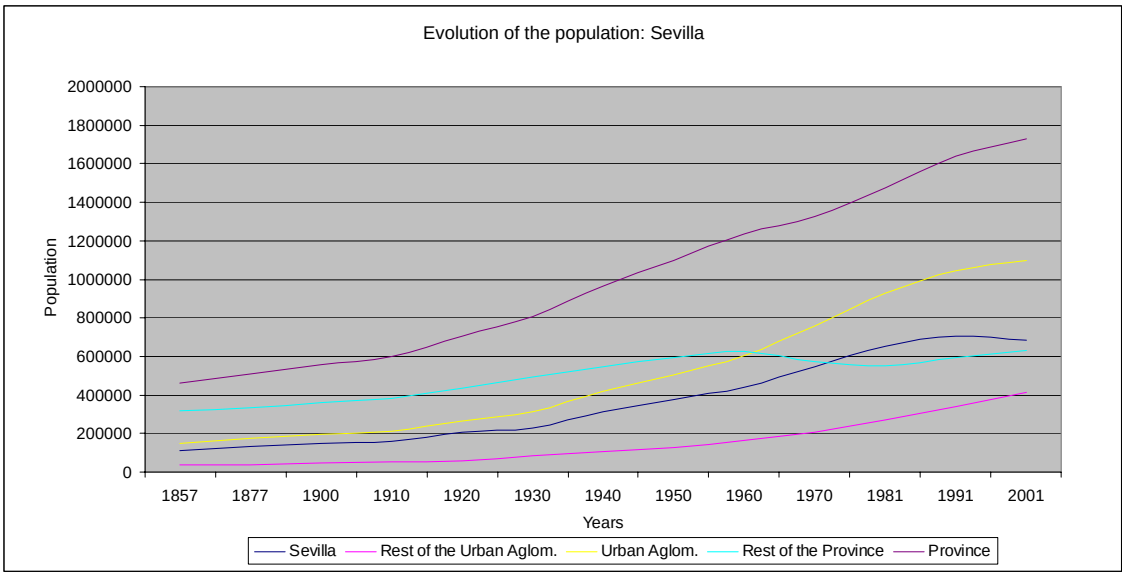


Figure 2.10. Evolution of the population of Sevilla (1857-2001)[122]

The peak of population within the remainder of the Province, in the area beyond the limits of what would later become the urban agglomeration, occurred in the decade leading up to 1940, seeing an increase of over 54,000 persons, although the highest relative increase (14%) had taken place earlier in 1920-1930 decade. As far as the

[121] The central municipality of Sevilla; the rest of the Urban Agglomeration; the Urban Agglomeration; the rest of the Province; and the Province of Sevilla.
[122] INE (own elaboration)

whole Province is concerned, the highest relative increase (20%) coincided with the corresponding increases in the central city and the urban agglomeration during the period 1930-1940. However the surge in the Provincial population in absolute terms did not occur until much later, in the decade prior to 1991, when the population rose by over 160,000 persons.

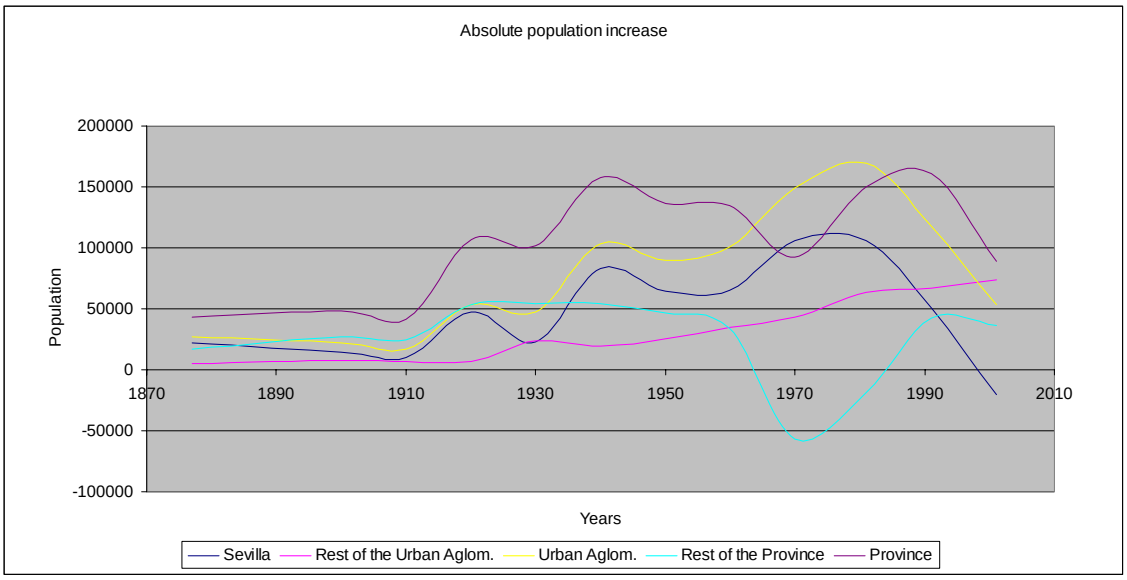


Figure 2.11. Absolute increase in the population of Sevilla (1857-2001)[123]

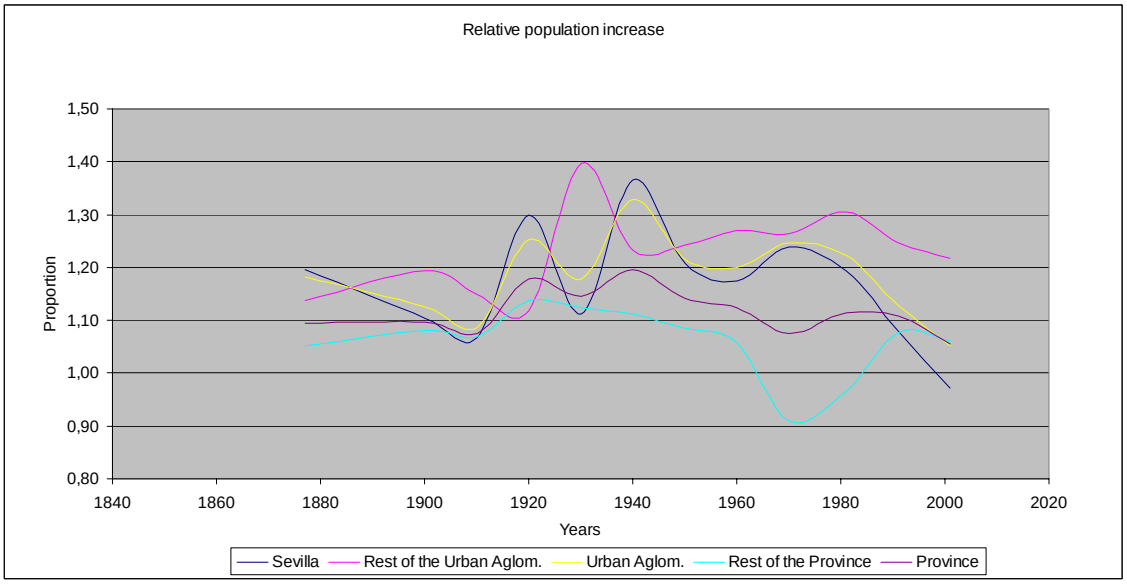


Figure 2.12. Relative increase in the population of Sevilla (1857-2001)[124]

[123] INE (own elaboration)
[124] INE (own elaboration)

SEVILLA	1857	1877	1900	1910	1920	1930	1940	1950	1960	1970	1981	1991	2001
Sevilla	112329	134318	148315	158287	205529	228729	312123	376627	442300	548072	653833	704857	684633
% of Province	24,24	26,50	26,71	26,51	29,20	28,40	32,41	34,26	35,83	41,30	44,25	43,03	39,63
Evolution (relative)		*1,20*	*1,10*	*1,07*	*1,30*	*1,11*	*1,36*	*1,21*	*1,17*	*1,24*	*1,19*	*1,08*	*0,97*
Evolution (absolute)		*21989*	*13997*	*9972*	*47242*	*23200*	*83394*	*64504*	*65673*	*105772*	*105761*	*51024*	*-20224*
Rest of the Urban Aglom.	34822	39587	47275	54356	60776	84824	104610	129893	165008	208603	272127	339210	412753
% of Province	7,51	7,81	8,51	9,10	8,64	10,53	10,86	11,82	13,37	15,72	18,42	20,71	23,89
Evolution (relative)		*1,14*	*1,19*	*1,15*	*1,12*	*1,40*	*1,23*	*1,24*	*1,27*	*1,26*	*1,30*	*1,25*	*1,22*
Evolution (absolute)		*4765*	*7688*	*7081*	*6420*	*24048*	*19786*	*25283*	*35115*	*43595*	*63524*	*67083*	*73543*
Urban Aglom.	147151	173905	195590	212643	266305	313553	416733	506520	607308	756675	925960	1044067	1097386
% of Province	31,75	34,31	35,23	35,62	37,84	38,94	43,27	46,07	49,20	57,01	62,67	63,73	63,52
Evolution (relative)		*1,18*	*1,12*	*1,09*	*1,25*	*1,18*	*1,33*	*1,22*	*1,20*	*1,25*	*1,22*	*1,13*	*1,05*
Evolution (absolute)		*26754*	*21685*	*17053*	*53662*	*47248*	*103180*	*89787*	*100788*	*149367*	*169285*	*118107*	*53319*
Rest of the Province	316335	332907	359666	384388	437442	491699	546311	592854	627127	570515	551468	594151	630217
% of Province	68,25	65,69	64,77	64,38	62,16	61,06	56,73	53,93	50,80	42,99	37,33	36,27	36,48
Evolution (relative)		*1,05*	*1,08*	*1,07*	*1,14*	*1,12*	*1,11*	*1,09*	*1,06*	*0,91*	*0,97*	*1,08*	*1,06*
Evolution (absolute)		*16572*	*26759*	*24722*	*53054*	*54257*	*54612*	*46543*	*34273*	*-56612*	*-19047*	*42683*	*36066*
Province	463486	506812	555256	597031	703747	805252	963044	1099374	1234435	1327190	1477428	1638218	1727603
% of Province	100	100	100	100	100	100	100	100	100	100	100	100	100
Evolution (relative)		*1,09*	*1,10*	*1,08*	*1,18*	*1,14*	*1,20*	*1,14*	*1,12*	*1,08*	*1,11*	*1,11*	*1,05*
Evolution (absolute)		*43326*	*48444*	*41775*	*106716*	*101505*	*157792*	*136330*	*135061*	*92755*	*150238*	*160790*	*89385*

Table 2.5. Demographic dynamics of the Province of Sevilla (1857-2001)[125]

[125] INE (own elaboration)

2.2.5. Bilbao[126]

Of the seven metropolitan urban regions under review, as can be seen from Table 2.6, Bilbao stands out as being the only case in which the surges in population throughout the 20th Century, in absolute and relative terms, for the central city, the wider surrounding 'metropolitan' area, the Province of Vizkaya and the intermediate areas were all concentrated in the ten year period between 1960 and 1970. Furthermore the pattern of growth of the central city and the wider surrounding area of Bajo Nervión was closely related over the entire 150 year period.

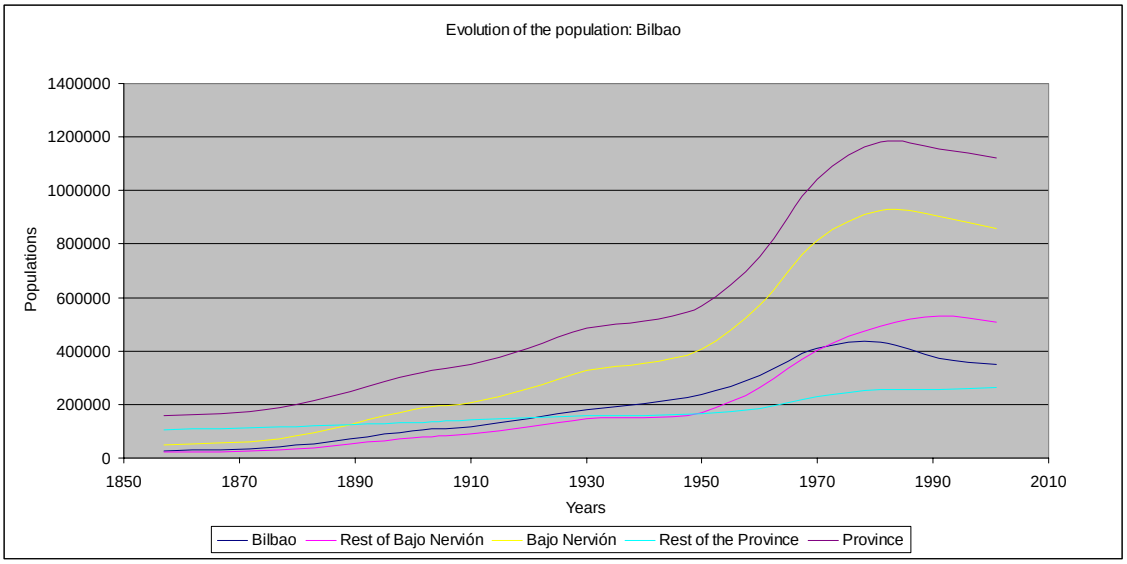


Figure 2.13. Evolution of the population of Bilbao (1857-2001)[127]

In 1857, Bilbao was the smallest of the seven metropolitan cities, with a population of over 27,000 persons, increasing by 50% in the twenty year period leading up to 1877, and increasing by 149% between 1877 and 1900 by which time its population had surpassed 100,000 persons. It grew steadily throughout the greater part of the 20th Century to reach a maximum of over 433,000 persons in 1981, having surged over the decade leading up to 1970, with an additional 100,000 persons representing a 34% increase over the previous period in relative terms. The wider metropolitan urban region, comprising the 26 municipalities of the Bajo Nervion, also experienced significant growth in this same period, with a 42% relative increase in population and over 242,000 additional persons. In 1857, the Province of Vizkaya itself had a population of over 150,000 inhabitants and grew to surpass the 1 million level in the decade leading up to 1970. As with Bilbao and the Bajo Nervion, the Province

[126] The central municipality of Bilbao; the rest of Bajo Nervión; Bajo Nervión; the rest of the Province; and the Province of Vizkaya.

experienced the greatest levels of growth during the decade between 1960 and 1970, registering a 38% relative increase in the number of inhabitants which in real terms accounted for almost an additional 300,000 persons.

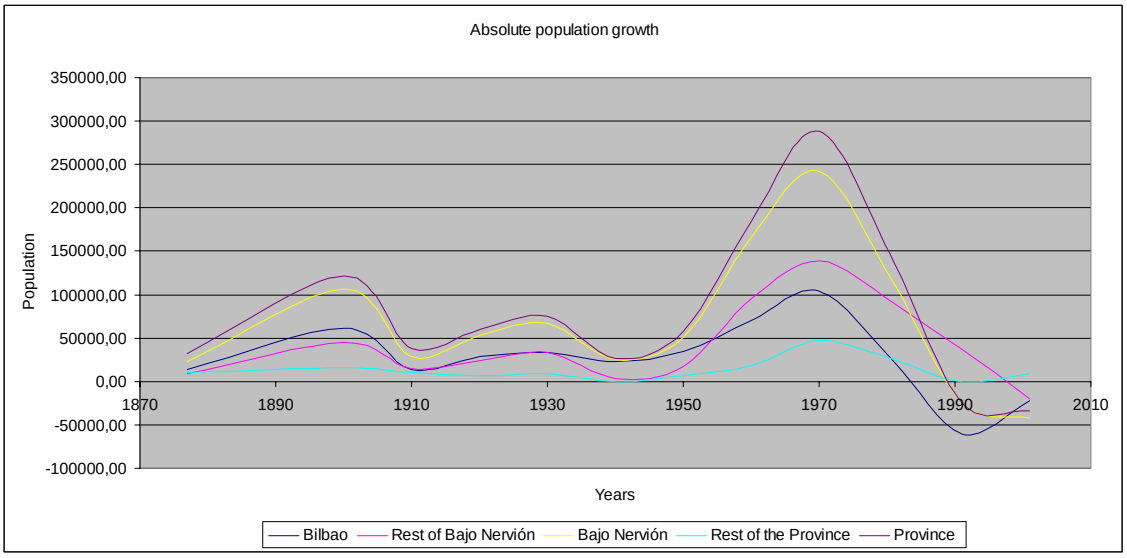


Figure 2.14. Absolute increase in the population of Bilbao (1857-2001)[128]
Source: INE, own elaboration

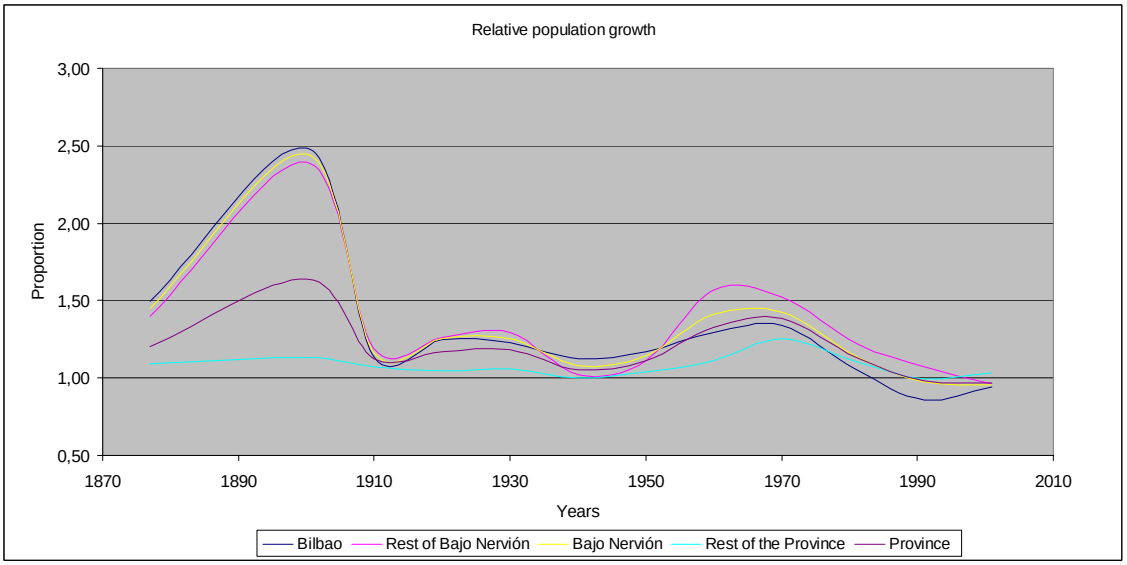


Figure 2.15. Relative increase in the population of Bilbao (1857-2001)

[127] INE (own elaboration)
[128] INE (own elaboration)

BILBAO	1857	1877	1900	1910	1920	1930	1940	1950	1960	1970	1981	1991	2001
Bilbao	27656	41348	102845	117079	146019	179570	202513	236565	306886	410490	433030	372045	349972
% of Province	17,56	21,77	33,03	33,46	35,65	37,01	39,62	41,56	40,68	39,34	36,65	32,18	31,17
Evolution (relative)		*1,50*	*2,49*	*1,14*	*1,25*	*1,23*	*1,13*	*1,17*	*1,30*	*1,34*	*1,05*	*0,86*	*0,94*
Evolution (absolute)		*13692*	*61497*	*14234*	*28940*	*33551*	*22943*	*34052*	*70321*	*103604*	*22540*	*-60985*	*-22073*
Rest of Bajo Nervión	22682	31775	76180	90805	114860	148338	151008	168274	264272	402745	493300	529853	509582
% of Province	14,40	16,73	24,47	25,95	28,05	30,57	29,54	29,56	35,03	38,60	41,76	45,83	45,39
Evolution (relative)		*1,40*	*2,40*	*1,19*	*1,26*	*1,29*	*1,02*	*1,11*	*1,57*	*1,52*	*1,22*	*1,07*	*0,96*
Evolution (absolute)		*9093*	*44405*	*14625*	*24055*	*33478*	*2670*	*17266*	*95998*	*138473*	*90555*	*36553*	*-20271*
Bajo Nervión	50338	73123	179025	207884	260879	327908	353521	404839	571158	813235	926330	901898	859554
% of Province	31,96	38,50	57,50	59,41	63,70	67,58	69,16	71,13	75,71	77,95	78,41	78,00	76,57
Evolution (relative)		*1,45*	*2,45*	*1,16*	*1,25*	*1,26*	*1,08*	*1,15*	*1,41*	*1,42*	*1,14*	*0,97*	*0,95*
Evolution (absolute)		*22785*	*105902*	*28859*	*52995*	*67029*	*25613*	*51318*	*166319*	*242077*	*113095*	*-24432*	*-42344*
Rest of the Province	107141	116831	132336	142039	148671	157297	157614	164349	183225	230075	255071	254347	263083
% of Province	68,04	61,50	42,50	40,59	36,30	32,42	30,84	28,87	24,29	22,05	21,59	22,00	23,43
Evolution (relative)		*1,09*	*1,13*	*1,07*	*1,05*	*1,06*	*1,00*	*1,04*	*1,11*	*1,26*	*1,11*	*1,00*	*1,03*
Evolution (absolute)		*9690*	*15505*	*9703*	*6632*	*8626*	*317*	*6735*	*18876*	*46850*	*24996*	*-724*	*8736*
Province	157479	189954	311361	349923	409550	485205	511135	569188	754383	1043310	1181401	1156245	1122637
% of Province	100	100	100	100	100	100	100	100	100	100	100	100	100
Evolution (relative)		*1,21*	*1,64*	*1,12*	*1,17*	*1,18*	*1,05*	*1,11*	*1,33*	*1,38*	*1,13*	*0,98*	*0,97*
Evolution (absolute)		*32475*	*121407*	*38562*	*59627*	*75655*	*25930*	*58053*	*185195*	*288927*	*138091*	*-25156*	*-33608*

Table 2.6. Demographic dynamics of the Province of Vizkaya (1857-2001)[129]

[129] INE (own elaboration)

2.2.6. Zaragoza[130]

Zaragoza is the only one of the seven principal metropolitan urban regions for which an historical area of metropolitan influence has not been applied. It is by far the largest of the seven cities being studied, accounting for over 6% of the total land area of the Province.

In 1857 the city had a population of just over 67,000 inhabitants, representing some 17% of the population of the Province. By 1920 the population had doubled and continued growth steadily to a peak of over 622,000 persons by 1991, at which time it contained over 72% of the population of the entire Province. Zaragoza experienced a decline (-1%) for the first time in the decade between 1991-2001.

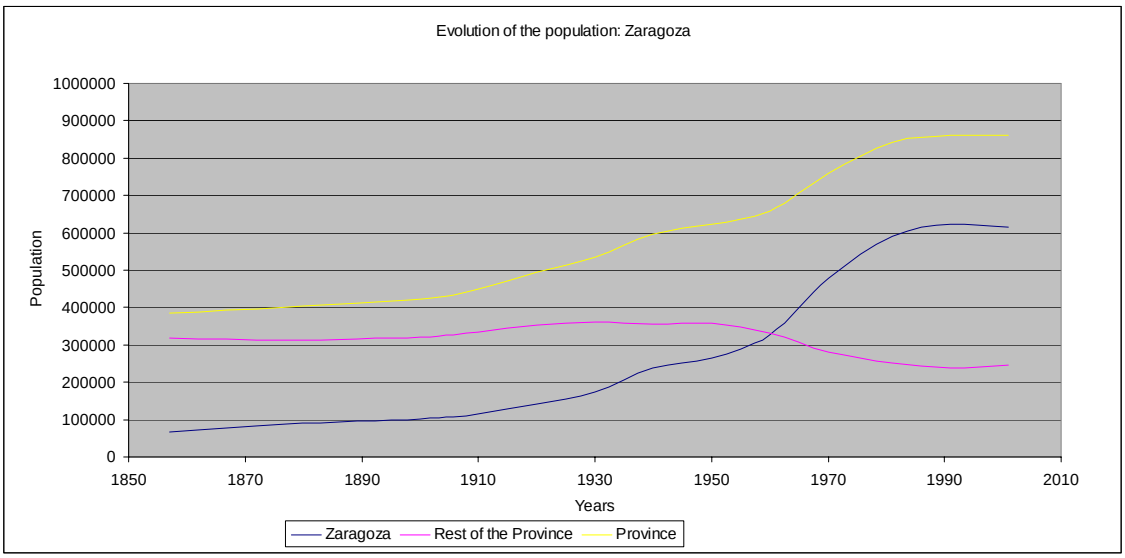


Figure 2.16. Evolution of the population of Zaragoza (1857-2001)[131]

As with Madrid and Valencia, the central city of Zaragoza surged in population by over 150,000 persons in the period leading up to 1970, representing a 47% increase over its 1960 population. This coincided with an absolute increase of more than 100,000 persons in the population of the Province, representing a relative increase of just 16%, due to a decline in the population of the remainder of the Province of more than 50,000 persons.

[130] The central municipality of Zaragoza; the rest of the province; and the Province of Zaragoza.
[131] INE (own elaboration)

ZARAGOZA	1857	1877	1900	1910	1920	1930	1940	1950	1960	1970	1981	1991	2001
Zaragoza	67097	88206	101286	113854	141472	174055	238695	264360	326316	479845	590750	622371	614905
% of Province	17,47	22,02	24,01	25,36	28,61	32,48	40,11	42,52	49,68	63,12	70,13	72,26	71,35
Evolution (relative)		*1,31*	*1,15*	*1,12*	*1,24*	*1,23*	*1,37*	*1,11*	*1,23*	*1,47*	*1,23*	*1,05*	*0,99*
Evolution (absolute)		21109	13080	12568	27618	32583	64640	25665	61956	153529	110905	31621	-7466
Rest of the Province	317079	312381	320557	335141	353078	361761	356400	357408	330456	280341	251636	238958	246950
% of Province	82,53	77,98	75,99	74,64	71,39	67,52	59,89	57,48	50,32	36,88	29,87	27,74	28,65
Evolution (relative)		*0,99*	*1,03*	*1,05*	*1,05*	*1,02*	*0,99*	*1,00*	*0,92*	*0,85*	*0,90*	*0,95*	*1,03*
Evolution (absolute)		-4698	8176	14584	17937	8683	-5361	1008	-26952	-50115	-28705	-12678	7992
Province	384176	400587	421843	448995	494550	535816	595095	621768	656772	760186	842386	861329	861855
% of Province	100	100	100	100	100	100	100	100	100	100	100	100	100
Evolution (relative)		*1,04*	*1,05*	*1,06*	*1,10*	*1,08*	*1,11*	*1,04*	*1,06*	*1,16*	*1,11*	*1,02*	*1,00*
Evolution (absolute)		16411	21256	27152	45555	41266	59279	26673	35004	103414	82200	18943	526

Table 2.7. Demographic dynamics of the Province of Zaragoza (1857-2001)[132]

[132] INE (own elaboration)

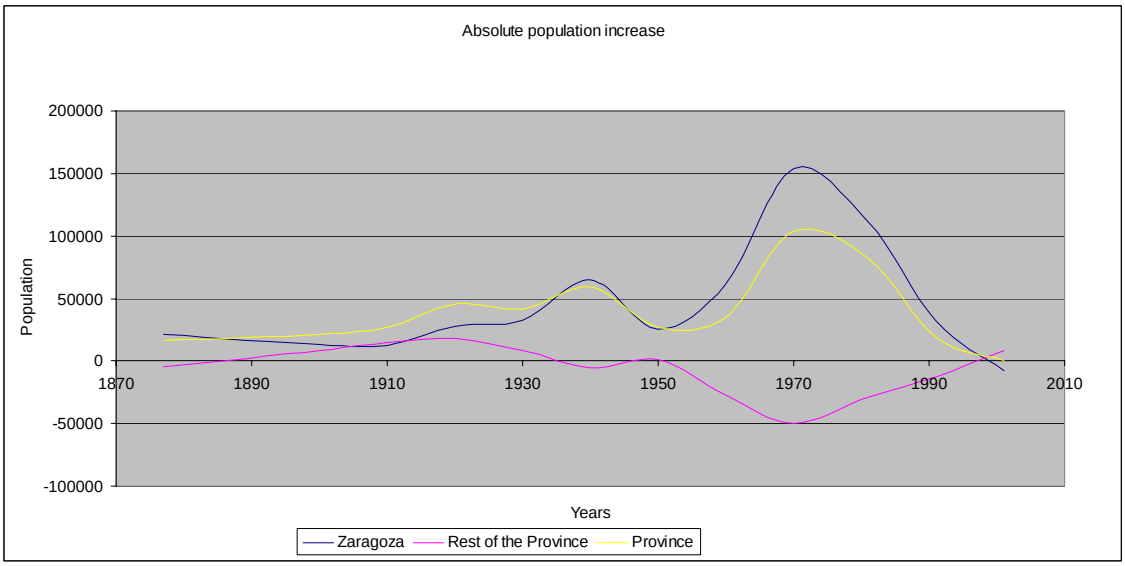


Figure 2.17. Absolute increase in the population of Zaragoza (1857-2001)[133]

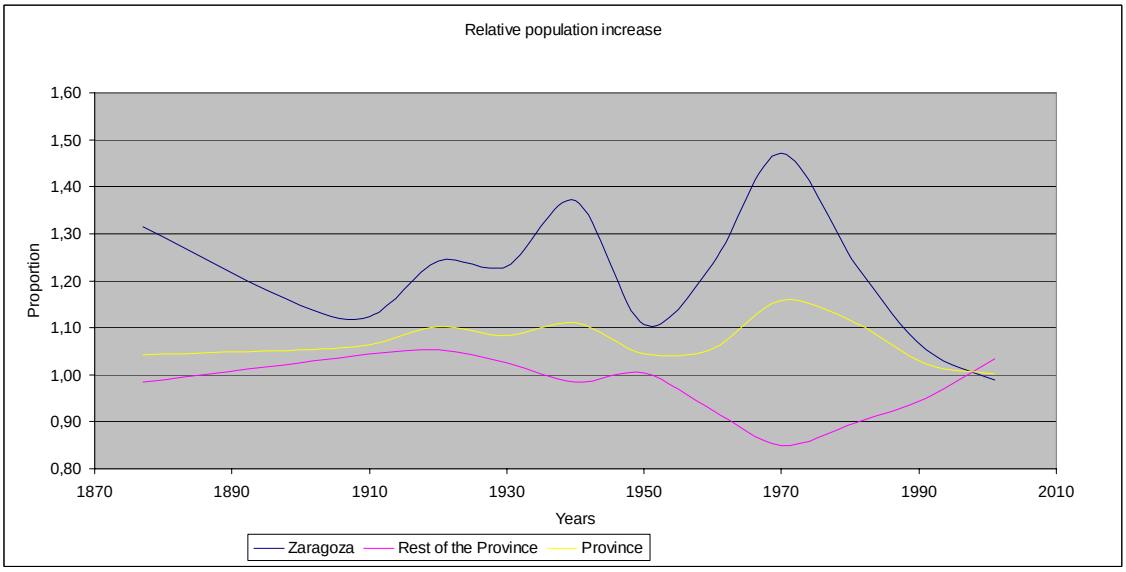


Figure 2.18. Relative increase in the population of Zaragoza (1857-2001)[134]

[133] INE (own elaboration)
[134] INE (own elaboration)

2.2.7. Málaga[135]

The population recorded for Málaga in the 1857 Census was just under that of 100,000 persons, which at that time represented 22% of the population of the province. The population of what would later become the wider metropolitan urban region, i.e. the urban agglomeration, was just over 132,000 representing under 30% of the population of the province. By 1940 the population of the city had doubled and then doubled again during the decade 1970-1981. Indeed by 1981 the city had a population in excess of 500,000 persons. This pattern was matched by the growth of the wider metropolitan urban region as well.

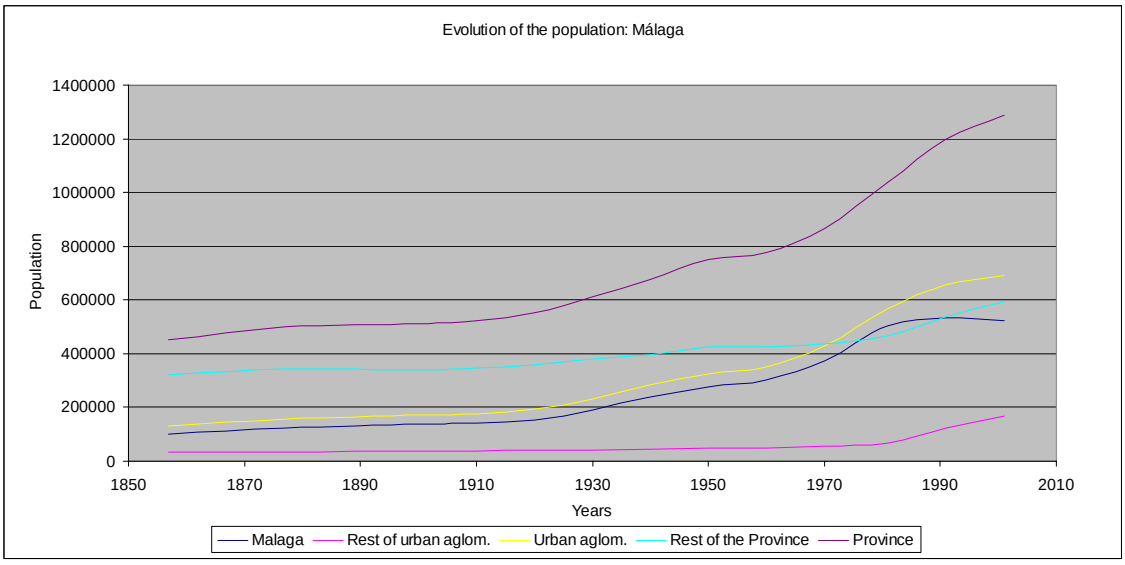


Figure 2.19. Evolution of the population of Málaga (1857-2001)[136]

It was over the ten year period leading up to the 1981 that the highest relative and absolute increases in population of the central city of Málaga were experienced, with an addition of almost 129,000 persons, representing an increase of 34% over the previous Census period. At that point, over 48% of the population of the Province was contained within the central city. The relative increase in population of the central city over this period (1970-1981) was matched by that experienced in the wider surrounding agglomeration, which witnessed an absolute increase of over 140,000 persons. This period leading up to 1981 marked the moment that the population of the wider metropolitan urban region of Málaga (i.e. the Urban Agglomeration) overtook that of the remainder of the province, reaching a peak in 1981 of almost 55% of the population of the province.

[135] The central municipality of Málaga; the rest of the Urban Agglomeration; the Urban Agglomeration; the rest of the Province; and the Province of Málaga.

This growth was all in phase with that experienced in the Province, increasing by 19% over the same 1970-1981 period and accounting for an additional 168,000 persons. However it was in the following Census period, 1981-1991 that the highest increases in population took place in the periphery of the wider metropolitan urban region, away from the central city, as indeed occurred in the part of the Province beyond the limits of the wider metropolitan urban region. In the remainder of the wider metropolitan urban region, the population grew by over 87% to account for an additional 57,500 persons while within the rest of the province the rate of growth was more modest, but accounted for an increase in absolute numbers of more than 72,000 persons.

[136] INE (own elaboration)

MÁLAGA	1857	1877	1900	1910	1920	1930	1940	1950	1960	1970	1981	1991	2001
Malaga	99586	121987	137020	140075	154377	188901	238782	276222	301048	374452	503251	534683	524414
% of Province	22,06	24,38	26,76	26,76	27,85	30,81	35,25	36,82	38,84	43,17	48,56	44,66	40,75
Evolution (relative)		*1,22*	*1,12*	*1,02*	*1,10*	*1,22*	*1,26*	*1,16*	*1,09*	*1,24*	*1,34*	*1,06*	*0,98*
Evolution (absolute)		*22401*	*15033*	*3055*	*14302*	*34524*	*49881*	*37440*	*24826*	*73404*	*128799*	*31432*	*-10269*
Rest of urban aglom.	32486	35050	36325	36937	40002	41614	44708	48014	49135	54518	65875	123386	167669
% of Province	7,20	7,01	7,09	7,06	7,22	6,79	6,60	6,40	6,34	6,29	6,36	10,31	13,03
Evolution (relative)		*1,08*	*1,04*	*1,02*	*1,08*	*1,04*	*1,07*	*1,07*	*1,02*	*1,11*	*1,21*	*1,87*	*1,36*
Evolution (absolute)		*2564*	*1275*	*612*	*3065*	*1612*	*3094*	*3306*	*1121*	*5383*	*11357*	*57511*	*44283*
Urban aglom.	132072	157037	173345	177012	194379	230515	283490	324236	350183	428970	569126	658069	692083
% of Province	29,26	31,39	33,86	33,82	35,07	37,59	41,85	43,22	45,18	49,46	54,92	54,96	53,77
Evolution (relative)		*1,19*	*1,10*	*1,02*	*1,10*	*1,19*	*1,23*	*1,14*	*1,08*	*1,22*	*1,33*	*1,16*	*1,05*
Evolution (absolute)		*24965*	*16308*	*3667*	*17367*	*36136*	*52975*	*40746*	*25947*	*78787*	*140156*	*88943*	*34014*
Rest of the Province	319334	343285	338644	346400	359922	382645	393984	425879	424984	438360	467135	539239	594934
% of Province	70,74	68,61	66,14	66,18	64,93	62,41	58,15	56,78	54,82	50,54	45,08	45,04	46,23
Evolution (relative)		*1,08*	*0,99*	*1,02*	*1,04*	*1,06*	*1,03*	*1,08*	*1,00*	*1,03*	*1,07*	*1,15*	*1,10*
Evolution (absolute)		*23951*	*-4641*	*7756*	*13522*	*22723*	*11339*	*31895*	*-895*	*13376*	*28775*	*72104*	*55695*
Province	451406	500322	511989	523412	554301	613160	677474	750115	775167	867330	1036261	1197308	1287017
% of Province	100	100	100	100	100	100	100	100	100	100	100	100	100
Evolution (relative)		*1,11*	*1,02*	*1,02*	*1,06*	*1,11*	*1,10*	*1,11*	*1,03*	*1,12*	*1,19*	*1,16*	*1,07*
Evolution (absolute)		*48916*	*11667*	*11423*	*30889*	*58859*	*64314*	*72641*	*25052*	*92163*	*168931*	*161047*	*89709*

Table 2.8. Demographic dynamics of the Province of Málaga (1857-2001)[137]

[137] INE (own elaboration)

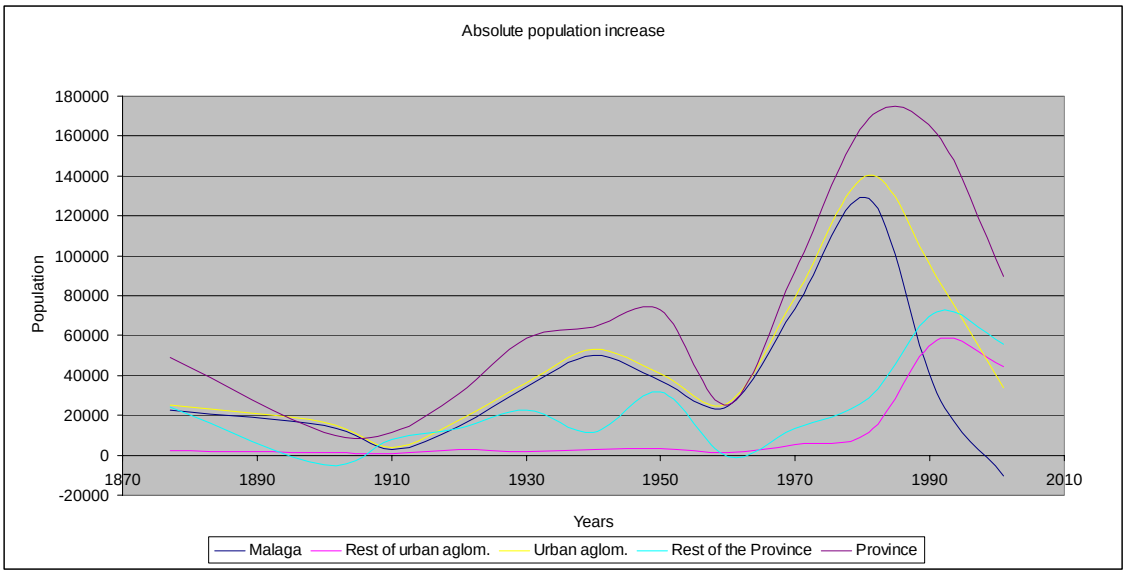


Figure 2.20. Absolute increase in the population of Málaga (1857-2001)[138]

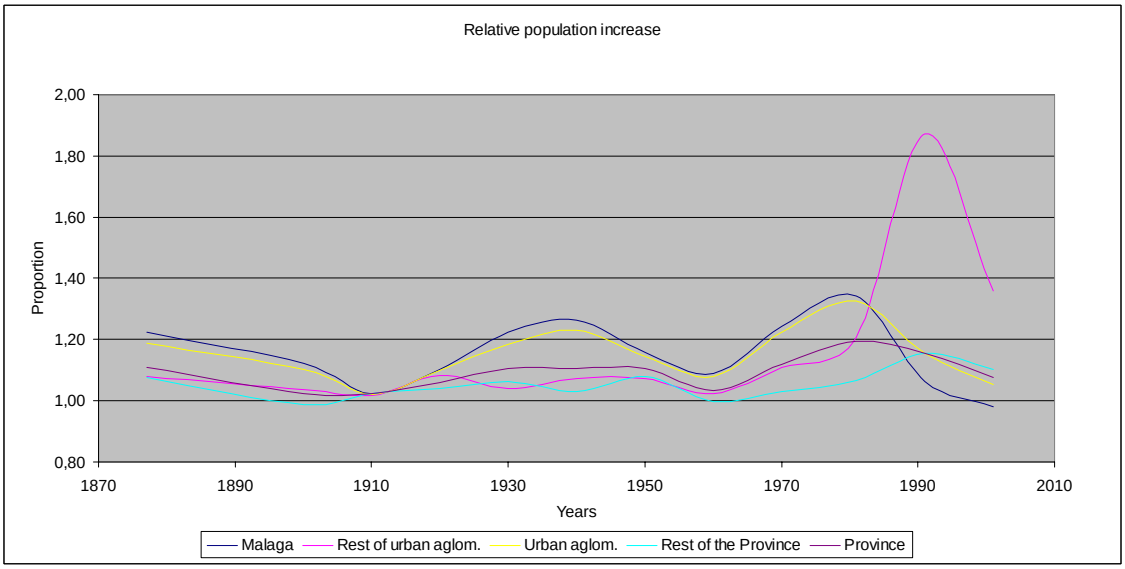


Figure 2.21. Relative increase in the population of Málaga (1857-2001)[139]

The period 1991-2001 marked a relative decline in population of Málaga of 2%, representing an absolute loss of over 10,000 persons. At the time of the 2001 Census the city had a population of almost 525,000 persons, accounting for almost 41% of the population of the province. The wider metropolitan urban region had a population nearing on 700,000 persons, representing almost 54% of that of the province.

[138] INE (own elaboration)
[139] INE (own elaboration)

Concluding remarks

What this analysis of the growth of the seven principal metropolitan urban regions indicates is in the first place a clear differentiation between the Madrid and Barcelona, and the remaining cases of Valencia, Sevilla, Bilbao, Zaragoza and Málaga. The two largest metropolises have expanded in phase with one another and at magnitudes far above those of the other five metropolitan agglomerations (Figure 2.22). Madrid stands out for the highest levels of population but also for the dramatic surge in the increase in population experienced in the period leading up to 1970, as evidenced by Figure 2.23. Both Madrid and Barcelona experienced increases in their population toward the end of the 19th Century and in the first part of the 20th Century, with definitive surges in the period leading up to 1930. These surges, resulting from this detailed analysis of the demographic changes of the seven metropolitan urban regions, coincide with Mumford's observations of the two cities having surpassed the 1 million level by 1930 (see Table 2.25). To a certain extent this phasing has been reflected in the case of Bilbao, albeit, as a much lower level, whereas the peaks in the relative population increases have occurred later in the case of the remaining metropolitan urban regions.

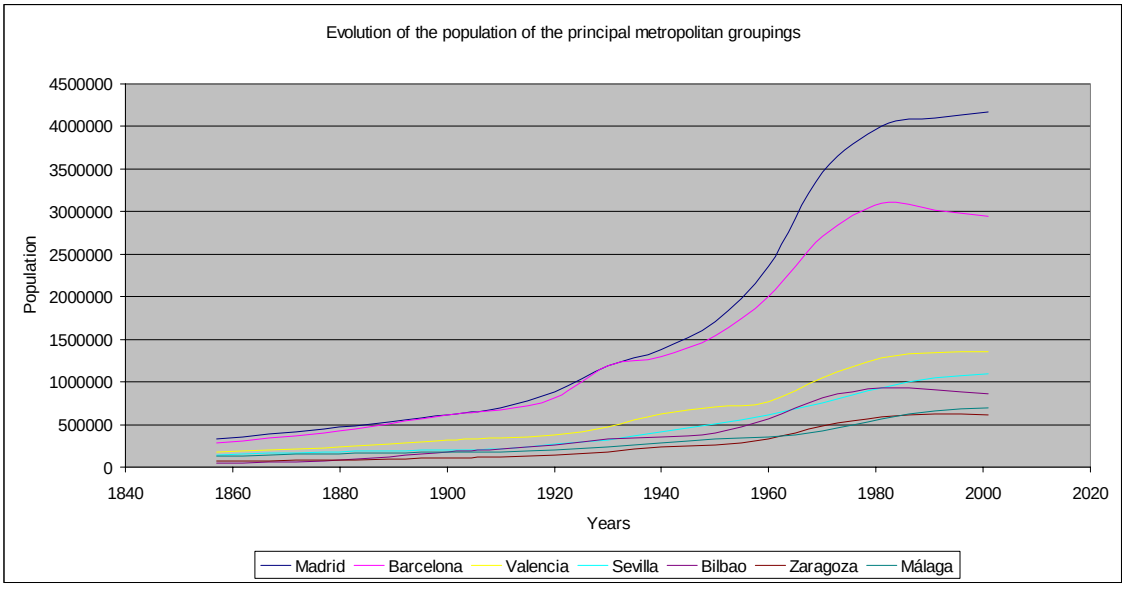


Figure.2.22. Evolution of the population of the metropolitan agglomerations (1857-2001)[140]

The detailed analysis also highlights the more advanced processes of urbanisation and metropolisation experienced in Madrid, Barcelona, Valencia, Bilbao and Zaragoza, with respect to the other cities of the sample. It is clearly evident of a north-south divide in

[140] INE (own elaboration)

terms of these processes, with marked delays in appearance of these phenomena in the cases of Sevilla and Málaga.

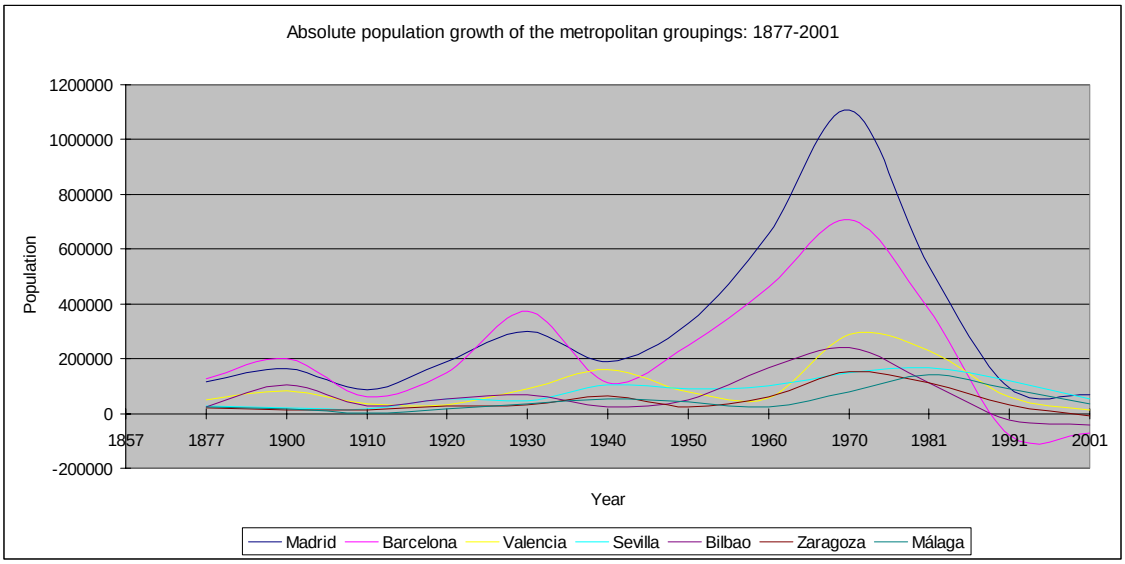


Figure 2.23. Absolute increase in the population of the metropolitan agglomerations (1857-2001)[141]

Drawing upon Blumenfield's definition of a metropolis 'as a concentration of at least 500,000 people living within an area in which travelling time from the outskirts to the centre is no more than about 40 minutes' (Blumenfield, 1965, p.64) it can be observed that by 1980, each of the metropolitan agglomerations under review here had well surpassed this level. As previously mentioned Madrid and Barcelona had both exceeded the 1 million level of population by 1930. Valencia grew to exceed the 500,000 population limit by 1940, followed by Sevilla, by 1950, and Bilbao by 1960, with both Zaragoza and Málaga delaying by a further 20 years until 1981.

Tables 2.25-2.27 highlight the surge in the increase of population in the central municipalities of the metropolitan agglomeration experienced in the post 1950 period, but also the difference in the timing of the more recent population losses of Madrid, Barcelona and Bilbao, and the remaining metropolitan urban regions.

[141] INE (own elaboration)

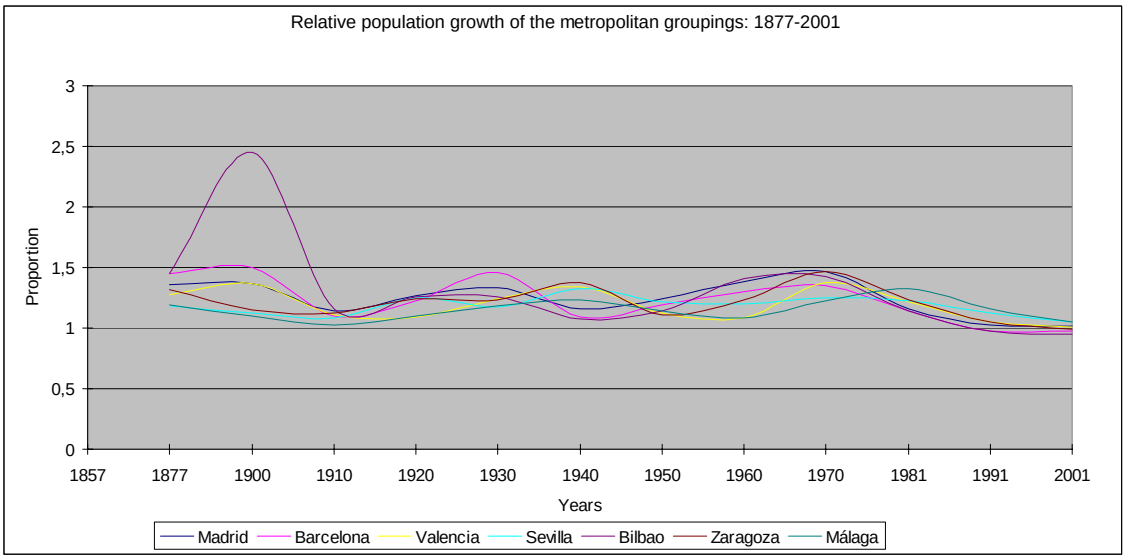


Figure 2.24. Relative increase in the population of the metropolitan agglomerations (1857-2001)[142]

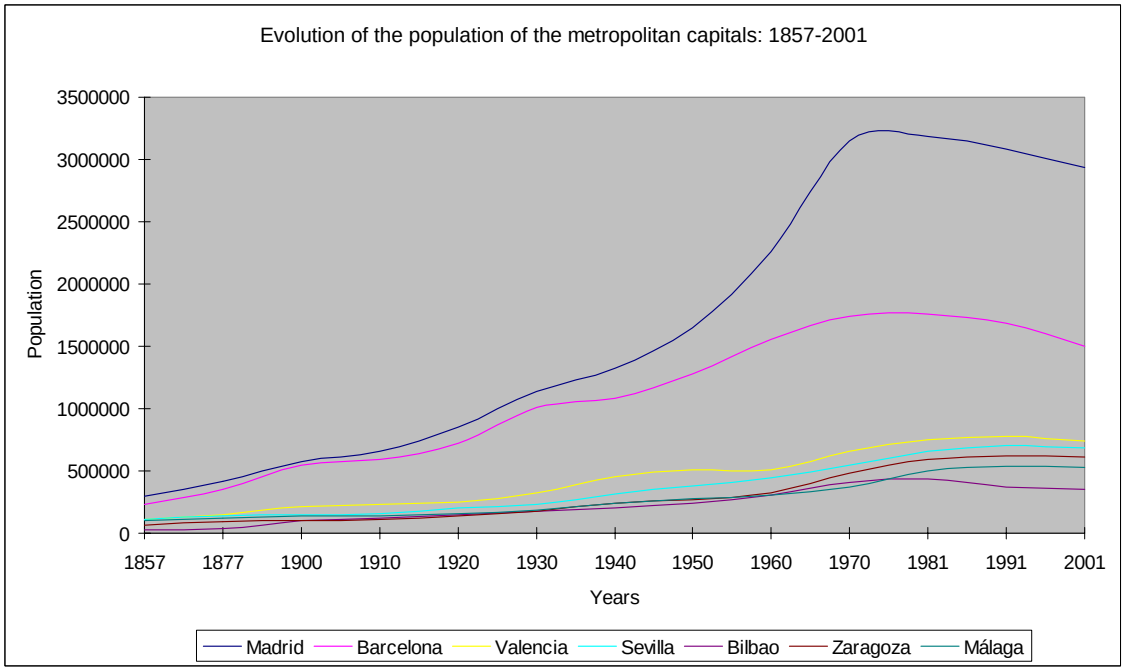


Figure 2.25. Evolution of the population of the metropolitan capitals (1857-2001)[143]

[142] INE (own elaboration)
[143] INE (own elaboration)

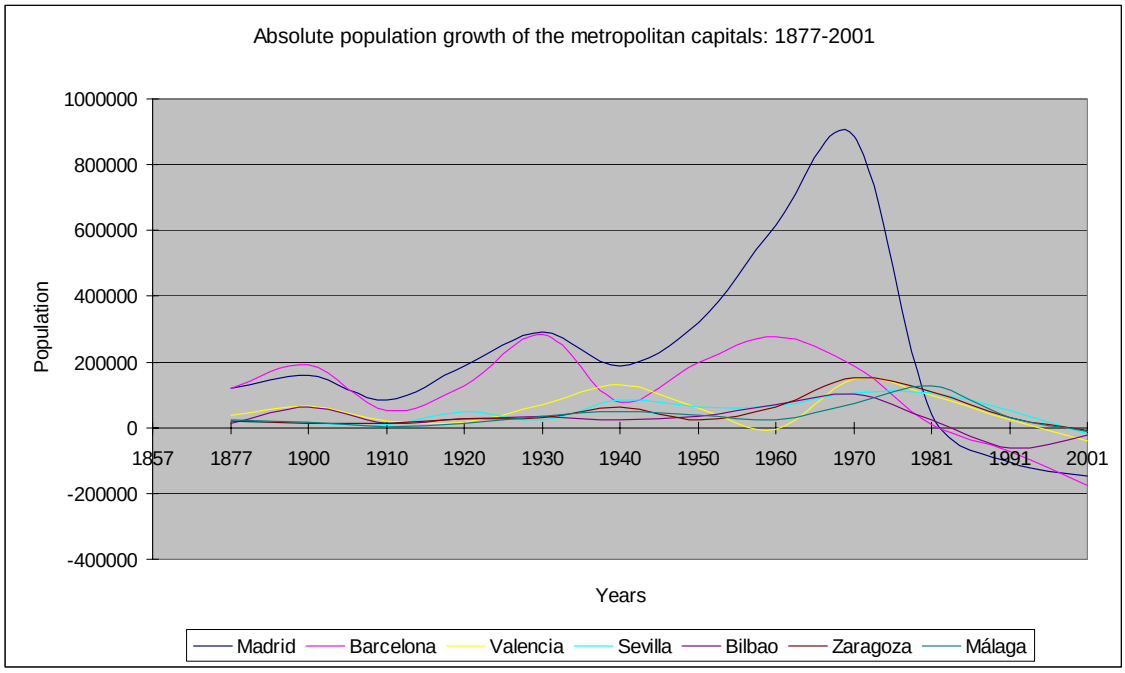


Figure 2.26. Absolute increase in the population of the metropolitan capitals (1857-2001)[144]

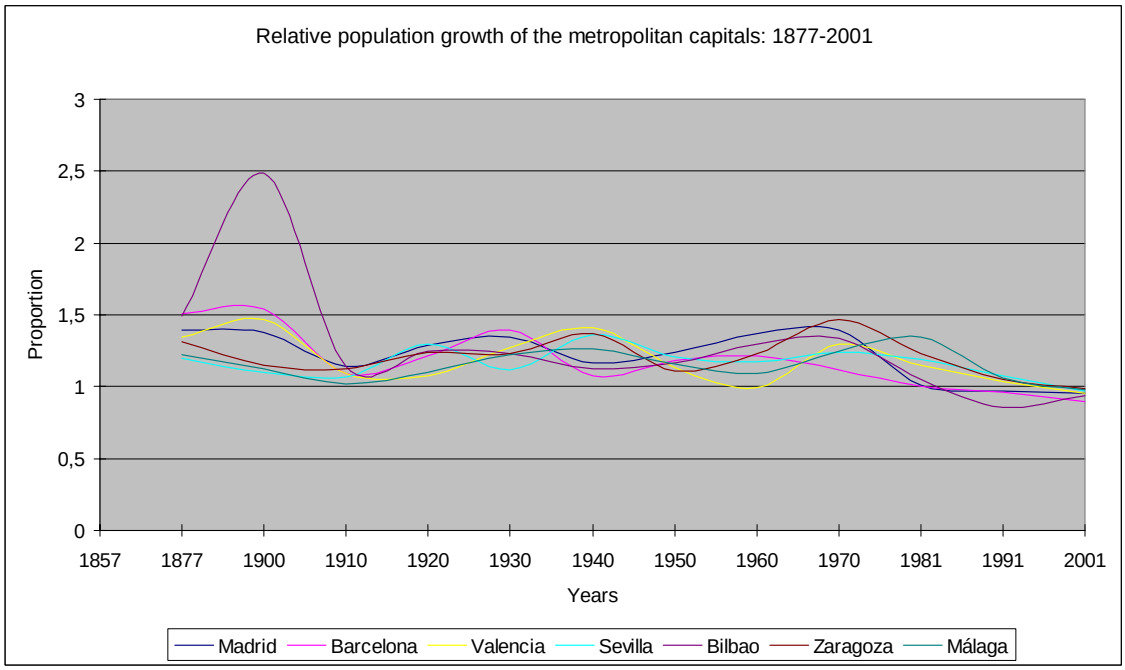


Figure 2.27. Relative increase in the population of the metropolitan capitals (1857-2001)[145]

Having detected the apparently historical bicephalic nature of the Spanish urban system, attention can be turned to explore the internal demographic and functional structures of the seven metropolitan urban regions in Chapters 4 and 5. However prior to that, it is necessary to focus upon the different approaches to determining the spatial units of analysis for comparative urban and regional research. Chapter 3 will therefore

[144] INE (own elaboration)

lead to the choosing of the methodology for determining the spatial extent and demographic characteristics of each of the seven Spanish metropolitan urban regions.

[145] INE (own elaboration)

CHAPTER 3. – THE SPATIAL DIMENSIONS OF THE SPANISH METROPOLITAN SYSTEM

Introduction

This chapter sets out to establish the spatial units of analysis of the seven metropolitan urban regions which together comprise the Spanish metropolitan system. An overview is presented of a number of different standard approaches to the delimitation of urban agglomerations, applying each of these to the case of Madrid as an example. This is, followed by an explanation of the functional methodology adopted by the UPC in the context of the two research projects of the INTERREG Programmes[146], in order to define the spatial extent of each of the seven metropolitan urban regions of the Spanish metropolitan system – Madrid, Barcelona, Valencia, Sevilla, Bilbao, Zaragoza and Málaga. These are briefly described in broad demographic and spatial terms, prior to contrasting them with a series of other complementary spatial descriptions utilised by different public bodies over recent years in Spain.

[146] The *Estudio Prospectivo del Sistema Urbano del Sudoeste Europeo* (INTERREG IIC) (1998-2001); and the *Expansión Urbana de las Metrópolis del Sudoeste Europeo* (EURMET) (INTERREG IIIB) (2003-2005).

3.1. Approaches to the delimitation of urban agglomerations

Different methodologies exist for the delimitation of urban and metropolitan agglomerations. Nel·lo (1998) put forward five groups of criteria (legal-administrative; morphological; functional; economical-productive; and services) but recognises these can be combined to provide more complex definitions of urban space. The prime example is that of the United States Census Bureau's definition of the Statistical Metropolitan Statistical Areas, which combines legal-administrative, demographic, morphological and functional elements.

More recently Roca (2003) focused on four principal approaches, albeit acknowledging the possibility of the legal-administrative approach:

a) The *morphological* approach which places the accent on the physical continuity of urban form (for example, separation distances < 200 metres). The urban continuity or built up form of the urban agglomerations is clearly differentiated from the remainder of the surrounding territory.

b) The *demographic* approach is based upon population density (for example, population density > 250 inhabitants/Km^2) as the key factor for differentiating such areas in relation to surrounding rural environments.

c) The *economic* approach differentiates the urban agglomeration from the surrounding rural areas in terms of the percentage of employment in professional urban categories (for example, professional urban employment > 66%).

d) Finally, *functional* approaches place the emphasis on principally employment related mobility flows, between the places of residence and the place of work. This allows for the application of different thresholds or cut-off points – for example urban catchments where the threshold is the attraction of at least 15% of the employment from adjoining areas.

Each of these methodologies will be analysed in greater detail in Sections 3.1.1-3.1.4.

3.1.1. Morphological approach

The first criteria developed for defining the city in the age of metropolitan growth were identifiable by a distinctly *morphological* component. Once the *urban agglomerations* had exceeded the administrative limits of the central city, they were initially defined in terms of strictly *physical* criteria, together with the traditional interpretation of the city, seeing it as a form, both ancient and rudimentary, which was related to a determined

regional analysis. The contiguity of urban growth was presented in this manner, as a defining element to make the distinction between the city and its rural environment.

The *metropolitan districts* defined in the United States in 1910 and the British *conurbations*, established formally in 1951, (as previously discussed in Chapter 1) are sufficiently well known examples of this type of delimitation. Similarly, it is possible to cite the recommendations of the United Nations, which established the concept of the urban agglomeration in terms of continuous construction without any discontinuity which exceeds 200 metres, based on officially established characteristics in various countries, particularly France[147].

Although the results are today outdated, passing reference has to be made to the contribution made by the projects backed by the NUREC network (NUREC, 1994), which led to the delimitation of 330 European agglomerations with populations of more than 100,000 inhabitants. The project drew upon the concept of urban agglomeration as the urban continuum in which at least 100,000 inhabitants are grouped, using in the Spanish case the population deriving from the 1991 Census of Population and determining the concept of the urban continuum as the urban fabric without discontinuities greater than 200 metres.

Looking at the application of the NUREC criteria to the example of Madrid, this did not lead to the delimitation of just one single metropolitan agglomeration, but rather seven clearly defined agglomerations: i) Madrid, Coslada (comprising Coslada, Madrid, Pozuelo de Alarcón and San Fernando de Henares); ii) Alcalá de Henares; iii) Alcobendas, San Sebastián de los Reyes (comprising Alcobendas and San Sebastián de los Reyes); iv) Alcorcón; v) Fuenlabrada, Parla (comprising Fuenlabrada, Humanes de Madrid and Parla); vi) Leganés, Getafe (comprising Getafe and Leganés); and finally vii) Móstoles. The characteristics of the seven urban agglomerations can be seen in Table 3.1, with the corresponding 1991 population figures. Taken together these agglomerations resulted in a population of 4,314,778 inhabitants lying within a territory of 1,185 km^2.

[147] For an analysis of the official definitions of urban agglomeration, see Pumain *et. al.* (1992)

NUREC (1994) morphological approach	Agglomerations	Municipalities.	Population 1991	Area (km^2)
Madrid	Madrid, Coslada	4	3,158,036	710
	Alcalá de Henares	1	159,355	88
	Alcobendas, San Sebastián de los Reyes	2	132,432	104
	Alcorcón	1	139,622	34
	Fuenlabrada, Parla	3	222,459	83
	Leganés, Getafe	2	310,779	121
	Móstoles	1	192,018	45
Total	7	14	4,314,778	1,185

Table 3.1. Summary of the agglomerations in the area of influence of Madrid, according to NUREC (1994)

This approach to the delimitation of urban areas, appropriate for the age in which the city used to spread concentrically, has proved to be inadequate in the age of suburbanisation and 'sprawl'. Improvements in communications, both rail and road, have generated urban structures strongly characterised by physical discontinuity. This approach therefore belongs to a very specific moment in urban development: the period that characterised the evolution of cities during the second half of the 19th Century. However it has proved to be totally incapable of tackling, or understanding, the processes of urban decentralisation which began with suburbanisation and which were accentuated with de-urbanisation. The metropolis, interpreted as a functional area or region, which was interdependent and characterised by a complex network of relationships and interconnections of the distinct urban continuums, is intrinsically indefinable and incapable of being delimited using a strictly morphological approach.

3.1.2. Demographic approach

If compared to rural environments, urbanisation was characterised by concentrations of population, then *demographic density* would be capable of providing an effective means of evaluating the urban phenomenon.

Density has, without doubt, been the most frequently used concept in the area of urban delimitation based upon demographical characteristics. The redefining of the Metropolitan Districts in the USA, in 1940, represented a first step in this direction. These were defined as city centres (of more than 50,000 inhabitants) with smaller administrative divisions with population densities in excess of 150 inhabitants per square mile (Bureau of the Census, 1942). This criterion would, in 1950, give rise to the North American concept of the 'urbanised area', which is still used today[148].

More recently, density has continued to play a key role in the design of delimitation criteria. An example is that used by GEMACA (1996)[149] in order to define 'morphological agglomerations of an urban nature. It was even used as the basic delimitation criterion of the Urban Audit[150], promoted by EUROSTAT and the then DG XVI of the European Commission, which it adopted in its task of compiling and constructing urban and environmental indicators.

In spite of its relative proliferation, such as in the current maintenance of determined studies using demographic criteria[151], delimitations of this kind were abandoned some time ago as far as the basic methodology for defining the metropolitan phenomenon is concerned. The progressive suburbanisation and diffusion of metropolitan urban regions has created a widespread land use pattern characterised by low densities, in such a way that one can no longer state with any certainty that high densities are synonymous with the city, as opposed to the unpopulated country. In this regard the fact that the United States Bureau of the Census abandoned this type of delimitation in 1950 is significant.

In the case of Madrid, the application of population density thresholds of 250 inhab./km^2 and 500 inhab./km^2, taking into consideration the population from the 2001 Census,

[148] The urbanised area has been described, therefore, as an area which includes one or more central locations and a densely constructed contiguous region, with a minimum population of 50,000 inhabitants and a density greater than or equal to 1,000 inhabitants per square mile. The urbanised area also includes any exterior region with a density greater than or equal to the cited 1,000 people per square mile if it is connected to the heart of the contiguous area by road, and located at a distance of less than a mile and a half, or within a radius of five miles measured by road, if separated from the urbanised core by land which cannot be developed or by water. This equally includes any other region with a density of less than 1,000 inhabitants/square mile, if its inclusion permits the elimination of an enclave or closes a cutting in the limit of the urbanised area. Density is determined: 1) outside of a 'place', by contiguous 'census blocks' with a density greater than or equal to that quoted above, or 2) including a place which contains census blocks of at least 50% of the population of the place and a density in excess of 1,000 inhabitants/square mile. See Bureau of the Census (1990) for further details.

[149] GEMACA (1996) defines the morphological agglomeration of a functional urban region (FUR) as a group of adjacent administrative entities with a density in excess of 700 inhabitants/ km^2.

[150] In this Urban Audit, metropolitan agglomeration (in cases where there is no official metropolitan area) as a group of adjacent administrative entities (at a more separate NUT level) with a density in excess of 500 inhabitants/km^2.

[151] The criterion of density, however, beyond its strictly demographic scope, has continued to be used frequently in the specialist literature. For example, it was used by Hall and Hay (1980), Cheshire et. al. (1986), Cheshire and Hay (1989) and GEMACA (1996), in order to define the central economic agglomerations of functional urban regions, using it to determine a condition of economic density (>700 jobs/ km^2). It was also used by Berry (1995) in terms of the density of

lead to the territorial extensions of de 2,370 km^2 and 1,707 km^2 respectively. There are some 40 municipalities in the area surrounding Madrid, where the density is higher than 250 inhab./km^2, which extend into Castilla La Mancha to include Guadalajara to the east, as well as leaping the boundary of the Autonomous Community to include Yuncos to the south. This grouping of municipalities has a population of some 5.08 million inhabitants. By contrast the 500 inhab./km^2 threshold indicates just 29 municipalities relatively more concentrated around the central municipality of Madrid, with a population of 4.87 millions inhabitants. Nevertheless this grouping shows the same tendency of extending towards the east, along the route of the N-II (Madrid-Zaragoza). However the differences in the economically active population (POR) and locally based jobs (LTL) for the two areas do not appear to be significant.

Demographical approach	No. of municipalities	Area km^2	Population (2001)	Economically active population (POR)	Locally-based jobs (LTL)
> 250 hab./km^2	41	2,370	5,080,270	2,310,131	2,303,026
> 500 hab./km^2	29	1,707	4,873,946	2,210,749	2,219,376

Table 3.2. Characteristics of the metropolitan delimitations resulting from the application of the demographic criteria for the area of Madrid

3.1.3. Economic approach

A third type of criteria relative to the delimitation of metropolitan urban regions consisted of recognising their urban characteristics in terms of their *economic structure* and, in some cases, the *lifestyle* of the population. In this context, it has been customary to identify a rural lifestyle with a production structure which is basically agrarian (primary sector), whereas industry, tertiary sectors and services are characteristics of urban life. More specifically, it could be said that the city, or the metropolis, generates *agglomeration economies* that make it more productive than rural environments. The concentration of *externalities* of this kind would be a determining factor in differentiating the urban from the rural in the resulting land.

Once again, one of the key references of an economic structure, used as a determining factor for land of a metropolitan nature, can be found in the metropolitan area

residential dwellings by area in order to define the *densely settled areas* which he proposed as a substitute for central cities of American Metropolitan Areas.

regulations (SMA), which was established by the United States Census in 1950. This definition modified the notion of the metropolis, going beyond the previous morphological and demographic criteria, basing urban and metropolitan population characteristics on the composition of employment. By considering peripheral counties which had at least 2/3 of the active population employed in non-agricultural work, together with other requirements, to be metropolitan, provided evidence of a change of perspective implemented towards the middle of the century.

Despite these efforts, this has not led to the production of a doctrine favouring the viability and efficiency of models based upon economic structure. The continual modifications made to the definition of metropolitan area in the United States are an example of the imprecise nature of the economic structure concept used to delimit the 'urban' from the 'non-urban', particularly during historic periods, for example after 1950, when the traditional differences between economic sectors tended to disappear. As a result, the continual transformation of the economy would lead the United States Bureau of the Census to increase the number of non-agricultural jobs to 75% in 1960, as opposed to the previous figure of 66% (Bureau of the Budget, 1964), in the definition of SMSAs. Finally, when the United States Census abandoned this concept in the definition of metropolitan areas in the 1990s, this highlighted the failure of such a concept in an economic context in which the traditional differentiation between sectors no longer apply and where the proliferation of industrial and tertiary activities characterise the most recent phase of *periurbanisation* and sprawl of the city across the region.

Looking at the case of Madrid, a basic analysis of the economic structure indicates that the application of the economic criteria results in the delimitation of areas of influence much larger than those deriving from the demographic criteria. Furthermore, by introducing different thresholds of 66%, 75% and 90% of the locally-based jobs in the 'urban professions', that is 'urban' economic activities (the construction, industrial and service sectors), it is noted that in each of the three cases, the resulting metropolitan delimitations are much larger than the previous delimitations deriving from criteria of demographic density. Although there area considerable differences in the territorial dimensions of these three groupings of municipalities, ranging from the 22,049 km^2 of the delimitation with more than 66% of its locally based jobs in the urban professions, to the 11,575 km^2 of the delimitation according to the 90% threshold of the LTLs grouped in these same activities, the corresponding figures for the total populations, the POR and the LTLs do not alter significantly between them.

Economic approach (urban professions)	No. of municipalities	Area km^2	Population (2001)	Economically active population (POR)	Locally-based jobs (LTL)
> 66%	442	22,049	5,822,119	2,603,074	2,521,988
> 75%	384	19,169	5,786,945	2,590,542	2,513,692
> 90%	238	11,575	5,657,956	2,544,185	2,486,209

Table 3.3. Characteristics of the metropolitan delimitations resulting from the application of the economic criteria for the area of Madrid

3.1.4. Functional approach

Without doubt, it is the functional delimitations, particularly those based on residence/employment relationships, which have been the most widely used in recent decades. The introduction of these criteria for defining metropolitan areas in 1950 by the United States Bureau of the Census represented a landmark in this regard[152]. Similarly, the introduction of Standard Metropolitan Statistical Areas (SMSA) in 1960 served to confirm the absolutely central role played by functional flows in the modern definition of the metropolis (Bureau of the Budget, 1964).

During the 1980s and 1990s a range of studies were developed directed towards the delimitation of functional urban regions (FUR) in Europe. In this same line the GEMACA (1996) group established an alternative methodology in order to compare real urban regions in North Western Europe, which went beyond arbitrary administrative limits. As a result, consistent criteria were applied to the regions of London, Paris, Lille, Brussels, Randstat, Rhine-Ruhr and Frankfurt by determining: a) the centre of the system, or *economic agglomeration* of the FUR, formed by the area surrounding the central city (and including this) with an employment density exceeding 7 locally based jobs per Hectare (700 jobs/km^2); b) a *morphological agglomeration* developed around the economic agglomeration (and including it) characterised by a group of municipalities with a demographic density equal to or greater than 7 inhabitants per Hectare (700 inhab./km^2); and c) the *functional urban region*, which was defined as the employment market area formed by the municipal boundaries in which more than 10% of the resident population work in the principal economic agglomeration (or in other agglomerations, in the case of multi-polar urban regions).

The application of these criteria in the case of Madrid would lead to an *economic agglomeration* of some 823 km^2; a *morphological agglomeration* of 1,372 km^2; and finally a *Functional Urban Region* of 16,977 km^2, with 5.65 million inhabitants. This FUR would characterised by an economically active population of 2.5 million persons and 2.46 million locally-based jobs. (See Table 3.7)

Functional approach (GEMACA)	No. of municipalities	Land area km^2	Population (2001)	Economically active population (POR)	Locally-based jobs (LTL)
Economic Agglomeration	7	823	3,814,610	1,698,269	1,815,220
Morphological Agglomeration	19	1,372	4,612,507	2,072,674	2,112,085
Functional Urban Region	360	16,977	5,649,733	2,534,765	2,463,845

Table 3.4. Characteristics of the urban agglomeration of Madrid, according to GEMAC criteria

Another functional approach to the determination of the spatial extent of areas of influence is that which was carried out as part of the ESPON studies across the EU27+2[153] group of countries. This involved the definition of Functional Urban Areas (FUA), comprising a central urban core and a surrounding area of influence through commuting[154]. The central urban core required a population of at least 15,000 persons. In the larger countries of the EU27+2 grouping, the commuting catchment area required a population of 50,000 persons, while in smaller countries this threshold was lower, standing at 20,000 persons. This methodology led to the identification of some 1,595 FUAs across the EU27+2 set of countries. The results of this methodology in terms of the resulting hierarchy of European metropolitan urban regions, following the application of a number of criteria, is important in contributing to form the basis for the sample of European metropolitan urban regions against which the quantitative measurement of the positioning of the Spanish metropolitan urban regions is carried out in Part II. (See Chapter 7, Section 7.4 and Chapter 8).

[152] It should be borne in mind that the "metropolitan nature" of the counties added to the Standard Metropolitan Areas of 1950 was determined, among other aspects, by the fact that they sent more than 15% of their residential population to the central county (or received at least 25% of their jobs from the central city of the metropolitan area).

[153] Belgium, France, Germany, Italy, Luxembourg, The Netherlands, the United Kingdom, Denmark, Ireland, Greece, Spain, Portugal, Austria, Finland, Sweden, the Czech Republic, Estonia, Cyprus, Latvia, Lithuania, Hungary, Malta, Poland, Slovenia, Slovakia, Bulgaria and Rumania (EU27) and Norway and Switzerland.

[154] This catchment area was taken to be the spatial extension which could be reached within a travelling time of 45 minutes by car. See Annex D (Morphological analysis of urban areas based on 45-minutes isochrones) of the Final Report (ESPON, 2004) for a full explanation of the methodology followed to reach the corresponding catchment areas.

3.2. Methodology of metropolitan delimitation

Keeping in mind the details of the functional approach to the delimitation of urban and metropolitan agglomerations, it is appropriate to turn the attention towards the United States' Metropolitan Areas. The continued efforts to analyse metropolitan phenomena, which had began in 1910, and which were undertaken with greater vigour after 1950, resulted in the 1990s in new conceptual developments which can perhaps shed light upon the future of urban analysis. Just as the Metropolitan Districts were pioneering in the application of morphological criteria for delimitation in 1910, which were substituted by demographic density criteria in 1940, in the same way in 1950 economic criteria were introduced for defining the metropolitan character, which further evolved through time until their eradication from the definition of Metropolitan Area. In the same way that the functional (residence/work) factor was introduced in the notion of metropolitan area, firstly (1950 and 1960) as an additional element in the determination of the degree of metropolitan integration, and later as a decisive and central element of the very conception of metropolis, the more recent evolution of the analysis of the metropolitan phenomenon in the United States illuminates new elements for reflection.

The most recent element which needs to be highlighted is that in 1983 there was a decisive change in the definition of the North American metropolitan statistics. The Standard Metropolitan Statistical Areas were substituted by *Metropolitan Areas* (MA), formed at the same time by the *Metropolitan Statistical Areas* (MSA), the *Consolidated Metropolitan Statistical Areas* (CMSA) and the *Primary Metropolitan Statistical Areas* (PMSA). More concretely it was accepted that some macro metropolitan areas (CMSA) could contain primary metropolitan areas (PMSA). This course of action led to the recognition of the change of territorial scale brought about in the metropolitan phenomenon. The metropolis, in the era of peri-urbanisation, expanded to cover ever-increasingly more extensive areas, to include different metropolitan urban regions, in those cases where the process of urbanisation was found to be most advanced.

Later, in 1990, the notion of metropolitan area was redefined (Bureau of the Budget, 1990), confirming the division established in 1983 between MSAs (simple metropolitan areas) and CMSAs/PMSAs (consolidated and primary metropolitan areas). However the most significant element of the new metropolitan structure of the United Status was found in the definition of the standards applied to the six states of New England. There,

as was highlighted in the 1950 Census, the towns and cities[155] are more important than the counties from an administrative perspective. This led to the establishment of different criteria to those used in the rest of the United States, through which the principle of the functional relation between the place of residence and the place of work has reached its limits as the defining element of the metropolitan areas.

These functional criteria applied in New England are characterised by the abandonment of the static notion of metropolitan centre and periphery, in order to adopt a more dynamic conception where the 'centre' and 'periphery' tend to become confused, owing to the adopted iterative model. Accordingly the metropolitan urban region is determined by four such iterations which commence within the largest city of the urbanised area (with a population of at least 50,000 inhabitants) and imply the successive aggregation of towns and cities where the commuting proportion of their respective economically active populations (POR) is larger than, or equal to, 15%. In this way the first iteration is produced with regard to the principal centre, and the successive iterations are carried out with regard to the aggregations generated in each step.

Finally it needs to be added that the United States Census Bureau once again modified the official standards of metropolitan delimitation for the 2000 Census[156]. The most significant novelty, amongst other changes, was in the introduction of the concept of *micropolitan areas*[157], with which the concept of the urban system tends to become generalised in urban statistical analysis.

[155] This led to the metropolitan definition for New England being an instrument closer to the reality of Continental Europe, where the counties do not have a comparable administrative ambit.
[156] See Office of Management and Budget (1999), as well as Office of Management and Budget (2000).
[157] The 'micropolitan areas' are delimited when the metropolitan system has a centre (referred to as a Core Based Statistical Area) with a population of between 10,000-50,000 inhabitants. If the CBSA has a population greater than or equal to 50,000 inhabitants, a 'metropolitan area' is delimited.

3.3. Methodology adopted for the delimitation of the Spanish metropolitan urban regions

The inspiration for the *metropolitan delimitation* proposed for the seven Spanish metropolitan urban regions in the context of the INTERREG IIC and IIIB studies, came from that used by the U.S. Bureau of the Census for the states of New England. This methodology starts out from an iterative criterion of municipal aggregation for the delimitation of the metropolitan urban region of influence.

- In the first step, municipalities are added to form a grouping with the central municipality where a determined proportion[158] of the residents from adjoining municipalities of these commute to the central municipality for employment purposes.
- These municipalities, together with the central municipality, form an aggregation, which in turn forms the 'centre in a second iteration; here the proportion of residents from the non-aggregated municipalities who commute to the first aggregation is calculated, generating in the case of those whose commuting ratio lies above the established threshold, a new 'centre' or aggregation, together with the municipalities of the first iteration.
- This same process is repeated two more time, leading to the generation in the end of a spatial unit based upon travel to work flows, defined through four aggregations, which is more than 95% self-contained[159].

The novelty of re-calculating the spatial extent of the Spanish metropolitan urban regions previously defined in the context of the INTERREG IIC study[160], for the INTERREG IIIB study[161], and inspired in this methodological approach stems from the statistical exploitation of travel to work data contained within the 2001 Spanish Census. This Census incorporated for the whole of Spain[162], the information relating to the local employment of each municipality for the very first time. As a result, it was possible to analyse the functional travel to work patterns in a homogeneous manner, without having to resort to other data sources, such an questionnaires as had been the case up

[158] This proportion is greater than or equal to 15% of the economically active resident population (POR) (see Chapter 5 for a description of the POR indicator). This threshold of 15% is used in the first and successive iterations alike.
[159] The notion of self-containment implies the proportion of the economically active resident population (POR) which works in the same municipality in which it resides. Self-sufficiency is understood as the proportion of locally-based jobs (LTL) which are filled by the POR residing in the same municipality. (See Chapter 5 for a description of the LTL indicator.)
[160] The *Estudio prospectivo del Sistema Urbano del Sudoeste Europeo* (INTERREG IIC) (1998-2001).
[161] The *Expansión Urbana de las Metrópolis del Sudoeste Europeo* (EURMET) (INTERREG IIIB) (2003-2005).
[162] Previous Censuses and electoral registration questionnaires ('padrones') had included the key question relating to the place (municipality) of employment on a wholly optional basis at the discretion of the Autonomous Communities. The 2001 Census marked the first time that the question was included in an obligatory manner over the entire country.

until then in Madrid[163], or in the absence of data for some areas as had been experienced in the Autonomous Communities and Provinces adjoining Madrid and Álava (Bilbao) and the complete absence of data in the case of Aragón (Zaragoza). The information deriving from the 2001 Census was able to be analysed to determine the true spatial extent of the seven Spanish metropolitan urban regions for the first time, through the application of the same criteria across the one single and comprehensive data source.

It needs to be added that this methodology is the only one that enables tackling the issue of the 'centre', as well as the issue of the 'sub-centres':

- All of the alternative systems used for the definition of metropolitan urban regions start out from a *static definition of the centre* (for example, the municipality or group of adjoining municipalities which exceed a pre-determined population threshold or threshold of locally-based jobs), which conditions the final result of the metropolitan urban region as a function of the area initially selected. The iterative character of the procedure adopted allows the problem of the static definition of the centre to be solved, or at least minimised, by permitting the expansion of the same, owing to the successive aggregations generated in the delimitation process.
- The methodology undertaken, for the same reasons, resolves the problem of the *definition of the sub-centres, in the case of polycentric metropolitan structures*. The iterative procedure allows for the recognition of complex functional relations, in the form of a network, and identifies the sub-centres that are able to structure the territory in 'cities' at a second level.

[163] The Community of Madrid had not included this key question in any of the previous Censuses or electoral registry ('padrón') questionnaires. The same situation had applied in the two Autonomous Communities adjoining that of Madrid i.e. Castilla-La Mancha and Castilla-León, thereby impeding the verification of the outer limits of the Madrid's metropolitan urban region and the verification of whether or not it had extended beyond the limits of the Autonomous Community itself.

3.4. Spain's principal metropolitan urban regions

The application of the aforementioned criteria for the delimitation of the seven principal Spanish metropolitan urban regions resulted in the identification of metropolitan territories accounting for almost 40% of the Spanish population in 2001. As indicated by Table 3.9 Madrid heads the ranking of the metropolitan territories in terms of population, followed by Barcelona, Valencia, Sevilla, Bilbao, Zaragoza and Málaga. The ranking of the territories based upon their spatial extent is similarly headed by Madrid, but followed by Zaragoza, Sevilla, Valencia, Barcelona, Bilbao and Málaga, as shown by Table 3.5 and Figure 3.1.

Metropolitan urban region	No. of municipalities	Surface area (km^2)	Population (2001)	Proportion of Spain's population
Madrid	609	27,581	5,853,263	14.33%
Barcelona	227	4,796	4,542,509	11.12%
Valencia	152	6,347	1,739,126	4.26%
Sevilla	60	6,842	1,408,963	3.45%
Bilbao	104	2,675	1,096,000	2.68%
Zaragoza	267	15,084	775,479	1.90%
Málaga	26	1,656	722,019	1.77%
Metropolitan urban regions			16,137,359	39.51%
SPAIN			40,847,371	100%

Table 3.5. Spanish metropolitan urban regions according to the functional travel to work methodology[164]

[164] INE (2001) (in-house application of the methodology carried out by CPSV in 2004)

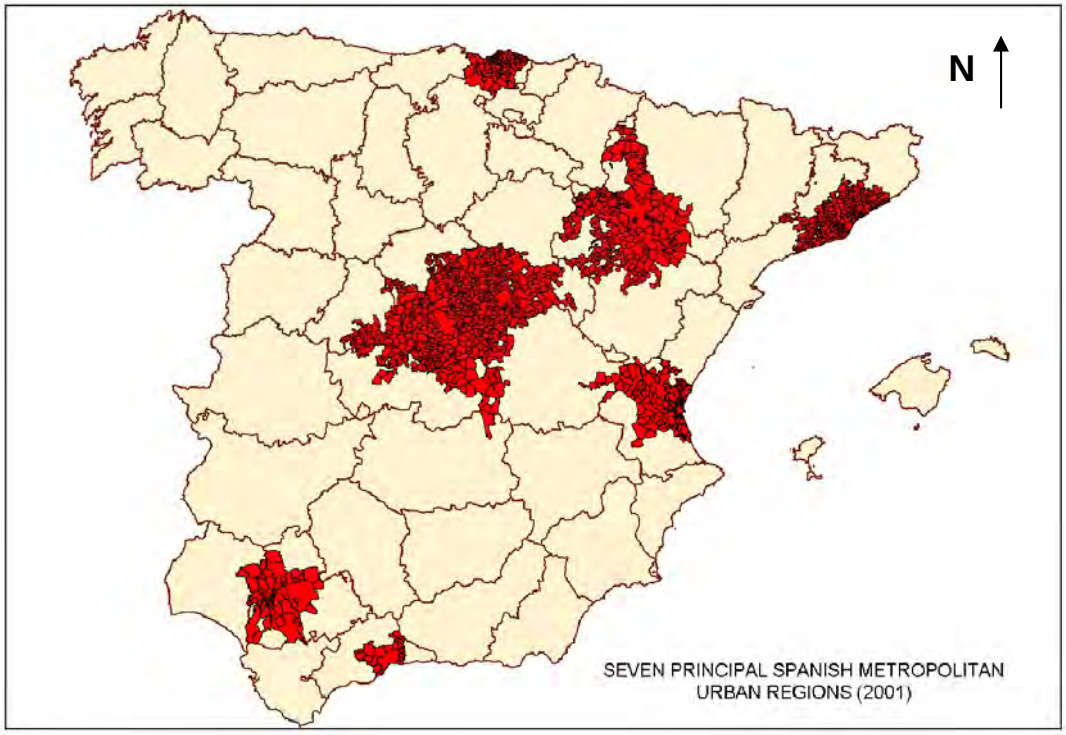


Figure 3.1. Spatial extent of the seven Spanish metropolitan urban regions (2001)[165]

A brief description is provided in Sections 3.4.1-3.4.7 of each of the metropolitan urban regions.

[165] INE (2001)

3.4.1. Metropolitan urban region of Madrid

The metropolitan urban region of Madrid comprised 609 municipalities with a 2001 population of 5.8 million inhabitants. The metropolitan territory had an area of 27,581 km^2, extending well beyond the limits of the Autonomous Community entering into the adjoining provinces of Toledo, Ciudad Real, Guadalajara, Cuenca, Soria, Segovia and Ávila. A more detailed analysis of the socio-demographic characteristics will be presented in Chapter 4, however it is relevant to indicate that the metropolitan urban region of Madrid included 14 cities with populations in excess of 50,000 inhabitants. In addition to the central municipality of Madrid, these large cities included Móstoles, Fuenlabrada, Leganés, Alcalá, Getafe, Alcorcón, Torrejón, Alcobendas, Coslada, Parla, Pozuelo, Guadalajara, San Sebastián de los Reyes and Las Rozas.

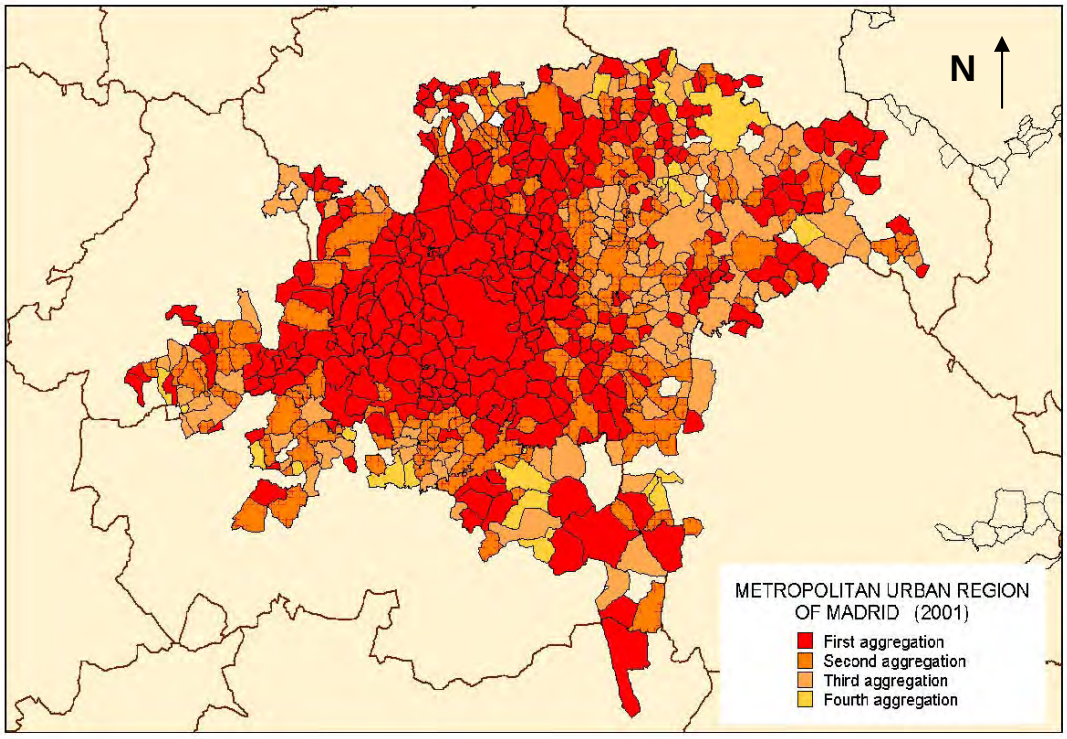


Figure 3.2. Metropolitan urban region of Madrid (2001)

Just three of the 13 micropolitan sub-centres[166] with populations of more than 10,000 inhabitants (Guadalajara, Aranjuez and Azuqueca) maintained a high degree of autonomy with regard to the central capital (<15%). By contrast the remaining sub-centres had a degree of dependency towards Madrid. However Guadalajara stood out with some 88 dependent municipalities and also stood out for being the only Primary Metropolitan Statistical Area (PMSA) of the metropolitan territory. (See Table 3.6 and Figure 3.3) These initial observations of the basic territorial structure indicate a high degree of monocentrism throughout the metropolitan territory.

Madrid PMSA	2001		
	No. of municipalities	Population of the PMSA	Population of the central municipality
Guadalajara[167]	83	271,039	67,640
Rest of the Metropolitan urban region of Madrid	526	3,656,513	
CMSA Madrid	609	5,793,964	

Table 3.6. PMSA subdivisions of the Consolidated Metropolitan urban region of Madrid (2001)
Source: INE, Census 2001, elaboration by CPSV.

[166] Madrid, Fuenlabrada, Alcalá, Torrejón, Alcobendas, Coslada, Guadalajara, Aranjuez, Rivas-Vaciamadrid, Arganda del Rey, Vallaviciosa, Azuqueca, Algeta and Ciempozuelos.

[167] Alamitos, Alarilla, Aldeanueva de Guadalajara, Algora, Alhóndiga, Alovera, Aranzueque, Arbancón, Armuña de Tajuña, Atanzón, Barriopedro, Berrinches, Brihuega, Cabanillas del Campo, Cañizar, Casa de Uceda, Casas de San Galindo, Centenera, Ciruelas, Cogollado, Copernal, Cubillo de Uceda (El), Chiloeches, Durón, Escopete, Espinosa de Henares, Fontanar, Fuencemillán, Fuentelahiguera de Albatages, Fuentelencina, Fuentelviejo, Gajanejos, Guadalajara, Heras de Ayuso, Hita, Horche, Hueva, Humanes, Inviernas (Las), Irueste, Luliana, Málaga del Fresno, Malaguilla, Mantiel, Marchamalo, Matarrubia, Mirabueno, Mohernando, Monasterio, Montarrón, Moratilla de los Meleros, Muduex, Olivar (El), Pastrana, Peñalver, Puebla de Beleña, Quer, Renera, Robledillo de Mohernando, Romanotes, San Andrés del Rey, Sotillo (El), Taragudo, Tendilla, Torija, Tórtola de Henares, Trijueque, Utande, Valdarachas, Valdeavellano, Valdeaveruelo, Valdeconcha, Valdegrudas, Valderrebollo, Valfermoso de Tajuña, Villaseca de Uceda, Viñuelas, Yebes, Yélamos de Abajo, Yélamos de Arriba, Yunquera de Henares, Zorita de los Canes and Semillas.

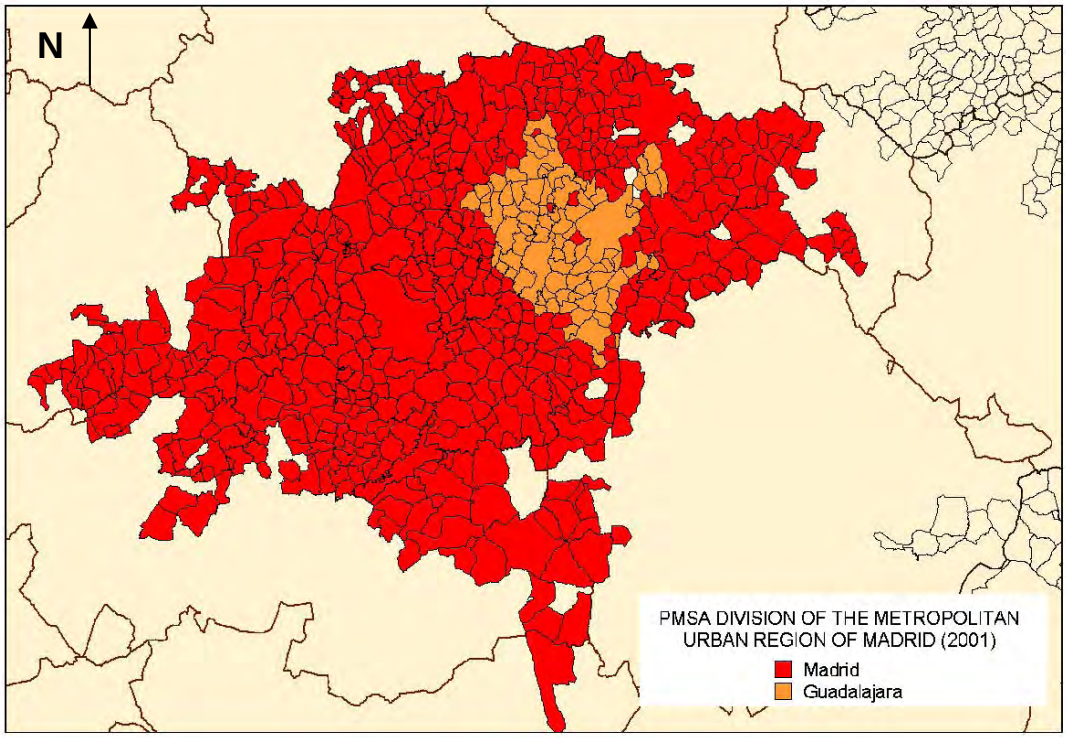


Figure 3.3. Metropolitan divisions (PMSA) of the wider metropolitan urban region (CMSA) of Madrid (2001)

3.4.2. Metropolitan urban region of Barcelona

The metropolitan urban region of Barcelona covered some 227 municipalities with an area of 4,796 km^2 and extended well beyond the limits of the Metropolitan Region of Barcelona (RMB), which as will be recalled from Chapter 2 contains just 164 municipalities lying within an area of 3,236 km^2. It had a population of over 4.5 million inhabitants in 2001 and on the face of it appeared to have a much more compact metropolitan structure than that of Madrid. The metropolitan urban region of Barcelona contained a total of 15 cities with populations in excess of 50,000 inhabitants, namely L'Hospitalet de Llobregat, Badalona, Sabadell, Terrassa, Santa Coloma de Gramanet, Mataró, Cornellà de Llobregat, Sant Boi, El Prat de Llobregat, Rubí, Viladecans, Sant Cigat del Vallès, Granollers, Cerdanyola del Vallès and Vilanova i la Geltrú.

The metropolitan urban region of Barcelona had some 14 'micropolitan' sub-centres[168], whose populations were in excess of 10,000 inhabitants. Only Badalona and Viladecans, as well as the capital, lie within the area of direct influence of Barcelona (> 15%). Of the remaining sub-centres, Martorell was the only one whose self-containment was less than 50%.

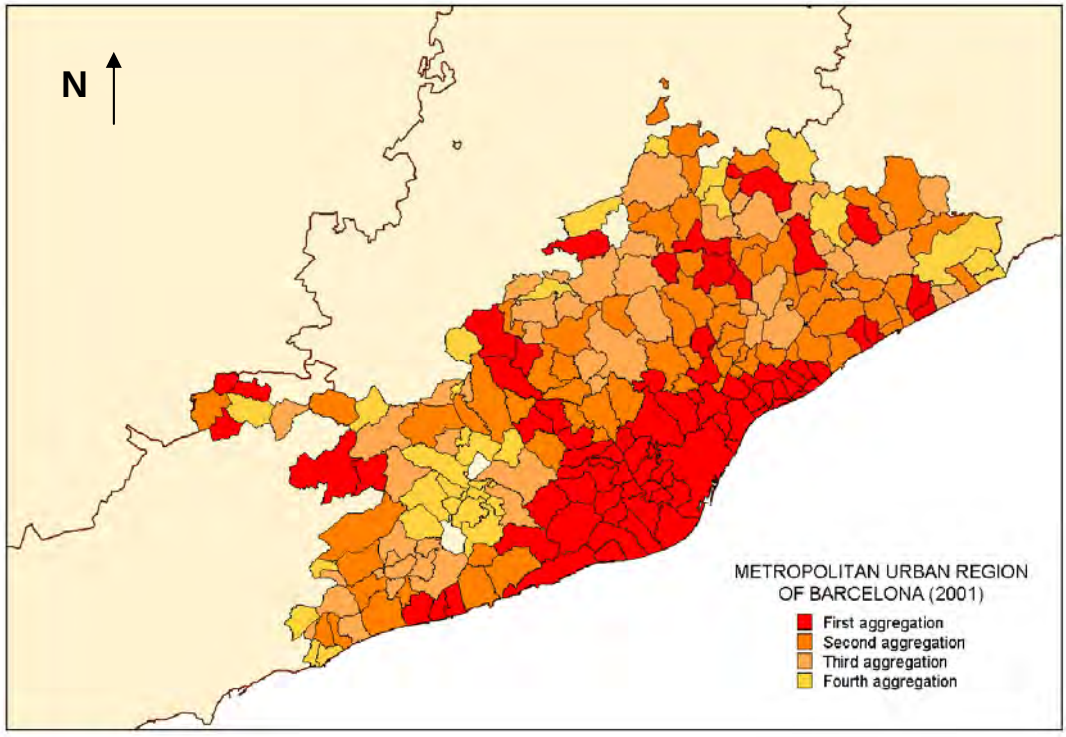


Figure 3.4. Metropolitan urban region of Barcelona (2001)

[168] Barcelona, Badalona, Sabadell, Terrassa, Mataró, Viladecans, Granollers, Vilanova, Vilafranca del Penedès, Barberà del Vallès, Vendrell, Martorell, Pineda del Mar, Sant Celoni and Tordera.

In contrast to the metropolitan urban region of Madrid, that of Barcelona appears to have a more polycentric structure, as indicated by the six PMSA described in Table 3.7 and expressed graphically in Figure 3.5.

Barcelona PMSA	No. of municipalities	2001 Population of the PMSA	Population of the central municipality
Sabadell[169]	9	271,039	185,170
Terrassa[170]	7	192,704	174,756
Granollers[171]	24	202,444	53,681
Mataró[172]	6	131,690	107,191
Vilanova i la Geltrù[173]	4	85,359	53,421
Rest of the Metropolitan urban region of Barcelona	177	3,656,513	
CMSA Barcelona	227	4,359,749	

Table 3.7. PMSA subdivisions of the Consolidated Metropolitan urban region of Barcelona (2001)

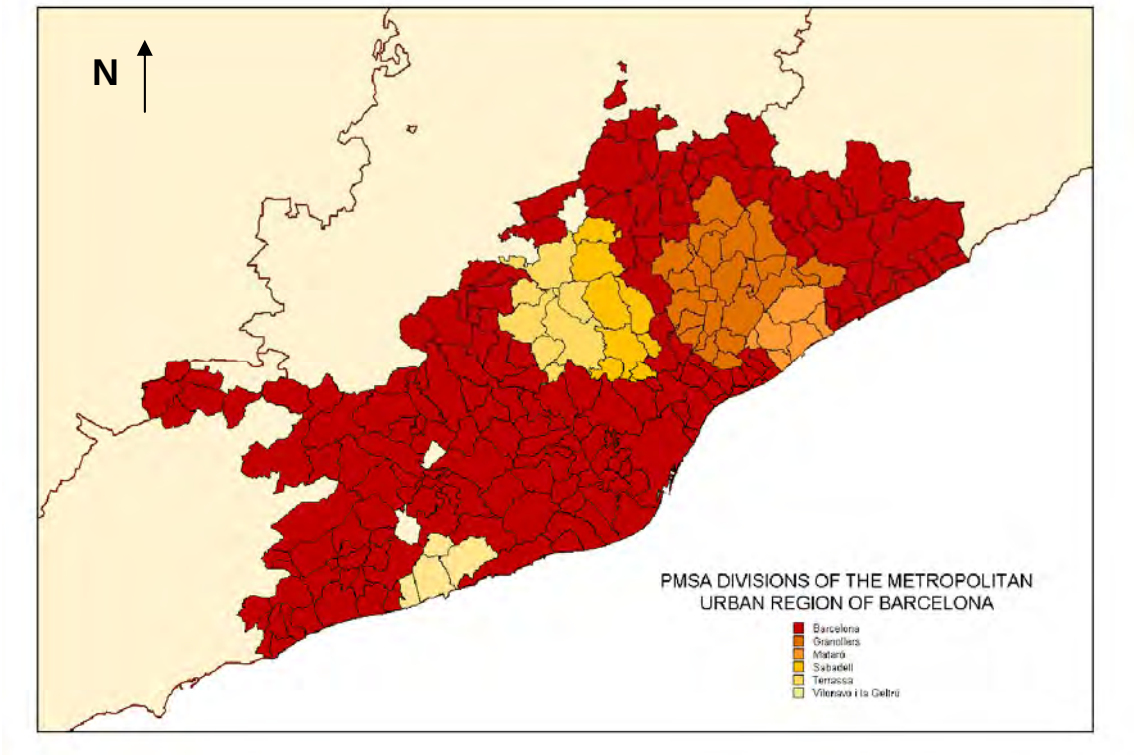


Figure 3.5. Metropolitan divisions (PMSA) of the wider metropolitan urban region (CMSA) of Barcelona (2001)

[169] Badia del Vallès, Barberà del Vallès, Castellar del Vallès, Granera, Polinyà, Sabadell, Sant Llorenç Savall, Sant Quirze del Vallès and Sentmenat.
[170] Matadepera, Mura, Rellinars, Terrassa, Ullastrell, Vacarisses and Viladecavalls.
[171] Ametlla del Vallès (l'), Bigues i Riells, Canovelles, Cànoves i Samalús, Cardedeu, Figaró-Montmany, Franqueses del Vallès (les), Garriga (la), Granollers, Lliçà d'Amunt, Lliçà de Vall, Llinars del Vallès, Montmeló, Montornès del Vallès, Parets del Vallès, Roca del Vallès (la), Sant Antoni de Vilamajor, Sant Pere de Vilamajor, Santa Eulàlia de Ronçana, Tagamanent, Vallgorguina, Vallromanes, Vilalba Sasserra and Vilanova del Vallès.
[172] Argentona, Cabrera de Mar, Dosrius, Mataró, Òrrius and Sant Andreu de Llavaneres.
[173] Canyelles, Cubelles, Sant Pere de Ribes and Vilanova i la Geltrú.

3.4.3. Metropolitan urban region of Valencia

The metropolitan urban region of Valencia comprised some 152 municipalities and was spread over an area of 6,347 km^2, extending into Castellón and Cuenca (Castilla La Mancha). It had a population of over 1.7 million inhabitants in 2001, with two cities in addition to Valencia – Torrent and Sagunto – whose populations were in excess of 50,000 inhabitants, and 31 other cities with more than 10,000 inhabitants[174].

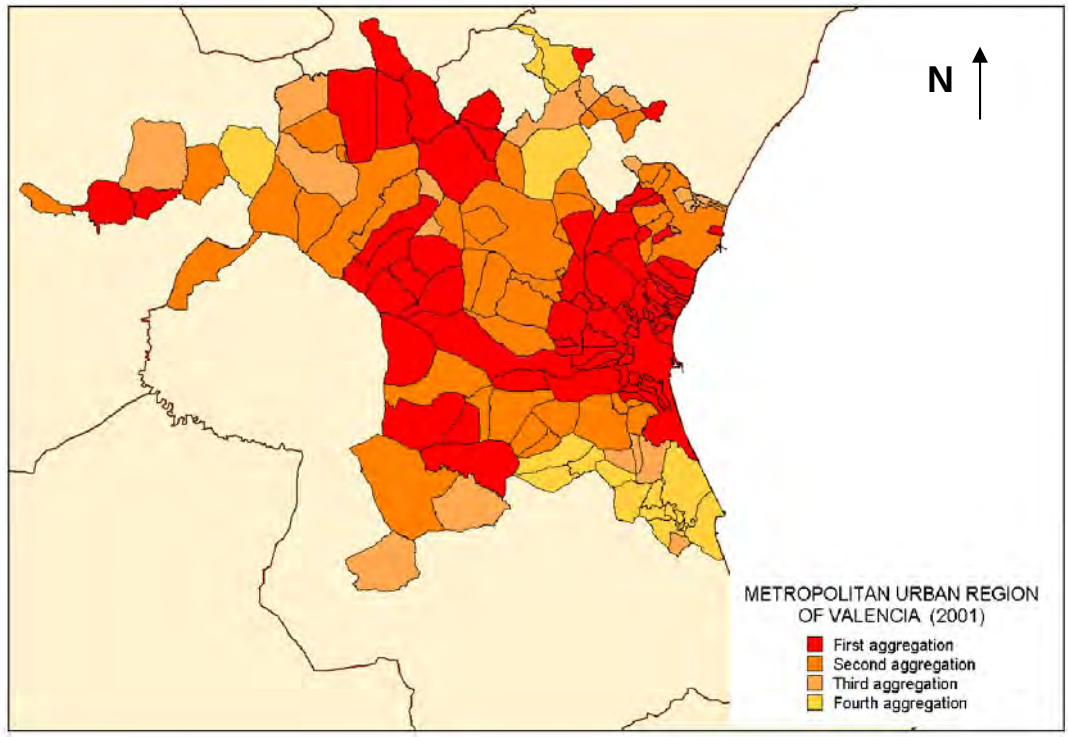


Figure 3.6. Metropolitan urban region of Valencia (2001)

The metropolitan urban region of Valencia incorporated 8 'micropolitan' sub-centres, whose populations were in excess of 10,000 inhabitants and was the only other Metropolitan urban region, apart from Madrid and Barcelona, where it was possible to detect a PMSA.

[174] Paterna, Mislata, Burjassot, Alaquàs, Xirivella, Manises, Sueca, Quart de Poblet, Aldaia, Algemesí, Catarrosa, Cullera, Paiporta, Moncada, Alfafar, Alborada, Llíria, Picassent, Silla, Bétera, Puçol, Riba-roja de Túria, Eliana (l'), Benetússer, Massamagrell, Pobla de Vallbona (la), Albal, Benifaió, Alginet, Godella and Chiva.

3.4.4. Metropolitan urban region of Sevilla

The metropolitan urban region of Sevilla consisted of 60 municipalities and had a population of 1.4 million inhabitants in 2001, with just two cities - Dos Hermanas and Guadaira – whose populations were greater than 50,000 inhabitants, apart from Sevilla. Some 19 other municipalities had populations exceeding 10,000 inhabitants[175] and there was just one single 'micropolitan' area which was detected incorporating Utrera. The Metropolitan urban region extended over an area of 6,842 km^2.

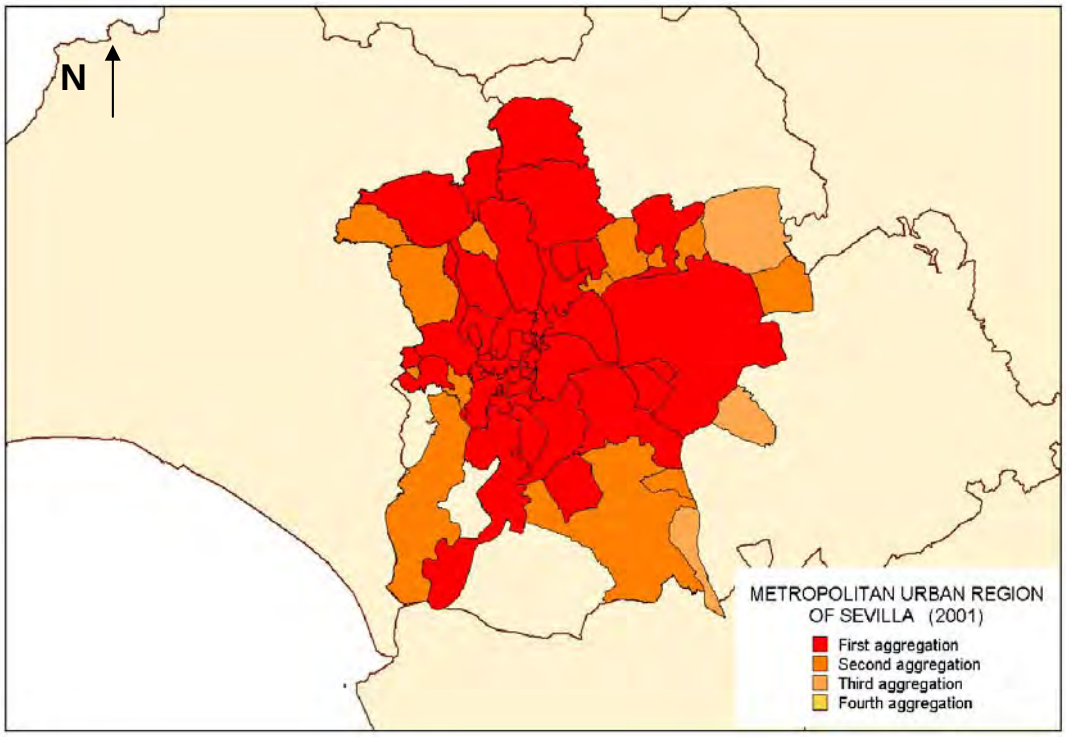


Figure 3.7. Metropolitan urban region of Sevilla (2001)

[175] Utrera, Mairena del Aljarafe, Palacios y Villafranca (Los), Rinconada (La), Carmona, Camas, Coria del Río, San Juan de Aznalfar, Tomares, Lora del Río, Mairena del Alcor, Viso del Alcor (El), Castilleja de la Cuesta, Algaba (La), Bormujos, Gines, Sanlúcar la Mayor, Brenes and Puebla del Río (La).

3.4.5. Metropolitan urban region of Bilbao

The Metropolitan urban region of Bilbao had an area of 2,675 km^2, extending beyond the Province of Álava into the adjoining Autonomous Community of Santander. It had a population of 1.1 million inhabitants in 2001, with 3 large cities, apart from Bilbao, whose populations exceeded 50,000 inhabitants - Baracaldo, Getxo and Portugalete. In addition it had some 15 other municipalities more than 10,000 inhabitants[176] and 8 'micropolitan' sub-centres were able to be detected, focused upon Bilbao, Getxo, Galdakao, Castro-Urdiales, Llodio, Bermeo, Gernika-Lumo and Mungia.

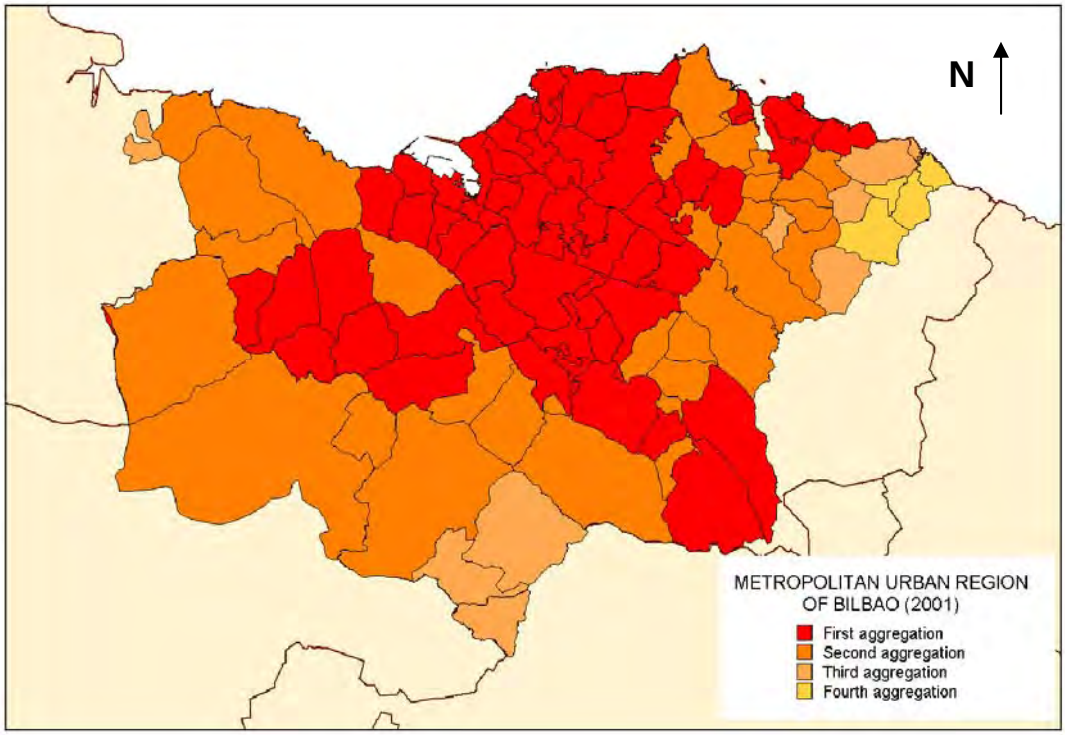


Figure 3.8. Metropolitan urban region of Bilbao (2001)
Source: INE, Census 2001, elaboration by CPSV.

[176] Santurtzi, Basauri, Sestao, Galdakao, Leioa, Erandio, Castro-Urdiales, Llodio, Bermeo, Amorebieta-Etxano, Gernika-Lumo, Mungia, Valle de Trápaga-Trapagaran, Sopelana and Arrigorriaga.

3.4.6. Metropolitan urban region of Zaragoza

In the case of Zaragoza, the Metropolitan urban region comprised 267 municipalities extending over an area of 15,084 km^2. The population of the Metropolitan urban region was 771,854 inhabitants in 2001, with just Zaragoza and Utebo having more than 50,000 and 10,000 inhabitants respectively at that time.

Only one “micropolitan” area was detected, focused upon Zaragoza itself. (See Figure 3.15)

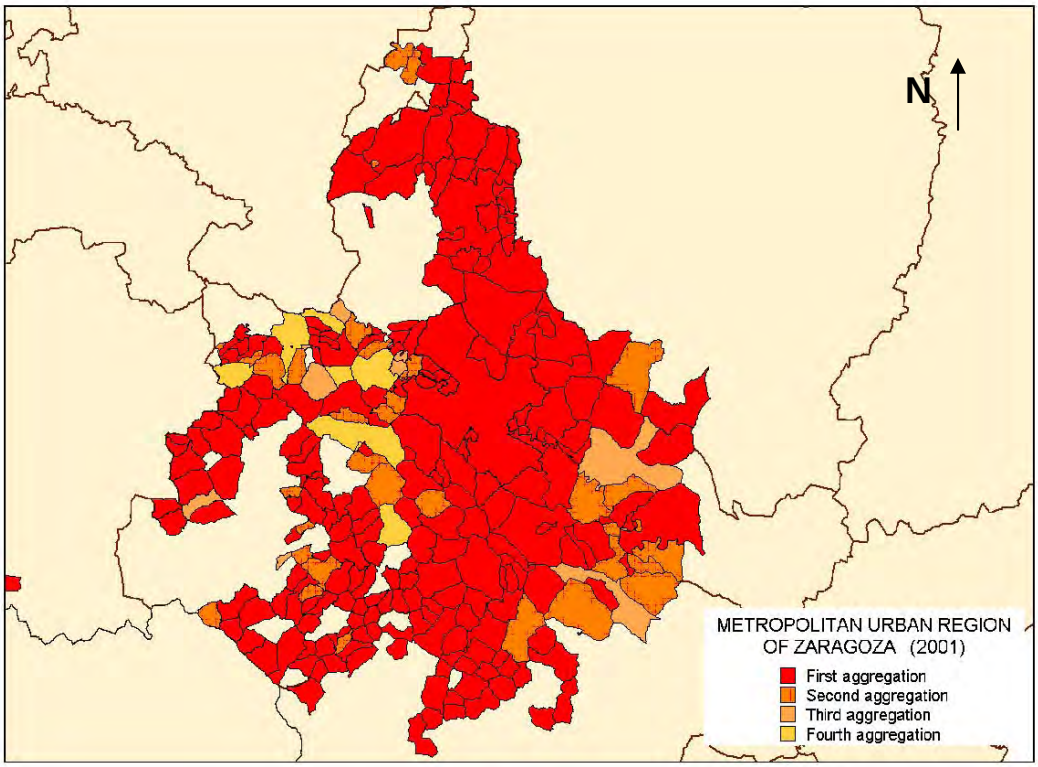


Figure 3.9. Metropolitan urban region of Zaragoza (2001)

Only one ‘micropolitan’ area was detected, focused upon Zaragoza itself.

3.4.7. Metropolitan urban region of Málaga

Málaga's Metropolitan urban region was by far the smallest of the Spanish metropolitan system. It had a population of 726,946 inhabitants in 2001, distributed over 26 municipalities and with just 6 municipalities of more than 10,000 inhabitants[177] at that time, other than Málaga itself. The Metropolitan urban region embraced an area of 1,656 km^2 and had just two 'micropolitan' sub-centres, focused upon Málaga and Rincón de la Victoria. Its structure was very dependent upon central municipality.

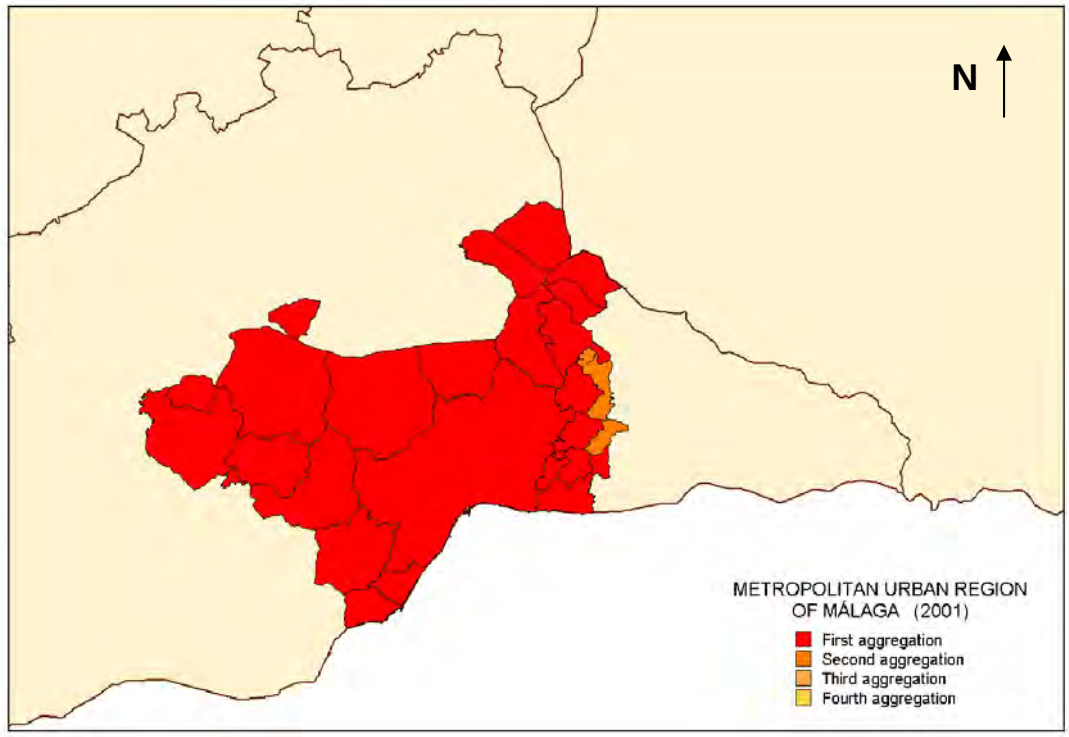


Figure 3.10. Metropolitan urban region of Málaga (2001)

[177] Torremolinos, Benalmádena, Rincón de la Victoria, Alhaurín de la Torre, Cártama and Alora.

3.5. Alternative approaches to defining the Spanish metropolitan system

At this stage it is appropriate to refer in passing to a number of parallel approaches towards the spatial definition of the metropolitan phenomenon in Spain, which in the main have proceeded from the public administration.

3.5.1. Ministerio de Obras Públicas y Urbanismo (1987)

In 1987, the then *Ministerio de Obras Públicas y Urbanismo* published a key report on what it termed the crisis facing the metropolitan urban regions at that time (MOPU, 1987). This study ascribed the term 'metropolitan urban region' to Madrid, Barcelona, Valencia, Bilbao and Sevilla, making passing reference to Zaragoza and Málaga as 'large agglomerations', and carried out an in-depth exploration of the said metropolitan urban regions from different socio-economic perspectives together with an analysis of then recent tendencies. These Metropolitan urban regions in the main reflected other formal designations previously referred to in Chapter 2.

The Metropolitan urban region of Madrid comprised the central municipality together with 26 adjoining municipalities[178], coinciding with the territorial extension of the *Área Metropolitana de Madrid* (1963), together with the additional municipalities of Alcalá de Henares, Fuenlabrada, Mósotoles and Parla.

The Metropolitan urban region of Barcelona entailed the central municipality of Barcelona and the 26 adjoining municipalities[179] which had comprised the territory of the *Corporació Metropolitana de Barcelona* (CMB).

In the case of Valencia the Metropolitan urban region comprised an area smaller than the *Horta* designation, incorporating some 29 municipalities[180].

[178] Alcalá de Henares, Alcobendas, Alcorcón, Boadilla del Monte, Brunete, Colmenar Viejo, Coslada, Fuenlabrada, Getafe, Leganés, Madrid, Majadahonda, Mejorada del Campo, Móstoles, Paracuellos de Jarama, Parla, Pinto, Pozuelo de Alarcón, Rivas-Vaciamadrid, Rozas De Madrid (Las), San Fernando de Henares, San Sebastián de Los Reyes, Torrejón de Ardoz, Velilla de San Antonio, Villanueva de la Cañada, Villanueva del Pardillo and Villaviciosa de Odón.
[179] Badalona, Barcelona, Castelldefels, Cerdanyola del Vallès, Cornellà de Llobregat, Esplugues de Llobregat, Gavà, l'Hospitalet de Llobregat, Molins de Rei, Montcada i Reixac, Montgat, Palleja, Papiol (El), El Prat de Llobregat, Ripollet, Sant Adrià de Besòs, Sant Boi de Llobregat, Sant Climent de Llobregat, Santa Coloma de Cervello, Sant Cugat del Vallès, Sant Feliu de Llobregat, Sant Just Despí, Sant Just Desvern, Sant Vicenç dels Horts, Santa Coloma de Gramenet, Tiana and Viladecans.
[180] Alaquas, Albalat dels Zorreéis, Alborada, Aldaia, Alfafar, Alfara del Patriarca, Almassera, Benetusser, Bonrepos i Mirambell, Burjassot, Catarrosa, Foios, Godella, Manises, Massanassa, Mediana, Mislata, Moncada, Paiporta, Paterna, Picanya, Quart de Poblet, Rocafort, Sedavi, Tavernes Blanques, Torrent, Valencia, Vinalesa and Xirivella.

The Metropolitan urban region of Sevilla included the central municipality together with the 10 adjoining municipalities[181] pertaining to the metropolitan ring of the Área Metropolitana de Sevilla (cf. Junta de Andalusia, 1984) with El Viso del Alcor.

Finally the Metropolitan urban region of Bilbao corresponded to what is today the area of *Bajo Nervión*, incorporating the central municipality and 25 adjoining municipalities[182].

3.5.2. Ministerio de Fomento (2000)

In 2000, an *Átlas Estadístico de la Áreas Urbanas en España* was produced by the Ministerio de Fomento. This Atlas provided a comprehensive breakdown of the Spanish urban system at all levels, taking into consideration aspects of population; population of adjoining municipalities; population density; demographic dynamics over the previous 30 years; existing urban dynamics; and existing transportation networks. This analysis led to the division of the national territory into large urban areas, small urban areas and non-urban areas.

On this basis a total of 68 'large urban areas' (*grandes areas urbanas*) were identified with more than 500,000 inhabitants. This grouping comprised 10 large urban areas[183] with populations in excess of 500,000 inhabitants; 10 large urban areas with populations in the 250,000-500,000 range; 20 large urban areas whose populations lay between 100,000-250,000 inhabitants; and finally 27 large urban areas with populations in the 50,000-100,000 range. Metropolitan status accorded to Madrid, Barcelona, Valencia and Bilbao. Sevilla, Zaragoza and Málaga were each described as urban agglomerations. The details of the individual characteristics of these designations appear in Table 3.13.

[181] Alcalá de Guadaira, Camas, Castilleja de la Cuesta, Dos Hermanas, Gelves, Mairena del Aljarafe, San Juan de Aznalfarache, Santiponce, Sevilla, Tomares and El Viso del Alcor.
[182] Abanto y Ciervana/Abanto Zierbena, Alonsotegi, Arrigorriaga, Barakaldo, Basauri, Berango, Bilbao, Derio, Erandio, Etxebarria, Galdakao, Getxo, Larrabetzu, Leioa, Lezama, Loiu (Lujua), Muskiz, Ortuella (Santurzi), Portugalete, Santurtzi, Sestao, Sondika, Valle De Trapaga-Trapagaran (San Salvador), Zamudio, Zaratamo and Zierbena.
[183] Área Metropolitana de Madrid; Barcelona (Región I); Área Metropolitana de Valencia; Aglomeración Urbana de Sevilla; Bilbao metropolitano; Área Central de Asturias; Aglomeración Urbana de Málaga; Aglomeración Urbana de Zaragoza; Área Urbana de la Bahía de Cádiz; and the Área Metropolitana de Alicante – Eix.

Large Urban Areas	No. of mun.	Land area (km^2)	Population (1996)	Density ($inhab./km^2$)
Metropolitan Area of Madrid[184]	28	1,944	4,576,806	2,345.3
Metropolitan Region of Barcelona[185]	164	3,284	4,228,621	1,287.6
Metropolitan Area of Valencia[186]	44	638	1,324,440	2,104.1
Urban Agglomeration of Sevilla[187]	25	1,644	1,141,807	694.5
Metropolitan Bilbao[188]	35	533	914,542	1,715.8
Urban Agglomeration of Zaragoza[189]	2	1,081	610,749	565.0
Urban Agglomeration of Málaga[190]	7	733	720,786	983.3

Table 3.8. Characteristics of the seven principal Spanish metropolitan urban regions based upon their 'large urban area status' according to the Ministerio de Fomento (2000)

[184] Alcalá de Henares, Alcobendas, Alcorcón, Boadilla del Monte, Brunete, Colmenar Viejo, Coslada, Fuenlabrada, Getafe, Leganés, Madrid, Majadahonda, Mejorada del Campo, Móstoles, Paracuellos de Jarama, Parla, Pinto, Pozuelo de Alarcón, Rivas-Vaciamadrid, Rozas de Madrid (Las), San Fernando de Henares, San Sebastián de los Reyes, Torrejón de Ardoz, Tres Cantos, Velilla de San Antonio, Villanueva de la Cañada, Villanueva del Pardillo and Villaviciosa de Odón.

[185] Abrera, Aiguafreda, Alella, Ametlla del Vallès (l'), Arenys de Mar, Arenys de Munt, Argentona, Avinyonet del Penedès, Badalona, Badia del Vallès, Barberà del Vallès, Barcelona, Begues, Bigues i Riells, Cabanyes (les), Cabrera de Mar, Cabrils, Caldes d'Estrac, Calella, Caldes de Montbui, Campins, Canet de Mar, Canovelles, Cànoves i Samalús, Canyelles, Cardedeu, Castellar del Vallès, Castellbisbal, Castellcir, Castelldefels, Castellet i la Jornal, Castellterçol, Castellví de la Marca, Castellví de Rosanes, Cerdanyola del Vallès, Cervelló, Collbató, Corbera de Llobregat, Cornellà de Llobregat, Cubelles, Dosrius, Esparreguera, Esplugues de Llobregat, Figaró-Montmany, Fogars de la Selva, Fogars de Montclús, Font-rubí, Franqueses del Vallès (les), Gallifa, Garriga (la), Gavà, Gelida, Granada (la), Granera, Granollers, Gualba, Hospitalet de Llobregat (l'), Llagosta (la), Lliçà d'Amunt, Lliçà de Vall, Llinars del Vallès, Malgrat de Mar, Martorell, Martorelles, Masnou (el), Matadepera, Mataró, Mediona, Mollet del Vallès, Molins de Rei, Montcada i Reixac, Montgat, Montmeló, Montornès del Vallès, Montseny, Olèrdola, Olesa de Bonesvalls, Olesa de Montserrat, Olivella, Òrrius, Pacs del Penedès, Palafolls, Palau de Plegamans, Pallejà, Palma de Cervelló (la), Papiol (el), Parets del Vallès, Pineda de Mar, Pla del Penedès (el), Polinyà, Pontons, Prat de Llobregat (el), Premià de Dalt, Premià de Mar, Puigdàlber, Rellinars, Ripollet, Roca del Vallès (la), Rubí, Sabadell, Sant Andreu de la Barca, Sant Andreu de Llavaneres, Sant Adrià de Besòs, Sant Antoni de Vilamajor, Sant Boi de Llobregat, Sant Cebrià de Vallalta, Sant Celoni, Sant Climent de Llobregat, Sant Cugat del Vallès, Sant Cugat Sesgarrigues, Sant Esteve de Palautordera, Sant Esteve Sesrovires, Sant Feliu de Codines, Sant Feliu de Llobregat, Sant Fost de Campsentelles, Sant Iscle de Vallalta, Sant Joan Despí, Sant Just Desvern, Sant Llorenç d'Hortons, Sant Llorenç Savall, Sant Martí Sarroca, Sant Pere de Ribes, Sant Pere de Riudebitlles, Sant Pere de Vilamajor, Sant Pol de Mar, Sant Quintí de Mediona, Sant Quirze del Vallès, Sant Quirze Safaja, Sant Sadurní d'Anoia, Sant Vicenç dels Horts, Sant Vicenç de Montalt, Santa Coloma de Cervelló, Santa Coloma de Gramenet, Santa Eulàlia de Ronçana, Santa Fe del Penedès, Santa Margarida i els Monjos, Santa Maria de Martorelles, Santa Maria de Palautordera, Santa Perpètua de Mogola, Santa Susanna, Sentmenat, Sitges, Subirats, Tagamanent, Teià, Terrassa, Tiana, Tordera, Torrelavit, Torrelles de Foix, Torrelles de Llobregat, Ullastrell, Vacarisses, Vallgorguina, Vallirana, Vallromanes, Viladecans, Viladecavalls, Vilafranca del Penedès, Vilalba Sasserra, Vilanova del Vallès, Vilanova i la Geltrú, Vilassar de Dalt, Vilassar de Mar and Vilobí del Penedès,

[186] Alaquàs, Albal, Albalat dels Sorells, Alboraya, Albuixech, Aldaia, Alcàsser, Alfafar, Alfara del Patriarca, Almàssera, Benetússer, Beniparrell, Bonrepòs i Mirambell, Burjassot, Catarroja, Emperador, Foios, Godella, Lugar Nuevo de la Corona, Manises, Massalfassar, Massamagrell, Massanassa, Mediana, Mislata, Moncada, Museros, Paiporta, Paterna, Picanya, Picassent, Pobla de Farnals (La), Puçol, Puig, Quart de Poblet, Sedaví, Rafelbuñol/Rafelbunyol, Rocafort, Silla, Tavernes Blanques, Torrent, Valencia, Vinalesa and Xirivella.

[187] Alcalá de Guadaira, Algaba (La), Almensilla, Bormujos, Camas, Castilleja de Guzmán, Castilleja de la Cuesta, Coria del Río, Dos Hermanas, Espartinas, Gelves, Gines, Mairena del Alcor, Mairena del Aljarafe, Palacios y Villafranca (Los), Palomares del Río, Puebla del Ría (La), Rinconada (La), San Juan de Aznalfarache, Santiponce, Sevilla, Tomares, Valencina de la Concepción and Viso del Alcor.

[188] Abanto y Ciérvana/Abanto Zierbena, Alonsotegi, Arrankudiaga, Arrigorriaga, Barakaldo, Barrika, Basauri, Berango, Bilbao, Derio, Erandio, Etxebarri - Anteiglesia de San Esteban, Galdakao, Getxo, Gorliz, Larrabetzu, Leioa, Lemoiz, Lezama, Loiu, Muskiz, Ortuella, Plentzia, Portugalete, Santurtzi, Sestao, Sondika, Sopelana, Urduliz, Ugao-Miraballes, Valle de Trápaga-Trapagaran, Zamudio, Zaratamo, Zeberio and Zierbena.

[189] Utebo and Zaragoza.

[190] Benalmádena, Cártama, Fuengirola, Málaga, Mijas, Rincón de la Victoria and Torremolinos.

3.5.3. Ministerio de Administraciones Públicas (2001)

In 2001 the *Ministerio de Administraciones Públicas* published a report concerning the large Spanish cities and the areas of urban influence. This report ascribed metropolitan area status to all seven of the principal metropolitan urban regions, the characteristics of which can be seen in Table 3.14.

Metropolitan urban region	Number of municipalities	Area (km^2)	Population (1999)	Population density inhabitants/km^2
Madrid	32	2,121	4,707,758	2,219.59
Barcelona	27	476	2,833,224	5,952.15
Valencia	45	729	1,374,842	1,885.93
Sevilla	46	5,043	1,343,332	266.37
Bilbao	35	506	911,302	1,800.99
Zaragoza	44	3,919	669,667	170.88
Málaga	20	1,501	835,225	556.45

Table 3.9. Basic characteristics of the 'Áreas metropolitanas' according to the Ministerio de Administraciones Públicas (2001)

3.5.4. Large European Urban Agglomerations (2002)

In 2002 a study aimed at determining the spatial extent of 'large European urban agglomerations' (*Grans aglomeracions metropolitanes europees* – GAME) throughout the EU15 countries, with the exception of Greece, was published, drawing principally upon questions of density and urban continuity. This led to the identification of 88 metropolitan agglomerations[191], where the central city had a minimum population of 100,000 inhabitants and a density of at least 1,500 inhabitants per km^2, where the entire population was greater than 250,000 inhabitants, and where the overall density was greater than 1,500 inhabitants per km^2. This methodology identified 4 such large European urban agglomerations in Spain – Madrid, Barcelona, Valencia and Sevilla (Serra et. al., 2002). See Table 3.15 for a description of the basic characteristics of these 4 large urban agglomerations.

[191] 30 with populations greater than 1 million inhabitants; 21 in the 500,000-1 million range; and 37 in the 250,000-500,000 inhabitants range.

Large European Urban Agglomerations (GAME)	No. of municipalities	Land area (km^2)	Population (1998)	Density (inhab./km^2)
Madrid[192]	34	2,021.2	4,747,548	2.349
Barcelona[193]	93	1,575.7	4,103,470	2.604
Valencia[194]	56	951.0	1,496,098	1.573
Sevilla[195]	16	579.1	1,006,547	1.738

Table 3.10. Four Spanish 'Large European Urban Agglomerations' according to Serra et. al. (2002)

3.5.5. Ministerio de Vivienda (2004)

The *Átlas Estadístico de la Áreas Urbanas en España* was revised in 2004, by the Ministerio de Vivienda, Madrid. A similar methodology was adopted as with the previous 2000 study (see Section 3.5.2) examining population statistics; housing statistics; territorial structure and urban dynamics; and both existing and planned transport networks, leading to the identification of large urban areas, small urban areas and non-urban areas.

The 2004 *Átlas* gave 'large urban area status' to the largest cities of the Spanish urban system, this time recognising a total of 82 such large urban areas. These 82 large urban areas were divided into 13 areas[196] with populations in excess of 500,000 inhabitants; 11 large urban areas with populations in the 250,000-500,000 range; 23 large urban areas whose populations lay between 100,000-250,000 inhabitants; and finally 35 large urban areas with populations in the 50,000-100,000 range, granting metropolitan status to Madrid, Barcelona, Valencia, Bilbao and Zaragoza. The 'urban agglomeration' was still used in referral to Sevilla and Málaga, with Zaragoza being named a 'metropolitan county'.

[192] Including the principal cities of Alcalá de Henares, Alcobendas, Alcorcón, Arganda del Rey, Collado Villalba, Coslada, Fuenlabrada, Getafe, Leganés, Madrid, Majadahonda, Móstoles, Parla, Pinto, Pozuelo de Alarcón, Rozas de Madrid (Las), San Fernando de Henares, San Sebastián de los Reyes, Sevilla la Nueva, Torrejón de Ardoz and Tres Cantos.

[193] Including the principal cities of Badalona, Barcelona, Castelldefels, Cerdanyola del Vallès, Cornellà de Llobregat, Esplugues de Llobregat, Gavà, Granollers, Hospitalet de Llobregat (l'), Mataró, Mollet del Vallès, Prat de Llobregat (el), Rubí, Sabadell, Sant Boi de Llobregat, Sant Cugat del Vallès, Santa Coloma de Gramenet, Terrassa, Viladecans and Vilanova i la Geltrú.

[194] Including the principal cities of Alaquàs, Aldaia, Alfafar, Algemesí, Alzira, Burjassot, Carcaixent, Catarroja, Cullera, Manises, Mislata, Montcada, Paiporta, Paterna, Quart de Poblet, Silla, Tavernes de la Valldigna, Torrent, Valencia and Xirivella.

[195] Including the principal cities of Algaba (La), Bormujos, Camas, Castilleja de Guzmán, Castilleja de la Cuesta, Coria del Río, Dos Hermanas, Gelves, Gines, Mairena del Aljarafe, Palacios y Villafranca (Los), Palomares del Río, San Juan de Aznalfarache, Santiponce, Sevilla and Tomares.

[196] Área Metropolitana de Madrid; Región Metropolitana de Barcelona; Área Metropolitana de Valencia; Aglomeración Urbana de Sevilla; Bilbao Metropolitano; Aglomeración Urbana de Málaga; Área Central de Asturias; Comarca Metropolitana de Zaragoza; Área Metropolitana de Alicante/Elx,; Área Urbana de la Bahía de Cádiz; Área Urbana de Vigo y Pontevedra; Área Urbana de Murcia; and the Área Urbana de la Palmas de Gran Canaria.

Large Urban Areas	No. of mun.	Land area (km^2)	Population (2003)	Density ($inhab./km^2$)
Metropolitan Area of Madrid[197]	52	2,888.1	5,404,750	1,871
Metropolitan Region of Barcelona[198]	165	3,286.1	4,619,177	1,406
Metropolitan Area of Valencia[199]	45	630,5	1,429,950	2,268
Urban Agglomeration of Sevilla[200]	24	1.616	1,205,104	746
Metropolitan Bilbao[201]	35	503	903,866	1,797
Urban Agglomeration of Málaga[202]	8	815	815,331	1,000
Metropolitan County of Zaragoza[203]	14	2,202	668,478	304

Table 3.11. Characteristics of the seven principal Spanish metropolitan urban regions based upon their 'large urban area status' according to the Ministerio de Vivienda (2004)

[197] Ajalvir, Álamo (El), Alcalá de Henares, Alcobendas, Alcorcón, Algete, Arganda del Rey, Arroyomolinos, Boadilla del Monte, Brunete, Camarma de Esteruelas Ciempozuelos, Cobeña, Colmenar Viejo, Colmenarejo, Collado Villalba, Coslada, Daganzo de Arriba, Fuenlabrada, Fuente el Saz de Jarama, Galapagar, Getafe, Griñón, Humanes de Madrid, Leganés, Madrid, Majadahonda, Meco, Mejorada del Campo, Moraleja de Enmedio, Móstoles, Navalcarnero, Paracuellos de Jarama, Pardillo, Parla, Pinto, Pozuelo de Alarcón, Rivas-Vaciamadrid, Rozas de Madrid (Las), San Agustín del Guadalix, San Fernando de Henares, San Martín de la Vega, San Sebastián de los Reyes, Sevilla la Nueva, Torrejón de Ardoz, Torrejón de la Calzada, Torrelodones, Tres Cantos, Valdemoro, Velilla de San Antonio, Villanueva de la Cañada, Villanueva del Pardillo and Villaviciosa de Odón.

[198] Abrera, Aiguafreda, Alella, Ametlla del Vallès (l'), Arenys de Mar, Arenys de Munt, Argentona, Avinyonet del Penedès, Badalona, Badia del Vallès, Barberà del Vallès, Barcelona, Begues, Bigues i Riells, Cabanyes (les), Cabrera de Mar, Cabrils, Caldes d'Estrac, Calella, Caldes de Montbui, Campins, Canet de Mar, Canovelles, Cànoves i Samalús, Canyelles, Cardedeu, Castellar del Vallès, Castellbisbal, Castellcir, Castelldefels, Castellet i la Jornal, Castellterçol, Castellví de la Marca, Castellví de Rosanes, Cerdanyola del Vallès, Cervelló, Collbató, Corbera de Llobregat, Cornellà de Llobregat, Cubelles, Dosrius, Esparreguera, Esplugues de Llobregat, Figaró-Montmany, Fogars de la Selva, Fogars de Montclús, Font-rubí, Franqueses del Vallès (les), Gallifa, Garriga (la), Gavà, Gelida, Granada (la), Granera, Granollers, Gualba, Hospitalet de Llobregat (l'), Llagosta (la), Lliçà d'Amunt, Lliçà de Vall, Llinars del Vallès, Malgrat de Mar, Martorell, Martorelles, Masnou (el), Matadepera, Mataró, Mediona, Mollet del Vallès, Molins de Rei, Montcada i Reixac, Montgat, Montmeló, Montornès del Vallès, Montseny, Olèrdola, Olesa de Bonesvalls, Olesa de Montserrat, Olivella, Òrrius, Pacs del Penedès, Palafolls, Palau-solità i Plegamans, Pallejà, Palma de Cervelló (la), Papiol (el), Parets del Vallès, Pineda de Mar, Pla del Penedès (el), Polinyà, Pontons, Prat de Llobregat (el), Premià de Dalt, Premià de Mar, Puigdàlber, Rellinars, Ripollet, Roca del Vallès (la), Rubí, Sabadell, Sant Andreu de la Barca, Sant Andreu de Llavaneres, Sant Adrià de Besòs, Sant Antoni de Vilamajor, Sant Boi de Llobregat, Sant Cebrià de Vallalta, Sant Celoni, Sant Climent de Llobregat, Sant Cugat del Vallès, Sant Cugat Sesgarrigues, Sant Esteve de Palautordera, Sant Esteve Sesrovires, Sant Feliu de Codines, Sant Feliu de Llobregat, Sant Fost de Campsentelles, Sant Iscle de Vallalta, Sant Joan Despí, Sant Just Desvern, Sant Llorenç d'Hortons, Sant Llorenç Savall, Sant Martí Sarroca, Sant Pere de Ribes, Sant Pere de Riudebitlles, Sant Pere de Vilamajor, Sant Pol de Mar, Sant Quintí de Mediona, Sant Quirze del Vallès, Sant Quirze Safaja, Sant Sadurní d'Anoia, Sant Vicenç dels Horts, Sant Vicenç de Montalt, Santa Coloma de Cervelló, Santa Coloma de Gramenet, Santa Eulàlia de Ronçana, Santa Fe del Penedès, Santa Margarida i els Monjos, Santa Maria de Martorelles, Santa Maria de Palautordera, Santa Perpètua de Mogola, Santa Susana, Sentmenat, Sitges, Subirats, Tagamanent, Teià, Terrassa, Tiana, Tordera, Torrelavit, Torrelles de Foix, Torrelles de Llobregat, Ullastrell, Vacarisses, Vallgorguina, Vallirana, Vallromanes, Viladecans, Viladecavalls, Vilafranca del Penedès, Vilalba Sasserra, Vilanova del Vallès, Vilanova i la Geltrú, Vilassar de Dalt, Vilassar de Mar and Vilobí del Penedès.

[199] Alaquàs, Albal, Albalat dels Sorells, Alboraya, Albuixech, Alcàsser, Aldaia, Alfafar, Alfara del Patriarca, Almàssera, Benetússer, Beniparrell, Bonrepòs i Mirambell, Burjassot, Catarroja, Emperador, Foios, Godella, Lugar Nuevo de la Corona, Manises, Massalfassar, Massamagrell, Massanassa, Meliana, Mislata, Moncada, Museros, Paiporta, Paterna, Picanya, Picassent, Pobla de Farnals (la), Puçol, Puig, Quart de Poblet, Rafelbuñol/Rafelbunyol, Rocafort, San Antonio de Benagéber, Sedaví, Silla, Tavernes Blanques, Torrent, Valencia, Vinalesa and Xirivella.

[200] Alcalá de Guadaira, Algaba (La), Almensilla, Bormujos, Camas, Castilleja de Guzmán, Castilleja de la Cuesta, Coria del Río, Dos Hermanas, Espartina, Gelves, Gines, Mairena del Alcor, Mairena del Aljarafe, Palacios y Villafranca (Los), Palomares del Río, Puebla del Ría (La), Rinconada (La), San Juan de Aznalfarache, Santiponce, Sevilla, Tomares, Valencina de la Concepción and Viso del Alcor (El).

[201] Abanto y Ciérvana-Abanto Zierbena, Alonsotegi, Arrankudiaga, Arrigorriaga, Barakaldo, Barrika, Basauri, Berango, Bilbao, Derio, Erandio, Etxebarri-Anteiglesia, Galdakao, Getxo, Gorliz, Larrabetzu, Leioa, Lemoiz, Lezama, Loiu, Muskiz, Ortuella, Plentzia, Portugalete, Santurtzi, Sestao, Sondika, Sopelana, Ugao-Miraballes, Urduliz, Valle de Trápaga, Zamudio, Zaratamo, Zeberio and Zierbena.

[202] Alhaurín de la Torre, Benalmádena, Cártama, Fuengirola, Málaga, Mijas, Rincón de la Victoria and Torremolinos.

[203] Alfajarín, Burgo de Ebro (El), Cadrete, Cuarte de Huerva, Fuentes de Ebro, Leciñena, María de Huerva, Pastriz, Puebla de Alfindén (La), San Mateo de Gállego, Utebo, Villanueva de Gállego, Zaragoza and Zuera.

Concluding remarks

The differences in the spatial and demographic characteristics of the metropolitan agglomerations referred to in Section 3.5 are symptomatic of the lack of a nationally agreed methodology or set of criteria for defining urban areas of these magnitudes. Despite the fact that the metropolitan phenomenon was recognised formally and institutionally more than 60 years ago, as indicated in Chapter 2, still today the use of the term 'metropolitan', for example contrasting the *Madrid Metropolitana* designation with that of the *Región Metropolitana de Barcelona* or *Bilbao Metropolitano*, has a completely different meaning in each spatial context. Even the categorisation of the higher order 'large urban areas' with populations exceeding 500,000 inhabitants, used by the *Ministerio de Fomento* in 2000 and the *Ministerio de Vivienda* in 2004 fail to apply the 'metropolitan' adjective to each of the cases grouped within that category. As seen previously some such large urban areas are of a metropolitan nature while others are grated an urban agglomeration status. This inconsistency, or even lack of rigour, from national institutions does not contribute to creating the right conditions for addressing the very real needs of such large urban areas spread across a multiplicity of local administrative units.

In this sense one of the real benefits of the UPC's methodology adopted in the context of the INTERREG projects lay in the fact that it applied the same criteria to each of the seven large urban areas, and by virtue of the nature of the functional relations between the municipalities comprising the final grouping at the close of the 4th and final iteration, each of these grouping was categorised as 'metropolitan'.

An additional and important benefit of the methodology used to describe the spatial dimensions of the seven Spanish metropolitan urban regions is that the spatial extensions of the metropolitan territories denote the areas coming under the influence of the metropolitan dynamics. While in broad terms, there is little demographic difference between the magnitude of the populations of the Madrid and Barcelona 'large European urban agglomerations' (cf. Section 3.5.4) compared with those of the 'large urban areas' (cf. Section 3.5.5) or the 'metropolitan urban regions' resulting from the UPC methodology, making allowance for the time difference, where the real differences lie is in the spatial dimensions of the said agglomerations. It is acknowledged that the differences between the spatial areas do not lead to significant differences in the populations. However it is considered that one of the real strengths of

the UPC methodology is the ability to determine the dimensions of the areas surrounding the large cities throughout which these metropolitan influences can be detected. These metropolitan influences stem directly from the analysis of the functional travel to work relations.

It is these spatial units or metropolitan urban regions which together comprise the Spanish metropolitan system, which form the basis for the analysis of the critical mass in demographic and economic terms to be carried out in Chapters 4 and 5.

CHAPTER 4. – THE SOCIAL STRUCTURE OF THE SPANISH METROPOLTAN SYSTEM

Introduction

This chapter seeks to provide an overview of the social structure of the Spanish metropolitan system, through focusing on a number of key issues relating to population and demographic tendencies, and the social composition of the metropolitan urban regions, comparing the metropolitan structure with that for Spain where possible.

This overview draws upon Census based data, for the municipalities of the metropolitan system, principally from the 2001 Census. Therefore the analysis can be read in parallel with the overview of the economic structure of the metropolitan system presented in Chapter 5.

The chapter commences with an examination of the 2001 population of the metropolitan urban regions. It then looks at the distribution of that population within the individual metropolitan urban regions and in particular the spatial distribution of the population in the case of the metropolitan urban regions of Madrid and Barcelona. It addresses the question of the density of the metropolitan urban regions and examines the change in population experienced in the metropolitan urban regions over the period 1986-2006. The age structure and the issue of the ageing of the metropolitan population are considered, as are the level of education and the occupational structure in the different metropolitan urban regions. Finally the question of the nationality of the metropolitan population is addressed.

4.1. Population of the metropolitan urban regions

The application of data from the 2001 Census to the municipalities contained within the delimitation of the seven principal Spanish metropolitan urban regions previously referred to resulted in reaching a population of the entire metropolitan system of 16.14 million inhabitants, accounting for 39.51% of Spain's overall population. Over 25% of this metropolitan population was contained within the metropolitan urban regions of Madrid (5.8 mil. inhab.) and Barcelona (4.5 mil. inhab.), with the remaining 14% distributed between Valencia (1.7 mil. inhab.), Sevilla (1.4 mil. inhab.), Bilbao (1.1 mil. inhab.), Zaragoza (almost 775,500 inhab.) and Málaga (just over 722,000 inhab.).

Over 45% of this metropolitan population (7.355 mil. inhab.) lay within the seven metropolitan capitals, with 27% contained in the metropolitan capitals of Madrid (2.9 mil. inhab.) and Barcelona (1.5 mil. inhab.). The remaining 18% was contained within Valencia (4.6%), Sevilla (4.2%), Zaragoza (3.8%), Málaga (3.3%) and Bilbao (2.2%).

Metropolitan urban region	Population of the metropolitan urban regions (2001)	Metropolitan urban region as a % of the national population	Population of the metropolitan capital (2001)	Metropolitan capital as a % of the metropolitan population
Madrid	5,853,263	14.33%	2,938723	18.21%
Barcelona	4,542,509	11.12%	1,503884	9.32%
Valencia	1,739,126	4.26%	738,441	4.58%
Sevilla	1,408,963	3.45%	684,633	4.24%
Bilbao	1,096,000	2.68%	349,972	2.17%
Zaragoza	775,479	1.90%	614,905	3.81%
Málaga	722,019	1.77%	524,414	3.25%
Metropolitan urban regions	16,137,359	39.51%	7,354,972	45.58%
SPAIN	40,847,371	100%		

Table 4.1. Population of the metropolitan urban regions and their metropolitan capitals (2001)[204]

Clearly what is highlighted by this initial examination is the dominance of the metropolitan system by the two metropolitan urban regions of Madrid and Barcelona, and the secondary nature of the five remaining areas of Valencia, Sevilla, Bilbao, Zaragoza and Málaga. The bicephalous characteristic of the metropolitan system is something which will be apparent throughout the remaining examination of the social and demographic tendencies as well as the economic dynamics considered in Chapter 5.

[204] INE (2001) (own elaboration)

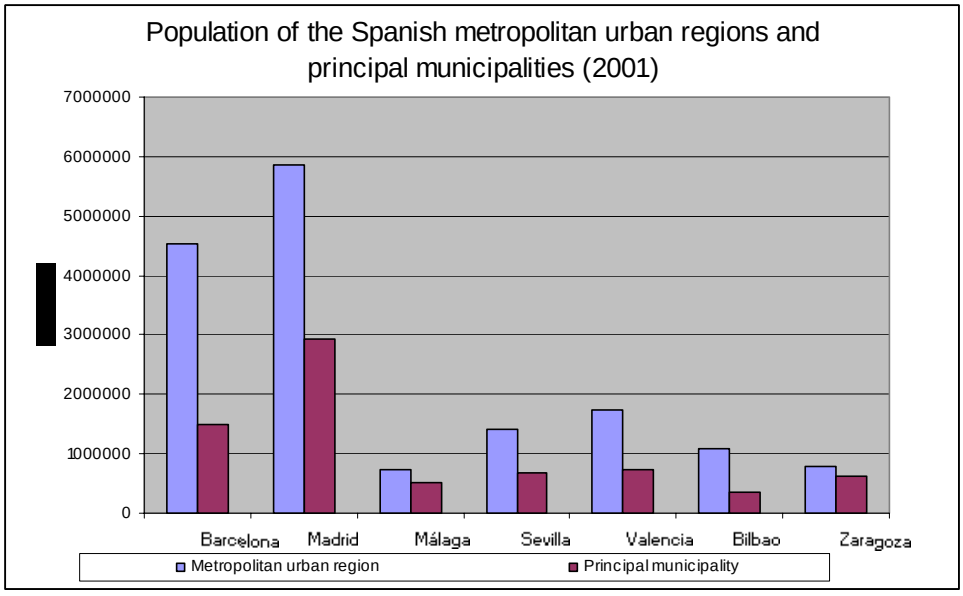


Figure 4.1. Population of the metropolitan urban regions and their metropolitan capitals (2001)[205]

[205] INE (2001), (own elaboration)

4.2. Distribution of the metropolitan population

Looking now at the distribution of the metropolitan municipalities as a whole and in turn within each of the metropolitan urban regions (see Table 4.2), the metropolitan urban regions of Barcelona and Madrid were the only two with their metropolitan capitals exceeding 1 mil. persons, contributing to 27.5% of the population of the metropolitan system. The other five metropolitan capitals (Málaga, Sevilla, Valencia, Bilbao and Zaragoza) all lay within the 300,000-1 mil. inhabitants range, accounting for 18% of the metropolitan population. Some 13 municipalities were contained within the 100,000-300,000 inhab. range, representing 13.4% of the metropolitan population. These municipalities lay principally within the metropolitan urban regions of Barcelona[206] and Madrid[207], but also included a municipality within the metropolitan urban region of Sevilla[208]. In cumulative terms these 20 municipalities represented almost 59% of the metropolitan population. A total of 24 municipalities whose populations lay in the 50,000-100,000 inhab. range contributed to provide more than 10% of the metropolitan population. Again these municipalities were found principally within the metropolitan urban regions of Barcelona and Madrid, but also within the metropolitan urban regions of Sevilla, Valencia y Bilbao[209]. These 44 municipalities with populations in excess of 50,000 inhab. accounted for just over 69% of the overall metropolitan population. By adding the population of the 64 municipalities whose populations lay within the 20,000-50,000 range, it can be seen that over 80% of the Spanish metropolitan population lived in municipalities of over 20,000 inhabitants. The remaining 20% of the metropolitan population was distributed in municipalities of between 10,000 and 20,000 inhab. (7.1%), between 5,000-10,000 inhab. (4.8%), between 1,000-5,000 inhab. (5.5%) and less than 1,000 inhab. (1.4%).

Turning now to the individual metropolitan urban regions, in the case of Madrid, the metropolitan capital accounted for over 50% of the population[210]. More than 86% of the metropolitan population lived in 29 municipalities of more than 20,000 persons.

[206] L'Hospitalet de Llobregat, Badalona, Sabadell, Terrassa, Santa Coloma de Gramenet and Mataró.
[207] Móstoles, Fuenlabrada, Alcalá de Henares, Leganés, Alcorcón and Getafe
[208] Dos Hermanas
[209] Torrejón de Ardoz, Alcobendas, Parla, Coslada, Guadalajara, Pozuelo de Alarcón, Las Rozas de Madrid, San Sebastián de los Reyes and Majadahonda in *Madrid*; Cornellà de Llobregat, Sant Boi de Llobregat, El Prat de Llobregat, Rubí, Sant Cugat del Vallès, Viladecans, Vilanova i la Geltrú, Cerdanyola del Vallès and Granollers in *Barcelona*; Baracaldo, Getxo and Portugalete in *Bilbao*; Torrent and Sagunto in *Valencia*; and Alcalá de Guadaíra in Sevilla.
[210] The metropolitan capital of Madrid extends over some 605km^2, accounting for 2.19% of the spatial extension of the metropolitan urban region.

Population range of municipalities	Madrid		Barcelona		Valencia		Sevilla		Bilbao		Zaragoza				Metropolitan municipalities	
	No. of muns.	No. of muns.	No. of muns.	% of pop.	No. of muns.	% of pop.	No. of muns.	% of pop.	No. of muns.	% of pop.	No. of muns.	% of pop.	No. of muns.	% of pop.	No. of muns.	% of pop.
>1 million inhab.	1	50.21	1	33.11	0	0	0	0	0	0	0	0	0	0	2	27.53
300,000-1 million inhab.	0	0	0	0	1	42.46	1	48.59	1	31.93	1	79.29	1	72.63	5	18.05
100,000-300,000 inhab.	6	17.66	6	22.49	0	0	1	7.24	0	0	0	0	0	0	13	13.37
50,000-100,000 inhab.	9	11.27	9	12.32	2	7.01	1	4.08	3	20.79	0	0	0	0	24	10.08
20,000-50,000 inhab.	13	7.28	21	13.68	12	19.80	7	15.48	7	20.57	0	0	4	17.73	64	12.17
10,000-20,000 inhab.	13	2.93	27	8.14	19	16.10	12	12.30	8	10.55	1	1.53	2	3.67	82	7.12
5,000-10,000 inhab.	26	2.82	37	5.82	17	7.11	19	8.91	10	6.77	2	1.45	1	0.95	112	4.78
1,000-5,000 inhab.	149	6.23	72	3.92	48	6.16	16	3.28	35	7.41	42	10.52	13	4.62	375	5.53
<1,000 inhab.	392	1.60	54	0.53	53	1.36	3	0.12	40	1.98	219	7.20	5	0.40	766	1.38
TOTAL	609	100	227	100	152	100	60	100	104	100	265	100	26	100	1,443	100

Table 4.2. Distribution of the metropolitan municipalities according to their population range (2001) and their share of the respective metropolitan populations[211]

[211] INE (2001), own elaboration

These were distributed in the six municipalities in the 100,000-300,000 inhab. range, accounting for almost 18% of the population; the 9 municipalities whose populations lay in the 50,000-100,000 range, representing over 11% of the population; and an additional 13 municipalities[212] in the 20,000-50,000 inhab. range which accounted for more than 7% of the metropolitan population. Well over half the municipalities of the metropolitan urban region of Madrid had populations of less than 1,000 persons, but these accounted for less than 2% of the metropolitan population.

Looking at the metropolitan urban region of Barcelona, just one third of the metropolitan population lived within the central municipality[213]. Almost 82% of the metropolitan population lived in 37 municipalities with populations in excess of 20,000 inhab. This population lay within the six municipalities in the 100,000-300,000 inhab. range, representing almost 22.5% of the population; the 9 municipalities whose populations lay in the 50,000-100,000 range, accounting for over 12% of the population; and a further 21 municipalities in the 20,000-50,000 inhab. range[214].

While the metropolitan urban region of Barcelona is physically constrained owing to its coastal position, in actual fact both the metropolitan urban regions of Madrid and Barcelona displayed similar characteristics in the sense of the spatial distribution of their populations at the core of their areas. As indicated by Table 4.3 both metropolitan urban regions contained some 50% of their populations within a distance of 10 km. from their respective centres[215]. In the case of Madrid this was simply due to the magnitude of the metropolitan capital itself, whereas in the case of Barcelona, this included eight municipalities of the so-called *Barcelona de les Rondes* grouping, i.e. Sant Adrià de Besòs, L'Hospitalet de Llobregat, Esplugues de Llobregat, Santa Coloma de Gramenet, Sant Just Desvern, El Prat de Llobregat, Badalona and Cornellà de Llobregat, in addition to the metropolitan capital.

In the case of Madrid some 5.8% of the metropolitan population (337,000 inhab.) was contained within a distance of 10-20 km. from the core, within the municipalities of Alcobendas, San Sebastián de los Reyes, Pozuelo de Alarcón, Coslada and Tres Cantos. At the equivalent distance from the centre in Barcelona one found 27

[212] Collado Villalba, Aranjuez, Tres Cantos, San Fernando de Henares, Rivas-Vaciamadrid, Colmenar Viejo, Arganda del Rey, Valdemoro, Pinto, Boadilla del Monte, Galapagar, Villaviciosa de Odón and Azuqueca de Henares.
[213] The area of the metropolitan capital is some 100km^2, representing 2.09% of the metropolitan urban region of Barcelona.
[214] Mollet del Vallès, Castelldefels, Esplugues de Llobregat, Sant Feliu de Llobregat, Gavà, Sant Adrià de Besòs, Vilafranca del Penedès, Ripollet, Sant Joan Despí, Montcada i Reixac, Barberà del Vallès, Premià de Mar, Sant Vicenç dels Horts, el Vendrell, Sant Pere de Ribes, Martorell, Sant Andreu de la Barca, Pineda de Mar, el Masnou, Molins de Rei and Santa Perpètua de Mogoda.
[215] The distances quoted in this section refer to road distance from the origin (centre of the metropolitan capital) to the destination (centre of the municipality).

municipalities[216], accounting for almost 16% of the metropolitan population (720,000 inhab.), including important municipalities with populations in excess of 20,000 persons such as Sant Joan Despí, Sant Feliu de Llobregat, Montcada i Reixac, Sant Boi de Llobregat, Cerdanyola del Vallès, Ripollet, Sant Cugat del Vallès, Molins de Rei, Viladecans, Sant Vicenç dels Hort, El Masnou, Barberà del Vallès, Gavà, Santa Perpètua de Mogoda, Mollet del Vallès and Rubí.

Distance from centre (km)	Metropolitan urban region of Madrid		Metropolitan urban region of Barcelona	
	Population (2001)	Percentage of met. pop.	Population (2001)	Percentage of met. pop.
<10	293,8723	50.21	229,4464	50.51
10-20	336,999	5.76	719,914	15.85
20-30	133,6390	22.83	868,619	19.12
30-40	513,469	8.77	217,901	4.80
40-50	239,543	4.09	240,707	5.30
50-60	192,252	3.28	110,517	2.43
60-70	77,054	1.32	6,1139	1.35
70-80	59,214	1.01	27,460	0.60
80-90	33,661	0.58	996	0.02
90-100	23,552	0.40	383	0.01
100-110	28,336	0.48	409	0.01
110-120	15,413	0.26	-	-
120-130	25,208	0.43	-	-
130-140	9,951	0.17	-	-
140-150	5,695	0.10	-	-
150-160	16,352	0.28	-	-
160-170	669	0.01	-	-
170-180	406	0.01	-	-
180-190	113	0	-	-
190-200	67	0	-	-
200-210	117	0	-	-
210-220	61	0		
220-230	18	0	-	-
TOTAL	5,853,263	100	4,542,509	100

Table 4.3. Spatial distribution of the metropolitan population within the metropolitan urban regions of Madrid and Barcelona[217]

At a distance of 20-30 km from their respective centres, in both metropolitan urban regions one found a greater concentration of population than in the 10-20 km ring. In the case of Madrid the 23 municipalities[218] accounted for almost 23% of the metropolitan population (1,336,400 inhab.). The municipalities in this ring with greater than 20,000 inhabitants included Leganés, Majadahonda, Getafe, Alcorcón, Torrejón de Ardoz, Rivas-Vaciamadrid, San Fernando de Henares, Móstoles, Fuenlabrada, Las

[216] Sant Joan Despí, Sant Feliu de Llobregat, Montcada i Reixac, Sant Boi de Llobregat, Montgat, Cerdanyola del Vallès, Ripollet, Tiana, La Llagosta, Sant Cugat del Vallès, Molins de Rei, Viladecans, Sant Vicenç dels Hort, El Masnou, Santa Coloma de Cervelló, Alella, Barberà del Vallès, Sant Climent de Llobregat, Gavà, Pallejà, Badia del Vallès, Santa Perpètua de Mogoda, Mollet del Vallès, Rubí, Teià, Sant Fost de Campsentelles and El Papiol.
[217] INE (2001), (own elaboration)
[218] Leganés, Majadahonda, Getafe, Alcorcón, Paracuellos de Jarama, Torrejón de Ardoz, Rivas-Vaciamadrid, San Fernando de Henares, Móstoles, Cobeña, Mejorada del Campo, Fuenlabrada, Ajalvir, las Rozas de Madrid, Boadilla del

Rozas de Madrid, Boadilla del Monte, Pinto, Colmenar Viejo and Villaviciosa de Odón. In the case of Barcelona over 19% of the metropolitan population (869,000 inhab.) was contained within some 37 municipalities[219], including the metropolitan sub-centres of Sabadell, Terrassa, Granollers and Matarò, as well as other municipalities with populations in excess of 20,000 inhabitants, such as Premià de Mar, Castelldefels, Sant Andreu de la Barca, and Martorell. In cumulative terms some 85.5% of the metropolitan population of Barcelona (3,882,997 inhab.) was located within a distance of 30 km from the centre, compared to 78.8% (4,612,112 inhab.) in the case of Madrid.

In the 30-40 km band from the centre of Madrid, one finds 34 municipalities[220], out of which Parla, Alcalá de Henares, Arganda del Rey, Galapagar and Valdemoro all stand out with populations in excess of 20,000 inhabitants. These 34 municipalities accounted for 8.8% of Madrid's metropolitan population (513,000 inhab.). In the case of Barcelona at this same distance one found 30 municipalities[221], representing 4.8% of the metropolitan population (218,000 inhab.), all of which had populations of under 20,000 inhabitants. Almost 87.6% of the metropolitan population of Madrid (5,125,581 inhab.) was located within a distance of 40 km from the centre, compared with almost 90.3% (4,100,898 inhab.) of Barcelona's metropolitan population.

In the case of the metropolitan urban region Barcelona, the 40-50 km band contained a greater proportion of the metropolitan population (5.3% or 241,000 inhab.) than the 30-40 km band, comprising some 44 municipalities[222]. Sant Pere de Ribes, Vilanova i la Geltrú and Vilafranca del Penedès were the only municipalities of this grouping whose populations exceeded 20,000 inhabitants. By contrast, in the case of the metropolitan

Monte, Velilla de San Antonio, Algete, Pinto, Colmenar Viejo, Fuente el Saz de Jarama, Daganzo de Arriba, Villaviciosa de Odón and Torrelodones.

[219] Premià de Mar, Martorelles, El Palma de Cervelló, Cervelló Torrelles de Llobregat, Sabadell, Santa Maria de Martorelles, Montmeló, Castelldefels, Sant Andreu de la Barca, Sant Quirze del Vallès, Premià de Dalt, Polinyà, Montornès del Vallès, Vilassar de Mar, Vallirana, Vilassar de Dalt, Corbera de Llobregat, Parets del Vallès, Castellbisbal, Palau-solità i Plegamans, Cabrils, Vilanova del Vallès, Lliçà de Vall, Cabrera de Mar, Martorell, Terrassa, Begues, Lliçà d'Amunt, Vallromanes, Castellar del Vallès, Granollers, Sentmenat, Mataró, Caldes de Montbui, Canovelles and Ullastrell.

[220] Humanes de Madrid, Parla, Villanueva del Pardillo, Alcalá de Henares, San Agustín del Guadalix, Valdeolmos-Alalpardo, Moraleja de Enmedio, Loeches, Torrejón de la Calzada, Arganda del Rey, Galapagar, Brunete, Valdemoro, El Molar, San Martín de la Vega, Villanueva de la Cañada, Torres de la Alameda, Arroyomolinos, Valdetorres de Jarama, Griñón, Hoyo de Manzanares, Camarma de Esteruela, Fresno de Torote, Colmenarejo, Serranillos del Valle, Campo Real, Cubas de la Sagra, Torrejón de Velasco, Casarrubuelos, Soto del Real, Meco, Navalcarnero, Ciempozuelos and Valdemorillo.

[221] Argentona, Matadepera, La Roca del Vallès, Viladecavalls, Castellví de Rosanes, Franqueses del Vallès, Abrera, Santa Eulàlia de Ronçana, Olesa de Bonesvalls, Sant Esteve Sesrovires, Gelida, L'Ametlla del Vallès, Sant Andreu de Llavaneres, Olesa de Montserrat, Esparreguera, Òrrius, Dosrius, Cardedeu, Sant Feliu de Codines, La Garriga, Caldes d'Estrac, Bigues i Riells, Sitges, Vacarisses, Sant Vicenç de Montalt, Masquefa, Sant Llorenç d'Hortons, Subirats, Arenys de Mar and Llinars del Vallès.

[222] Sant Pere de Ribes, Collbató, Avinyonet del Penedès, Sant Llorenç Savall, Figaró-Montmany, Sant Sadurní d'Anoia, Canet de Mar, Cànoves i Samalús, Vilalba Sasserra, Arenys de Munt, Rellinars, Sant Antoni de Vilamajor, Sant Cugat Sesgarrigues, Tagamanent, Castellbell i el Vilar, Gallifa, Sant Quirze Safaja, Sant Pere de Vilamajor, Piera, El Bruc, Vilanova i la Geltrú, Hostalets de Pierola, Monistrol de Montserrat, Sant Pol de Mar, La Granada, Castellterçol, Santa Fe del Penedès, Sant Iscle de Vallalta, Vilafranca del Penedès, Sant Vicenç de Castellet, Aiguafreda, Canyelles, Sant Cebrià de Vallalta, Sant Celoni, Castellcir, Torrelavit, Olèrdola, Vallbona d'Anoia, Santa Maria de Palau, Calella, Puigdàlber, Castellgalí, Les Cabanyes and Cubelles.

urban region of Madrid, this same band comprising some 58 municipalities[223], contained 4.1% of the metropolitan population (239,500 inhab.). Just two municipalities - Collado Villalba and Azuqueca de Henares – stood out by having populations in excess of 20,000 inhabitants. In cumulative terms some 95.6% of the metropolitan population of Barcelona (4,341,605 inhab.) was located within a distance of 50 km from the centre, compared to 91.7% (5,365,124 inhab.) in the case of Madrid.

Of the remaining outer rings of the metropolitan urban region of Madrid, the 50-60 km ring contained just 2 municipalities with populations in excess of 20,000 inhabitants - Aranjuez and Guadalajara – which together proportioned almost 110,000 inhabitants. This ring represented 3.3% of the entire metropolitan population (192,000 inhab.), meaning that almost 95% of the Madrid's metropolitan population was contained within a distance of 60 km from the core. The remaining 5% of Madrid's metropolitan population lay between 60 and 220 km from the core. With the exception of Campo de Criptana, at a distance of 151 km from the core, with a population of 13,200 inhabitants, the remaining population was distributed in municipalities with less than 10,000 inhabitants.

In the case of the metropolitan urban region of Barcelona, the remaining 4.4% of the population lay within a range of 50-110 km from the core. The municipality of El Vendrell, with a population of almost 24,000 inhabitants, at a distance of 64 km stood out, as did the municipalities of Torredembara (11,200 inhab. at a distance of 72 km) and Tordera (10,000 inhab. at a distance of 64 km). However the remaining municipalities all had populations of less than 5,000 inhabitants.

Figures 4.2 and 4.3 illustrate the spatial distribution of the municipalities of the metropolitan urban regions of Madrid and Barcelona, relative to the distance from the respective metropolitan capitals. The more compact nature of the metropolitan urban region of Barcelona is clearly evident, as is the dominance of the metropolitan capital of Madrid within its metropolitan urban region.

[223] Pedrezuela, Quijorna, Valverde de Alcalá, Morata de Tajuña, Collado Villalba, Sevilla la Nueva, Batres, Pozuelo del Rey, Anchuelo, Villalbilla, El Escorial, El Casar, Manzanares el Real, El Vellón, Alpedrete, Talamanca de Jarama, Corpa, Carranque, Azuqueca de Henares, Ribatejada, Valdepiélagos, Ugena, Illescas, El Alamo, Miraflores de la Sierra, Venturada, Guadalix de la Sierra, El Boalo, Valdeavero, Perales de Tajuña, Seseña, Santos de la Humosa, El Viso de San Juan, Santorcaz, Nuevo Baztán, Titulcia, Yeles, Torrejón del Rey, Villanueva de Perales, Navalagamella, Redueña, Valdilecha, Moralzarzal, Villamanta, Collado Mediano, Guadarrama, Valdenuño Fernández, Cabanillas de la Sierra, Numancia de la Sagra, Becerril de la Sierra, Alovera, Tielmes, Villanueva de la Torre, Cedillo del Condado, San Lorenzo de El Escorial, Navalafuente, Torrelaguna and Yuncos.

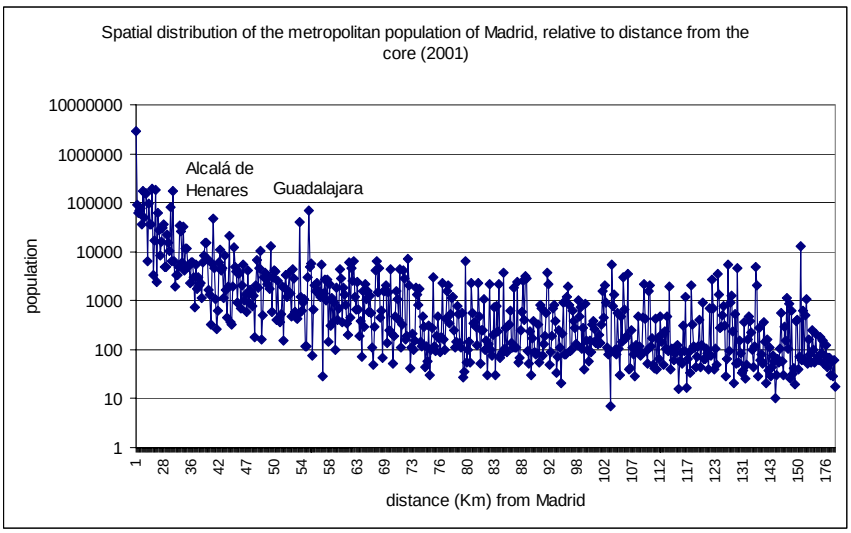


Figure 4.2. Spatial distribution of the metropolitan municipalities of Madrid (2001)[224]

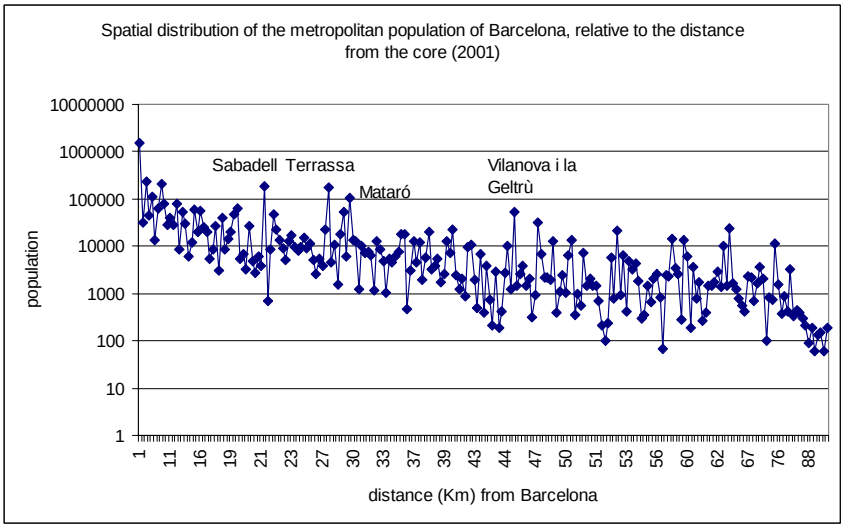


Figure 4.3. Spatial distribution of the metropolitan municipalities of Barcelona (2001)[225]

Continuing with the examination of the population distribution in the other metropolitan urban regions, the metropolitan urban region of Valencia, the metropolitan capital lay in the 300,000-1 million inhabitants range, accounting for over 42% of the metropolitan population[226]. Two municipalities in the 50,000-100,000 inhabitants range, Torrent and Sagunto, together accounted for 7% of the metropolitan population. With the addition of 12 municipalities[227] lying in the 20,000-50,000 range, representing almost 20% of the metropolitan population, it can be seen that over 73% of the metropolitan population lay within municipalities of more than 20,000 persons.

[224] INE (2001) (own elaboration)
[225] INE (2001) (own elaboration)
[226] The 136km^2 of the metropolitan capital account for 2.14% of the metropolitan urban region of Valencia.

The metropolitan urban region of Sevilla was structured by the core municipality of Sevilla, in the 300,000-1 million inhabitants range, representing over 48% of the metropolitan population[228]; Dos Hermanas lying in the 100,000-300,000 inhabitants range, accounting for over 7% of the metropolitan population; Alcalá de Guadaíra in the 50,000-100,000 inhabitants range representing 4% of the metropolitan population; and 7 municipalities in the 20,000-50,000 inhabitants range, Utrera, Mairena del Aljarafe, Los Palacios y Villafranca, La Rinconada, Carmona, Camas y Coria del Río, which together accounted for over 15% of the metropolitan population. These 10 municipalities all brought the metropolitan population living in municipalities of more than 20,000 inhabitants to over 75% of the total.

Of the seven metropolitan urban regions, that of Bilbao was the closest which resembled Barcelona, in the sense of the population of its metropolitan capital being of a similar proportion to the remainder of the metropolitan urban region. The population of the metropolitan capital lay in the 300,000-1 million inhabitants range and represented almost 32% of the metropolitan population[229]. Three municipalities, Barakaldo, Getxo and Portugalete, in the 50,000-100,000 inhabitants range accounted for over 20% of the metropolitan population. A further seven municipalities, Santurtzi, Basauri, Sestao, Galdakao, Leioa, Erandio and Castro-Urdiales, whose combined population represented more than 20% of that of the metropolitan urban region, brought the total population living in municipalities of more than 20,000 inhabitants to over 73% of the overall metropolitan population.

In the case of the metropolitan urban region of the case of the metropolitan urban region of Zaragoza stands out for the fact that almost 80% of the metropolitan population was located within the metropolitan capital, which lay in the 300,000-1 million inhabitants range[230]. By contrast almost 18% of the population lay within small municipalities of less than 5,000 inhabitants, with over 7% located in municipalities of less than 1,000 inhabitants. On the other hand 3 medium-sized municipalities were significant for containing almost 3% of the metropolitan population: Utebo in the 10,000-20,000 inhabitants range, and Zuera and Alagón in the 5,000-10,000 inhabitants range.

[227] Paterna, Mislata, Burjassot, Alaquàs, Xirivella, Manises, Sueca, Quart de Poblet, Aldaia, Algemesí, Catarroja and Cullera.
[228] The metropolitan capital extends to some 140km^2, representing 2.05% of the metropolitan urban region of Sevilla.
[229] The area of the metropolitan capital extends to some 41km^2, which represents 1.53% of the metropolitan urban region of Bilbao.
[230] The metropolitan capital has an area of some 1,068km^2, which represents 7.08% of the metropolitan urban region of Zaragoza.

Lastly, Málaga was dominated by the municipality of Málaga itself, in which almost 73% of the metropolitan population resided[231]. Four municipalities, Torremolinos, Benalmádena, Rincón de la Victoria and Alhaurín de la Torre, whose populations lay in the 20,000-50,000 inhabitants range, accounted for almost 18% of the metropolitan population, and brought the proportion of the metropolitan population residing in municipalities of more than 20,000 inhabitants to over 90%.

[231] The metropolitan capital has an area of some 395km^2, representing 23.85% of the metropolitan urban region of Málaga.

4.3. Population density

The demographic density of the metropolitan urban regions in 2001 stood at almost 250 inhabitants/km^2, some three times the density for the whole of Spain (81 inhab./km^2) and almost six times the density for the remainder of Spain (56 inhab./km^2).

However the cumulative figure for the metropolitan urban regions hides considerable differences between the seven individual metropolitan urban regions. Barcelona stood out as the densest of the metropolitan urban regions with a density of almost 950 inhab./km^2, followed by Málaga (436 inhab./km^2), Bilbao (410 inhab./km^2), Valencia (274 inhab./km^2), Madrid (212 inhab./km^2) and Zaragoza (51 inhab./km^2).

Metropolitan urban region	Area (km^2)	Density (inhabitants/km^2) 1991	1996	2001
Madrid	27580,90	193,00	196,61	212,22
Barcelona	4796,41	911,18	907,63	947,06
Valencia	6346,91	261,55	268,44	274,01
Sevilla	6841,73	192,17	202,21	205,94
Bilbao	2674,55	419,45	414,25	409,79
Zaragoza	15077,55	49,92	50,30	51,43
Málaga	1655,62	400,75	432,74	436,10
Total	64973,66	234,04	237,73	248,37
Rest of Spain	439671,34	53,83	55,09	56,20
SPAIN	504645,00	77,03	78,61	80,94

Table 4.4. Population density of the metropolitan urban regions (1991-2001)[232]

With regard to the population densities within each of the metropolitan urban regions, (Table 4.5) in the case of Sevilla almost 1 in every 4 inhabitants resides in municipalities with low or very density (< 250 inhab.km^2). In the case of Zaragoza the equivalent proportion is almost 1 in every 5 residents. In terms of the mid-range densities (250-1,000 inhab.km^2), almost one fifth of the population of Sevilla, Valencia and Bilbao live in municipalities with such densities. At the top end of the density range (> 1,000 inhab.km^2), more than 80% of the metropolitan populations of Barcelona (85.8%) and Málaga (83.6%) are concentrated in municipalities of this density, with that of Madrid lying marginally below (79.1%).

Looking in greater detail at the urban agglomerations of the respective metropolitan urban regions, i.e. the grouping of municipalities with a population density in excess of 250 inhab./km^2, (Table 4.6) one finds that Barcelona stands out as having the highest proportion of such urban spaces (38.6%) followed by Málaga (33.4%).

[232] INE (1991 and 2001) (own elaboration)

Metropolitan urban region	<100 inhab./km^2	100-250 inhab./km^2	250-500 inhab./km^2	500-1,000 inhab./km^2	1,000-5,000 inhab./km^2	>5,000 inhab./km^2
Barcelona	81,991	102,676	239,019	220,641	1,587,445	2,310,737
Madrid	424,370	314,491	217,491	265,448	4,553,579	77,884
Valencia	123,326	65,508	159,545	164,780	335,018	890,949
Sevilla	196,654	137,527	91,728	167,848	798,961	16,245
Bilbao	54596	37,297	87,169	115,246	194,338	607,354
Zaragoza	134,591	13,793	0	626,801	294	0
Málaga	43,684	25,913	23,369	25,302	603,751	0
Met. areas	1,059,212	697,205	818,321	1,586,066	8,073,386	3,903,169

Table 4.5. Population density structure of the metropolitan urban regions (2001)[233]

Zaragoza and Madrid at the other extreme, the two most extensive metropolitan urban regions, have the least proportion of urban spaces (7.2% and 8.6%) respectively. This apart this approach indicates Barcelona as the densest of the seven metropolitan urban regions (2,352 inhab./km^2), followed by Madrid (2,159 inhab./km^2), Bilbao (1,607 inhab./km^2), Valencia (1,525 inhab./km^2), Sevilla (1,512 inhab./km^2), Málaga (1,181 inhab./km^2) and Zaragoza (577 inhab./km^2).

Metropolitan urban region	Population (2001)	Area (km^2)	Density (inhab./km^2)
Madrid	5,114,402	2,368.67	2,159
Barcelona	4,357,842	1,852.63	2,352
Valencia	1,550,292	1,016.77	1,525
Sevilla	1,074,782	710.95	1,512
Bilbao	1,004,107	624.82	1,607
Zaragoza	627,095	1,086.27	577
Málaga	652,422	552.22	1,181
TOTAL	14,380,942	8,212.33	1,751

Table 4.6. Characteristics of the urban agglomerations of the metropolitan urban regions, where the population density is greater than 250 inhab./km^2 [234]

[233] INE (2001) (own elaboration)
[234] INE (2001) (own elaboration)

4.4. Change in the metropolitan population (1986-2006)

Turning to the question of the evolution of the Spanish metropolitan population (see Figure 4.4 and Table 4.7), over the period 1991-1996, the population of the combined metropolitan urban regions increased at a similar rate to that of Spain. However during the preceding five year period, 1986-1991 and over the subsequent periods 1996-2001 and 2001-2006, the metropolitan population increased at a rate marginally higher than that of Spain – by 2% during the period 1986-1991 compared to the 1% increase of Spain; by 4% in the period 1996-2001 compared to 3% for Spain; and by 10% over the period 2001-2006, compared to the 9% increase of Spain. Nevertheless the tendencies of growth at the national level were clearly reflected at the metropolitan level over this 20 year period.

In absolute terms, the metropolitan urban regions of Málaga and Bilbao both lost population in the period 1986-1991, with Bilbao losing three times the corresponding loss of Málaga. The decline in the metropolitan population of Bilbao continued over the following ten years up until 2001, and although in absolute terms the period 2001-2006 indicated an increase in population, this increase was insufficient to compensate for the magnitude of the losses experienced over the preceding 15 years. The metropolitan population of Barcelona also declined over the period 1991-1996, but increased over the period 1996-2001, and compensated for this decline. Otherwise the population of each of the other metropolitan urban regions increased steadily over this twenty year period, with marked increases in absolute terms between 1986-1991 in Madrid (167,469 persons) and Sevilla (77,937 persons); between 1991-1996 again in Madrid (99,461 persons) and Sevilla (68,667 persons); between 1996-2001 in Madrid (430,627 persons) and Barcelona (189,123 persons); and between 2001-2006 in Madrid (670,560 persons), Barcelona (497,369 persons), Valencia (196,883 persons), Sevilla (96,411 persons) and Málaga (102,892 persons).

Looking at the change over these same periods in relative terms, the population of the metropolitan urban regions of Málaga has increased by 14% since 2001, with increases of 11% in Madrid, Barcelona and Valencia, 7% in Sevilla, 6% in Zaragoza and 2% in Bilbao. Over the previous five year period, 1996-2001 Madrid stood out for an 8% increase in its population, followed by Barcelona (4%), Sevilla, Valencia and Zaragoza (each 2%) and Málaga (1%) with a 1% decline in the metropolitan urban region of Bilbao. The two southern-most metropolitan urban regions of Málaga and Sevilla underwent the highest relative increases in population in the period 1991-1996, with

increases of 8% and 5% respectively, followed by increases of 3% in Valencia, 2% in Madrid, 1% in Zaragoza and a 1% loss in Bilbao. However during the previous five year period (1986-1991) while the metropolitan population of Sevilla increased by 6%, that of Málaga declined by 1%, with moderately low increases experienced in Madrid (3%), Valencia and Zaragoza (2%), and Barcelona (1%), and a decline of 2% in Bilbao.

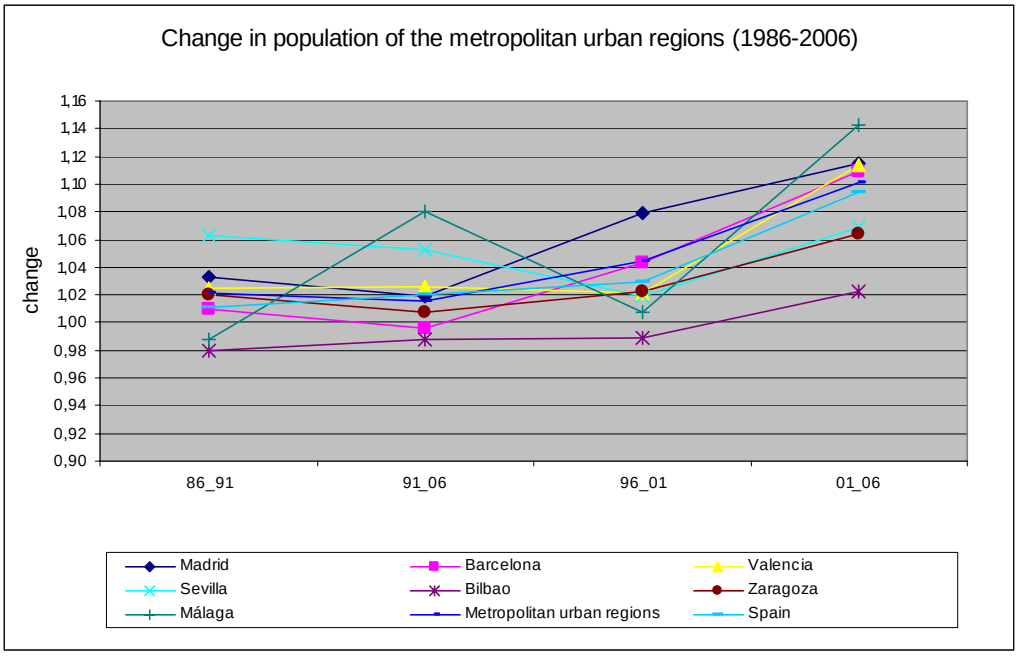


Figure 4.4. Change in population of the metropolitan urban regions (1986-2006)[235]

Turning to look at the change in population of the metropolitan capital cities, one finds over the period since 1986 the growth of these cities has been of a scale under that of both the metropolitan urban regions as a whole and Spain. While Table 4.7 indicates that the metropolitan system increased in its population by 4% between 1986 and 1996, and by 15% between 1996 and 2005, Table 4.8 shows that the metropolitan capitals declined in population by 4% in the period 1986-1996, increasing by 7% in the period between 1996 and 2006. Indeed both Madrid and Barcelona lost population of in the order of 200,000 persons in the ten year period following 1986. In the case of Madrid increases in the periods 1996-2001 and 2001-2006 were sufficient to compensate for these losses, but in the case of Barcelona, the sum of the losses between 1986-1991, 1991-1996 and 1996-2001 were not overcome by the increase experienced between 2001-2005, meaning that the 2006 population of the city (1.605 mil. inhab.) stood at a level inferior to that of the population in 1986 (1.702 mil. inhab.). With the exception of Zaragoza, which has steadily increased in population over the period 1986-2006, each of the other four metropolitan capitals have undergone losses in population – in Málaga

[235] INE (1986, 1991, 1996 and 2001) (own elaboration)

between 1986 and 1991 and again between 1996 and 2001; in Sevilla between 1996 and 2001; in Valencia between 1991 and 2001; and in Bilbao between 1986 and 2001. Both Málaga and Bilbao reflect the overall decline in population witnessed in Barcelona over this period, with their 2005 populations being less than that in 1986. The period 2001-2006 was the first of the four periods examined in this analysis which saw a recovery of this phenomenon of loss in population at the core of the metropolitan urban regions, with an overall absolute increase in population in each of the seven metropolitan capitals. Clearly the increases in population of the metropolitan urban regions seen previously have been due to overall increases in the population of the remainder of the metropolitan urban regions, in the peripheral areas lying beyond the administrative limits of the metropolitan capitals.

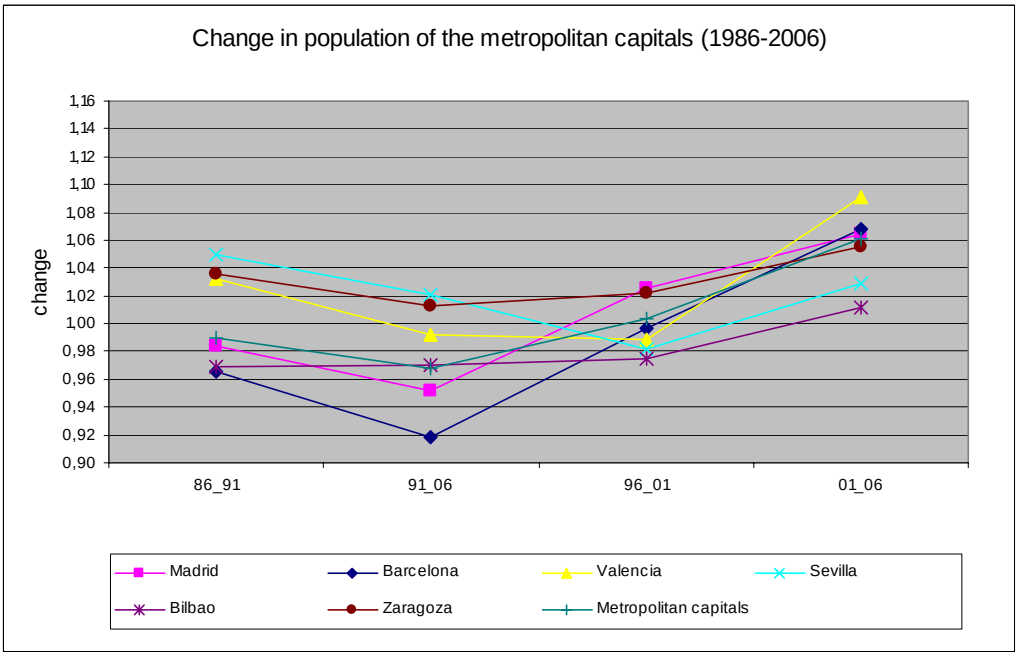


Figure 4.5. Change in population of the metropolitan capitals (1986-2006)[236]

[236] INE (1986, 1991, 1996 and 2001) (own elaboration)

Metropolitan urban region	Population. 1986	Population 1991	Population 1996	Population 2001	Population 2006	Absolute change 1986-91	Absolute change 1991-96	Absolute change 1996-2001	Absolute change 2001-2006
Madrid	5,155,706	5,323,175	5,422,636	5,853,263	6,523,823	167,469	99,461	430,627	670,560
Barcelona	4,327,804	4,370,385	4,353,386	4,542,509	5,039,878	42,581	-16,999	189,123	497,369
Valencia	1,619,621	1,660,029	1,703,671	1,739,126	1,936,009	40,408	43,642	35,455	196,883
Sevilla	1,236,831	1,314,768	1,383,435	1,408,963	1,505,374	77,937	68,667	25,528	96,411
Bilbao	1,144,905	1,121,841	1,107,934	1,096,000	1,120,310	-23,064	-13,907	-11934	24,310
Zaragoza	737,716	752,627	758,359	775,479	824,911	14,911	5,732	17,120	49,432
Málaga	671,376	663,490	716,460	722,019	824,911	-7,886	52,970	5,559	102,892
Total	14,893,959	15,206,315	15,445,881	16,137,359	17,775,216	312,356	239,566	691,478	1,637,857
Spain	38,473,418	38,872,268	39,669,394	40,847,371	44,708,964	398,850	797,126	1,177,977	3,861,593

Metropolitan urban region	Relative change 1986-91	Relative change 1991-96	Relative change 1996-2001	Relative change 2001-06	Relative change 1986-96	Relative change 1996-2006	Relative change 1986-2006
Madrid	1.03	1.02	1.08	1.11	1.05	1.20	1.27
Barcelona	1.01	1.00	1.04	1.11	1.01	1.16	1.16
Valencia	1.02	1.03	1.02	1.11	1.05	1.14	1.20
Sevilla	1.06	1.05	1.02	1.07	1.12	1.09	1.22
Bilbao	0.98	0.99	0.99	1.02	0.97	1.01	0.98
Zaragoza	1.02	1.01	1.02	1.06	1.03	1.09	1.12
Málaga	0.99	1.08	1.01	1.14	1.07	1.15	1.23
Total	1.02	1.02	1.04	1.10	1.04	1.15	1.19
Spain	1.01	1.02	1.03	1.09	1.03	1.13	1.16

Table 4.7. Population change of the metropolitan urban regions 1986-2006[237]

[237] INE (1986, 1991, 1996 and 2001) (own elaboration)

Metropolitan capital	Population. 1986	Population 1991	Population 1996	Population 2001	Population 2006	Absolute change 1986-91	Absolute change 1991-96	Absolute change 1996-2001	Absolute change 2001-2006
Madrid	3,058,182	3,010,492	2,866,850	2,938,723	3,128,600	-47,690	-143,642	71,873	189,877
Barcelona	1,701,812	1,643,542	1,508,805	1,503,884	1,605,602	-58,270	-134,737	-4,921	101,718
Valencia	729,419	752,909	746,683	738,441	805,304	23,490	-6,226	-8,242	66,863
Sevilla	651,084	683,028	697,487	684,633	704,414	31,944	14,459	-12,854	19,781
Bilbao	381,506	369,839	358,875	349,972	354,145	-11,667	-10,964	-8,903	4,173
Zaragoza	573,662	594,394	601,674	614,905	649,181	20,732	7,280	13,231	34,276
Málaga	563,332	522,108	549,135	524,414	560,631	-41,224	27,027	-24,721	36,217
Total	7,658,997	7,576,312	7,329,509	7,354,972	7,807,877	-82,685	-246,803	25,463	452,905

Metropolitan capital	Relative change 1986-91	Relative change 1991-96	Relative change 1996-2001	Relative change 2001-06	Relative change 1986-96	Relative change 1996-2006	Relative change 1986-2006
Madrid	0.98	0.95	1.03	1.06	0.94	1.09	1,02
Barcelona	0.97	0.92	1.00	1.07	0.89	1.06	0,94
Valencia	1.03	0.99	0.99	1.09	1.02	1.08	1,10
Sevilla	1.05	1.02	0.98	1.03	1.07	1.01	1,08
Bilbao	0.97	0.97	0.98	1.01	0.94	0.99	0,93
Zaragoza	1.04	1.01	1.02	1.06	1.05	1.08	1,13
Málaga	0.93	1.05	0.95	1.07	0.97	1.02	1,00
Total	0.99	0.97	1.00	1.06	0.96	1.07	1,02

Table 4.8. Population change of the metropolitan capitals (1986-2006)[238]

[238] INE (1986, 1991, 1996 and 2001) (own elaboration)

4.5. Age structure of the metropolitan population

The analysis of the age structure of the metropolitan urban regions (Table 4.9) as well as the metropolitan capitals (Table 4.10) indicates that in general terms around one third of the respective populations in 2001 lay within the 40-64 year age group, and around one quarter in the 25-39 year age group. One clear difference stands out in relation to the metropolitan populations of the two southernmost metropolitan urban regions of Málaga and Sevilla, in the sense that these two areas had a significantly higher proportion of population in the younger age groups, both under 15 years of age and between 15-24 years of age, than the other five metropolitan urban regions. In the same way, these two metropolitan urban regions indicated a lower proportion of population in the uppermost elderly age group than the other metropolitan urban regions.

Metropolitan urban region	Age group				
	under 15 yrs.	15-24 yrs.	25-39 yrs.	40-64 yrs.	over 64 yrs.
Madrid	14.37	13.76	26.74	30.16	14.98
Barcelona	13.67	12.95	25.58	31.05	16.75
Valencia	14.02	13.98	25.46	30.53	16.00
Sevilla	16.84	15.70	25.96	28.21	13.29
Bilbao	11.42	12.44	24.85	32.68	18.61
Zaragoza	12.61	12.42	24.00	31.27	19.70
Málaga	16.40	15.45	25.43	29.23	13.49
Metropolitan urban regions	14.16	13.65	25.89	30.46	15.85
SPAIN	14.52	13.83	24.90	29.71	17.04

Table 4.9. Age structure of the metropolitan urban regions (2001)[239]

Metropolitan capital	Age group				
	under 15 yrs.	15-24 yrs.	25-39 yrs.	40-64 yrs.	over 64 yrs.
Madrid	12.31	12.11	26.20	30.09	19.29
Barcelona	11.51	11.39	23.82	31.61	21.67
Valencia	12.78	13.35	25.31	31.07	17.49
Sevilla	15.01	14.98	25.49	29.35	15.18
Bilbao	10.98	11.50	24.27	32.27	20.98
Zaragoza	12.92	12.85	24.46	31.81	17.96
Málaga	16.08	15.90	25.15	29.21	13.67
SPAIN	14.52	13.83	24.90	29.71	17.04

Table 4.10. Age structure of the metropolitan capitals (2001)[240]

With the exception of the metropolitan urban regions of Málaga and Sevilla, all the other cases indicated a lower proportion of population in the under 15 year age group than the proportion for the whole of Spain. Similarly at the opposite end of the age range, the metropolitan urban regions of Bilbao and Zaragoza were the only two with a

[239] INE (2001) (own elaboration)
[240] INE (2001) (own elaboration)

higher proportion of elderly population, over 64 years of age, than the proportion for Spain. Having said that, looking at the metropolitan capitals, Barcelona, Madrid, Valencia, Bilbao and Zaragoza all had a higher proportion of elderly population than that pertaining to the country at wide.

4.6. Ageing of the metropolitan population

Comparing data from the 1991 and 2001 Censuses, one can observe that there was a marked increase in the ageing of the population over that decade, i.e. defined as the elderly proportion of the population divided by the youngest age group, not only at the metropolitan level but in Spain as a whole. In 1991 the metropolitan urban region of Zaragoza indicated a similar proportion of elderly and young population, whereas all the other metropolitan urban regions were characterised as having a higher proportion of population in the under-15 year age group. However by 2001 this pattern had changed completely. The metropolitan urban regions of Málaga and Sevilla continued to have a higher proportion of younger than older population, but all the other metropolitan urban regions and Spain at large displayed an ageing population structure. This was most clearly evident in Bilbao (1.63), followed by Zaragoza (1.56), Barcelona (1.23), Valencia (1.14) and Madrid (1.04).

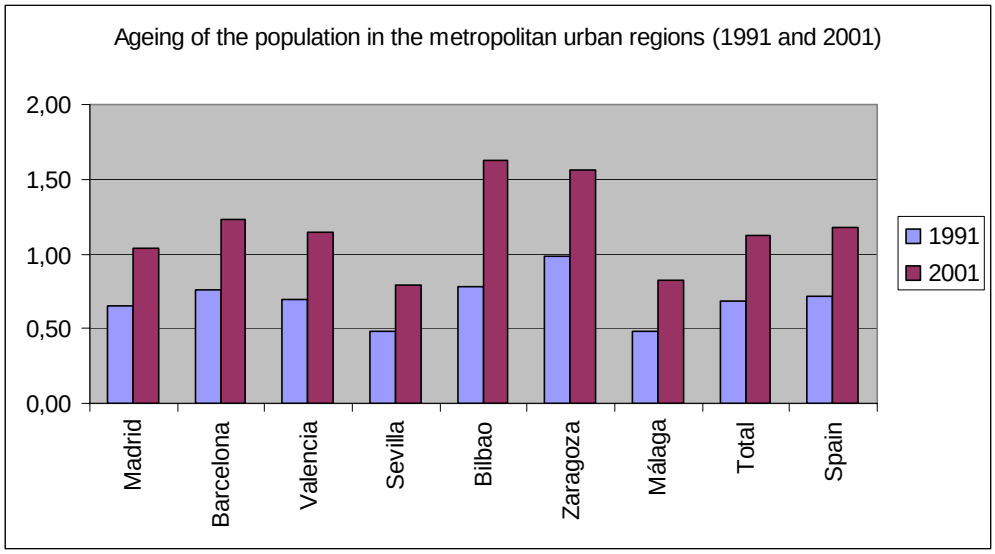


Figure 4.6. Ageing of the population of the metropolitan urban regions (1991 and 2001)[241]

However this ageing tendency was even more marked within the metropolitan capitals. In 2001 Bilbao stood out with the highest rate (1.91) having increased from 0.97 in 1991. This was followed closely by Barcelona (1.88), Madrid (1.57), Zaragoza (1.39) and Valencia (1.37) having increased over the previous ten years in these four metropolitan capitals from 1.21, 1.0, 0.84 and 0.83 respectively. The proportions of the older and younger age groups were virtually balanced in Sevilla, with Málaga again indicating a much younger population structure than the other metropolitan capitals (0.85).

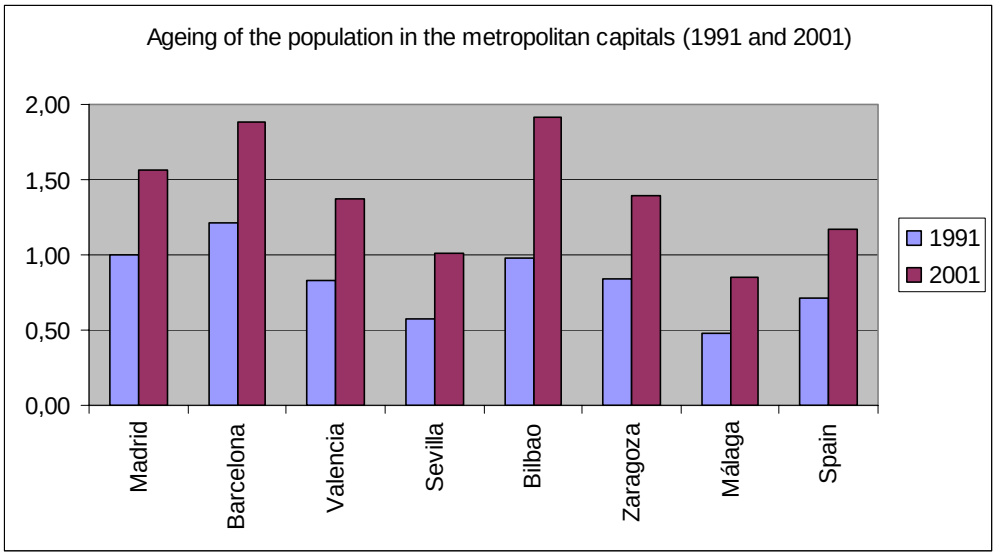


Figure 4.7. Ageing of the population in the metropolitan capitals (1991 and 2001)[242]

[241] INE (1991 and 2001) (own elaboration)
[242] INE (1991 and 2001) (own elaboration)

4.7. Educational level

Taking into consideration the level of education of the economically active population, 16 years and over, of the metropolitan urban regions, as indicated by Table 4.11 the two southernmost metropolitan urban regions of Málaga and Sevilla were characterised by having a higher proportion of less educated population than the other metropolitan urban regions and Spain at large. Conversely Sevilla was the only case with a lower proportion of medium and higher educated population (76.46%) than the corresponding proportion for Spain (77.40%). The metropolitan urban region of Bilbao indicated having the most highly educated population (86.83%), followed by Zaragoza (84.36%) and Madrid (83.16%), with Barcelona, Málaga, Valencia and Sevilla all lying below the figure of 81.35% for the sum of the metropolitan urban regions.

Metropolitan urban region	Level of education				
	Illiterate (%)	No formal qualification (%)	Primary education (%)	Secondary education (%)	University education (%)
Madrid	0.55	3.95	12.34	55.14	28.02
Barcelona	0.64	4.63	14.90	58.16	21.67
Valencia	0.47	3.94	16.98	56.59	22.01
Sevilla	0.66	6.29	16.58	53.72	22.75
Bilbao	0.20	1.74	11.22	59.71	27.12
Zaragoza	0.34	2.44	12.86	60.30	24.06
Málaga	0.56	5.31	15.45	57.02	21.66
Metropolitan urban regions	0.54	4.16	13.95	56.69	24.66
SPAIN	0.54	5.04	17.03	56.75	20.64

Table 4.11. Educational level of the metropolitan urban regions (2001)[243]

However in the case of the metropolitan capitals, one finds a much higher level of education than in the metropolitan urban regions (Table 4.12). Each of the metropolitan capitals indicates having a proportion of medium and higher educated population above that of Spain (77.40%) with the one exception of Málaga (80.87%). Again the metropolitan capital of Bilbao stands out for the highest proportion of population with secondary and university studies (86.83%), followed by Madrid (86.09%), Zaragoza (86%), Barcelona (85.29%), Valencia (85.28%) and Sevilla (83.22%).

[243] INE (2001) (own elaboration)

Metropolitan urban region	Level of education				
	Illiterate (%)	No formal qualification (%)	Primary education (%)	Secondary education (%)	University education (%)
Madrid	0.51	3.34	10.07	50.73	35.36
Barcelona	0.40	3.47	10.84	52.90	32.40
Valencia	0.42	2.62	11.67	54.45	30.83
Sevilla	0.48	4.17	12.12	52.82	30.40
Bilbao	0.20	2.00	10.97	54.07	32.75
Zaragoza	0.35	2.28	11.38	59.20	26.80
Málaga	0.54	4.53	14.06	57.50	23.37
SPAIN	0.54	5.04	17.03	56.75	20.64

Table 4.12. Educational level of the metropolitan capitals (2001)[244]

[244] INE (2001) (own elaboration)

4.8. Employment structure

Looking at the occupations of the economically active population, Table 4.13 shows that for Spain as a whole some 41% of the workforce is engaged in managerial, professional, technical and administrative activities. The corresponding proportion for each of the metropolitan urban regions lies above this figure, led by Madrid (51%) and followed by Barcelona (47%), Bilbao (46%) Málaga, Sevilla and Zaragoza (each 43%) and Valencia (42%).

However these differences are accentuated looking at the metropolitan capitals (Table 4.14). In the case of both Barcelona and Madrid, the proportion of the population engaged in these more professional activities accounts for almost 60% of the economically active population, contrasting with Bilbao (54%), Sevilla and Valencia (both 53%), Zaragoza (47%) and Malaga (44%).

Clearly there is a higher concentration of better qualified and more skilled occupations within the core areas of the metropolitan urban regions in general, with a significantly higher proportion in the core areas of Barcelona and Madrid.

Metropolitan urban region	Armed forces (%)	Managers (companies and public admin.) (%)	Scientific and intellectual tech./prof. (%)	Supporting tech./prof. (%)	Admin. staff (%)	Employees within the restaurant industry (%)	Qualified workers (agric. and fish.) (%)	Qualified workers (man. ind.) (%)	Machinery operators (%)	Unqualified workers (%)
Madrid	0.80	8.42	16.08	14.33	12.01	14.56	0.94	13.73	7.70	11.43
Barcelona	0.09	8.67	12.54	14.12	11.36	14.53	0.70	16.09	12.32	9.59
Valencia	0.48	7.72	12.86	10.25	11.48	13.82	2.33	18.94	11.43	10.71
Sevilla	0.88	7.30	14.37	11.92	9.82	15.53	1.78	15.35	7.84	15.21
Bilbao	0.11	8.48	14.98	12.74	10.25	14.56	1.16	16.62	11.48	9.62
Zaragoza	1.25	8.16	13.16	11.80	9.72	13.60	2.76	15.93	13.87	9.75
Málaga	0.37	7.25	13.16	11.42	10.74	19.32	1.35	15.18	7.68	13.53
Metropolitan urban regions	0.53	8.29	14.26	13.34	11.34	14.68	1.19	15.43	9.99	10.97
SPAIN	0.65	8.06	12.18	10.83	9.71	14.87	3.66	17.07	10.74	12.23

Table 4.13. Employment structure of the metropolitan urban regions (2001)[245]

Metropolitan capitals	Armed forces (%)	Managers (companies and public admin.) (%)	Scientific and intellectual tech./prof. (%)	Supporting tech./prof. (%)	Admin. staff (%)	Employees within the restaurant industry (%)	Qualified workers (agric. and fish.) (%)	Qualified workers (man. ind.) (%)	Machinery operators (%)	Unqualified workers (%)
Madrid	0.72	8.92	20.75	15.65	13.00	14.22	0.39	9.53	5.29	11.55
Barcelona	0.10	9.85	19.21	16.67	13.17	14.77	0.30	10.26	7.00	8.66
Valencia	0.56	8.21	18.35	12.77	13.46	14.90	0.87	13.22	8.47	9.20
Sevilla	0.89	7.32	19.48	14.11	11.83	16.83	0.75	10.98	6.75	11.06
Bilbao	0.13	8.79	18.56	14.16	12.37	14.65	0.33	13.47	8.33	9.22
Zaragoza	1.34	8.33	14.91	12.88	10.41	14.34	0.68	15.26	12.40	9.44
Málaga	0.39	6.37	14.40	11.88	11.27	19.49	0.80	14.68	7.74	13.00
SPAIN	0.65	8.06	12.18	10.83	9.71	14.87	3.66	17.07	10.74	12.23

Table 4.14. Employment structure of the metropolitan capitals (2001)[246]

[245] INE (2001) (own elaboration)
[246] INE (2001) (own elaboration)

4.9. Nationality of the metropolitan population

The proportion of the 2001 population of Spanish origin relative to non-Spanish population[247] within the metropolitan urban regions was extremely high, with the figure for the combined metropolitan urban regions standing at 95.45%, marginally lower than the corresponding figure of 96.15% for Spain as a whole. (See Table 4.15)

The metropolitan urban region of Madrid stood out with a relatively higher proportion of non-Spanish population (6.49%), followed by Barcelona (4.87%). The remaining metropolitan urban regions all had populations of non-Spanish origin lying below the average for Spain: 3.81% in the case of Málaga, 3.26% in Zaragoza; 2.98% in Valencia; 1.37% in Bilbao and just 1% in Sevilla.

Madrid and Barcelona both had the largest concentration of non-Spanish population in absolute terms (379,671 and 221,011 persons), with 133,787 persons being distributed amongst the other five metropolitan urban regions. The non-European non-Spanish population of the metropolitan urban regions of Madrid and Barcelona was predominantly from (Latin) America (214,326 persons or 3.66%, and 94,735 persons or 2.09% respectively), and Africa (57,567 persons or 0.98%, and 60,979 persons or 1.34% respectively).

At the level of the metropolitan capitals, (Table 4.16) the proportion of non-Spanish relative to Spanish population was marginally higher than that within the corresponding metropolitan urban regions, with the highest proportion in Madrid (7.63%), followed by Barcelona (6.34%) and Valencia (4.18%), all lying above the proportion of 3.85% for Spain. Although the proportion of non-Spanish population for Zaragoza (3.44%), Bilbao (2.10%), Málaga (1.99%) and Sevilla (1.25%) lay below the average proportion for Spain, these proportions were all higher than their wider metropolitan urban regions. In terms of the composition of the non-Spanish population of the metropolitan capitals, this was in the main from (Latin) America with the highest representation in the case of Madrid (149,634 persons accounting for 5.09% of the population), followed by Barcelona (49,954 persons representing 3.32% of the population), Valencia (16,875 persons accounting for 2.29% of the population) and Zaragoza (10,154 persons representing 1.65% of the population).

[247] This makes reference to foreign population of a formally recognised nature, as recorded through the 2001 Census. While Spain has witnessed a huge wave of foreign immigration over the last 10 years, the illegal-status of many of these immigrants means they lie outside the formal procedures enabling the exact magnitude of the immigrant population to be determined.

Metropolitan urban regions			Continent of nationality				
	Non-Spanish (%)	Spanish (%)	Europe (%)	Africa (%)	America (%)	Asia (%)	Oceania (%)
Madrid	6.49	93.51	95.02	0.98	3.66	0.33	0
Barcelona	4.87	95.13	96.11	1.34	2.09	0.45	0
Valencia	2.98	97.02	97.88	0.53	1.38	0.20	0
Sevilla	1.00	99.00	99.31	0.22	0.42	0.06	0
Bilbao	1.37	98.63	98.96	0.21	0.74	0.08	0
Zaragoza	3.26	96.74	97.52	0.96	1.43	0.09	0
Málaga	3.81	96.19	98.27	0.73	0.80	0.20	0.01
Metropolitan urban regions	4.55	95.45	96.54	0.90	2.25	0.29	0.01
SPAIN	3.85	96.15	97.45	0.83	1.53	0.18	0.00

Table 4.15. Nationality of the population of the metropolitan urban regions (2001)[248]

Metropolitan capitals			Continent of nationality				
	Non-Spanish (%)	Spanish (%)	Europe (%)	Africa (%)	America (%)	Asia (%)	Oceania (%)
Madrid	7.63	92.37	93.69	0.72	5.09	0.49	0
Barcelona	6.34	93.66	95.04	0.71	3.32	0.92	0.01
Valencia	4.18	95.82	96.74	0.63	2.29	0.34	0
Sevilla	1.25	98.75	99.08	0.27	0.56	0.09	0
Bilbao	2.10	97.90	98.25	0.40	1.22	0.13	0
Zaragoza	3.44	96.56	97.25	0.98	1.65	0.11	0
Málaga	1.99	98.01	98.67	0.64	0.60	0.10	0
SPAIN	3.85	96.15	97.45	0.83	1.53	0.18	0.00

Table 4.16. Nationality of the population of the metropolitan capitals (2001)[249]

[248] INE (2001) (own elaboration)
[249] INE (2001) (own elaboration)

In the case of the metropolitan capital of Barcelona, population of an Asian origin was significant, with some 13,831 persons representing 0.92% of the population, a higher proportion than that of the 10,684 persons of African origin accounting for 0.71% of the population. While the corresponding proportion of population of an African origin was 0.72% in Madrid, in absolute terms this represented 21,230 persons, meaning over 36,000 persons of African origin distributed throughout the remainder of the metropolitan urban region. This compared with a figure of some 50,000 persons of African origins distributed within the wider metropolitan urban region.

Concluding remarks

This chapter has sought to explore the social structure of the Spanish metropolitan system, comprising the seven principal metropolitan urban regions, through an analysis of the demographic dynamics and other social indicators over the 20 year period between 1986 and 2006.

This exploration of the different demographic and social factors highlights the weight of seven metropolitan urban regions within the national population and in particular the dominance of Madrid and Barcelona which together account for over 25% of the national population. Furthermore almost 60% of the metropolitan population of the seven cities lives in municipalities of more than 100,000 inhabitants.

In terms of the spatial distribution of the population, more than 50% of the metropolitan populations of Madrid, Málaga and Zaragoza live within the respective metropolitan capitals, the upper extreme being Zaragoza which appears as the most centralised with over 80% of the population concentrated within the metropolitan, owing to the large size of its administrative limits. By contrast Bilbao and Barcelona are the least centralised of the seven metropolitan urban regions, with just 33% and 32% of their populations located within the respective metropolitan capitals.

Barcelona stands out by far as the densest of the metropolitan urban regions, with almost 950 inhab./km^2. Zaragoza at the other extreme is the least dense, with just 51 inhab./km^2.

Over the period under review (1986-2006) the Spanish population as a whole increase by 16%. This magnitude of change was matched or superseded in the cases of Madrid (27%), Málaga (23%), Sevilla (22%), Valencia (20%) and Barcelona (16%), whereas the corresponding increase in Zaragoza was of just 12%. The metropolitan urban region of Bilbao was the only case which experienced an overall decrease in population of 2%. However the metropolitan capitals on the whole displayed more moderate changes. The highest increase was that of Zaragoza (13%) followed by Valencia (10%), Sevilla (8%) and Madrid (2%). The population of Málaga remained static, with losses of 6% in Barcelona and 7% in Bilbao. Having said that the 10 year period 1986-1996 was characterised by proportionally greater population losses and lower increases, than the subsequent period between 1996 and 2006, which saw a general upturn in the metropolitan capital populations.

The analysis of the age structure denotes a higher proportion of young people (under 25s) in the metropolitan urban regions of Málaga and Sevilla, and a corresponding lower proportion of population in the older age groups (over 64s). In general a marked ageing of the population can be observed over the 1991-2001 period. In Málaga and Sevilla there are greater proportions of population in the under 15 group than the over 64 group, whereas in all the other metropolitan urban regions this phenomenon is wholly reversed and even more marked in the metropolitan capitals.

The southern-most metropolitan urban regions (Málaga and Sevilla) stand out for a less highly educated population than the remaining metropolitan urban regions. In general the metropolitan capitals are characterised by a more highly educated population than the wider metropolitan urban regions.

As might be expected the economically active populations of the metropolitan urban regions are engaged in a higher proportion of managerial, professional, technical and administrative functions, than the corresponding proportion of the population for the whole of Spain. Indeed these concentrations are accentuated within the metropolitan capitals.

In terms of nationality, the metropolitan capitals display a marginally higher proportion of non-Spanish population than the wider metropolitan urban regions. Madrid and Barcelona stand out for having the highest concentration of non-Spanish population, predominantly from Latin America but also of African origin.

From this examination it appears plainly evident that the Spanish metropolitan urban system remains significantly dominated by Madrid and Barcelona, with a wide gap between the levels of population of these two leading metropolitan urban regions and that of the remaining five cases of the system, thereby confirming the notion of bicephalia. Furthermore in other aspects there is a clear divide between the southern and northern metropolitan urban regions, i.e. between Málaga and Sevilla, and the remaining cities of the metropolitan system, in terms of the overall age structure and levels of education of the populations. This divide will be further evidenced in the exploration of the economic structure of the metropolitan urban regions, the subject of Chapter 5.

CHAPTER 5. – THE ECONOMIC STRUCTURE OF THE SPANISH METROPOLITAN SYSTEM

Introduction

This chapter sets out to examine the economic structure of the Spanish metropolitan system, by addressing a number of issues broadly relating to the nature of the workforce, employment in general and its location within the metropolitan urban regions.

The journey to work data collected from the 2001 Census, which formed the basis for the physical delimitation of the seven Spanish metropolitan urban regions, provides key information to understanding the internal dynamics of the said metropolitan urban regions from a functional perspective. This data provides information relating to the sectors of the economy in which the economically active resident population (POR) is employed, as well as the economic sectors and divisions of the locally-based jobs (LTL), all of which is available at the level of the local municipal councils. Therefore it is possible not only to analyse the sectors in which the workforce of the metropolitan urban regions are employed, but also to analyse the internal local employment structure of the different metropolitan urban regions. While the POR gives an indication of the economic sectors in which the workforce is employed, it gives no indication of the spatial location of where the workforce is employed. By contrast the value of the complementary LTL data lies in contributing to an in-depth understanding of the functional nature of a particular spatial territory, in this case the metropolitan urban regions. Put another way, the POR represents the demand for employment, while the LTL represents the potential to meet that demand, through the supply of locally-based employment of a spatial territory.

Table 5.1 gives an indication of the magnitude of the metropolitan workforce and the locally-based employment. In 2001 the metropolitan system contributed to provide almost 42% of the Spanish workforce and some 42.5% of Spain's locally-based jobs. Furthermore Madrid and Barcelona stood out for accounting for over two-thirds of the POR and the LTL of the metropolitan system. These were followed, in much lesser magnitudes, by Valencia, Sevilla, Bilbao, Zaragoza and Málaga, an ordering reflecting that of the overall population of the metropolitan urban regions outlined in Section 4.1.

Metropolitan urban region	Economically active resident population (POR) (2001)	Metropolitan urban region as a % of the combined POR of the seven met. urban regions	Locally-based jobs (LTL) (2001)	Metropolitan urban region as a % of the combined LTL of the seven met. urban regions
Madrid	2,612,039	38.10	2,528,350	38.95
Barcelona	2,019,181	29.46	1,903,291	29.32
Valencia	719,451	10.50	662,263	10.20
Sevilla	486,173	7.09	454,432	7.00
Bilbao	433,859	6.33	386,626	5.96
Zaragoza	325,137	4.74	312,640	4.82
Málaga	259,149	3.78	244,357	3.76
Metropolitan system	6,854,989	(41.98% of Spain's POR)	6,491,959	(42.52% of Spain's LTL)
SPAIN	16,329,713		15,267,762	

Table 5.1. Workforce and locally-based jobs of the metropolitan urban regions (2001)[250]

The economic analysis of the Spanish metropolitan system starts with an overview of the *POR* for 1991 and 2001, and the *LTL* for 2001[251]. This is followed by looking at the *Job Ratio*, a simple comparison between the POR and the LTL to ascertain to what extent different spatial territories are *importers* or *exporters* of workers. Drawing upon information provided by the Spanish *Ministerio de Trabajo y Asuntos Sociales* (MTAS), a more detailed analysis of the internal economic structure of the metropolitan urban regions is presented, through the examination of two indices of diversification and specialisation. The remainder of the chapter depends upon data pertaining to the principal provinces within which the metropolitan urban regions are located, owing to the absence of such data for the municipal unit of analysis. A brief overview of the GDP per capita is provided, together with an examination of the imports and exports. Finally several aspects relating to the activity rate and unemployment are addressed.

[250] INE (2001) (own elaboration)
[251] Information concerning the LTL across Spain first became available as a result of the 2001 Census.

5.1. Economically active resident population (POR)

In 2001 Spain's economically active resident population (POR) stood at around 16.33 million, some 42% of which was contained within the spatial limits of the seven principal metropolitan urban regions. Just over two thirds of this population was located within the metropolitan urban regions of Madrid (38.10%) and Barcelona (29.46%), with the remaining 2.2 million persons residing in the metropolitan urban regions of Valencia (10.50%), Sevilla (7.09%, Bilbao (6.33%), Zaragoza (4.74%) and Málaga (3.78%). (See Figure 5.1)

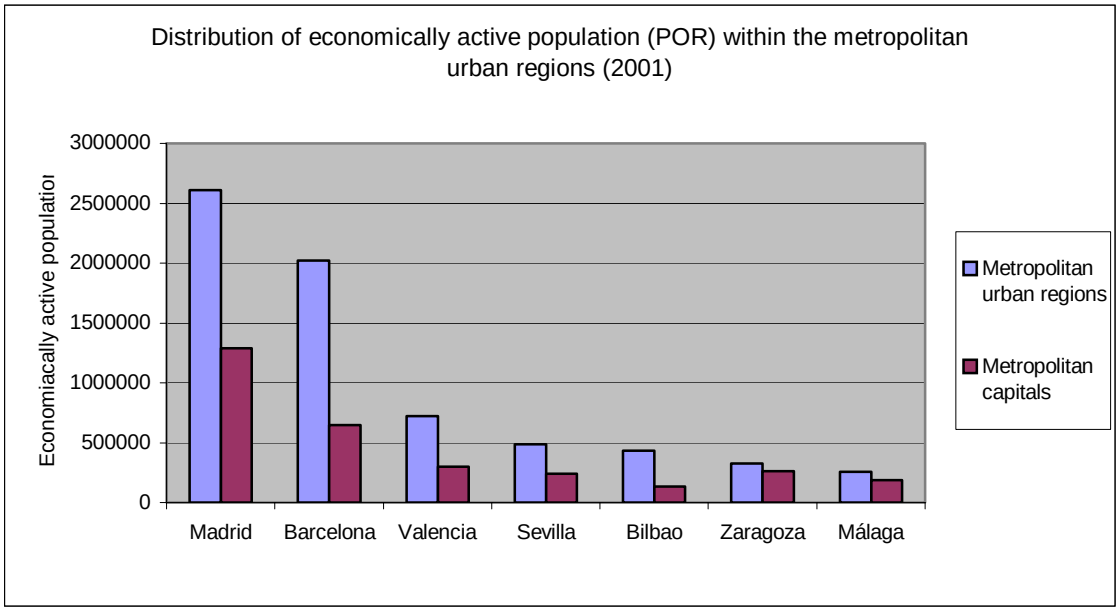


Figure 5.1. Economically active population (POR) of the metropolitan urban regions (2001)[252]

Over the period 1991-2001 there was an overall increase in the POR of the metropolitan urban regions of 14.4%, compared with a national increase of 12.5% over the same ten years. This increase was most noticeable in Madrid, witnessing a 23.6% increase in its POR, followed by Zaragoza (11.7%), Valencia (11.5%), Málaga (11%), Sevilla (9.3%), Barcelona (9.1%) and Bilbao (4.9%).

At the level of the metropolitan system, this increase was most significant in the service sector, increasing by 38.6%, compared with losses of 27.1% in the industrial sector and 32.2% in the agricultural sector. The construction sector observed an increase of 15.4%. At the level of the individual metropolitan urban regions, each of these underwent an increase in their POR in the service sector. This was most significant in Madrid, undergoing an increase of 45.2%, followed by Barcelona and Sevilla (both with

[252] INE (2001) (own elaboration)

36.8%), Valencia (33.8%), Zaragoza (32.1%), Málaga (29.3%) and Bilbao (27.4%) By contrast each of the metropolitan urban regions experienced a loss of employment in the industrial sector – this was felt most strongly in the cases of Málaga (-39.1%) and Bilbao (-31.8%), followed by Sevilla (-29.1%), Madrid (-28.6%), Barcelona (-26.9%), Valencia (-23.6%) and Zaragoza (-14.3%)

In terms of the economic sectors in which the POR was employed in 2001, the majority of the residents (69%) of the metropolitan system worked in the service sector, compared with 18.86% in the industrial sector, 10.10% in the construction sector and just 2% in the agricultural sector. (See Table 5.2.) Looking at individual metropolitan urban regions, Málaga and Madrid stood out with around 75% of their respective POR in the service sector. Almost 70% of the POR of Sevilla was contained within the service sector, with more than 60% of the POR of the remaining metropolitan urban regions being in this economic sector. Barcelona stood out with more than 25% of its POR in the industrial sector, followed by Zaragoza (24.38%), Bilbao (21.36%) and Valencia (21.29%). In the metropolitan urban region Madrid and the two metropolitan urban regions of Andalusia the representation of the POR in the industrial sector was much lower (14% in the case of Madrid, 12.18% in Sevilla and 8.53% in Málaga. The resident population engaged in the agricultural sector was most significant in Sevilla (6.82%), followed by Valencia (4.28%), Zaragoza (3.69%), Málaga (2.40%), Bilbao (1.66%), Madrid (1.24%) and Barcelona (0.89%).

Turning to the concentration of the POR within each of the metropolitan urban regions, in the case of Madrid the metropolitan capital contained almost half the POR of the entire metropolitan urban region, while the 28 municipalities with the POR above 10,000 accounted for almost 87% of the total POR[253]. By contrast in the metropolitan urban region of Barcelona, almost four fifths of the entire POR was contained in 33 municipalities where the POR of the municipality was in excess of 10,000. Furthermore almost 32% of the total POR of the metropolitan urban region was found within the metropolitan capital[254].

[253] The other municipalities in descending order of importance were Móstoles, Fuenlabrada, Alcalá de Henares, Leganés, Alcorcón, Getafe, Torrejón de Ardoz, Alcobendas, Coslada, Parla, Las Rozas de Madrid, Pozuelo de Alarcón, San Sebastián de los Reyes, Guadalajara, Majadahonda, Collado Villalba, Tres Cantos, Rivas-Vaciamadrid, San Fernando de Henares, Aranjuez, Valdemoro, Colmenar Viejo, Arganda del Rey, Pinto, Boadilla del Monte, Galapagar and Villaviciosa de Odón.

[254] These 33 municipalities were headed by Barcelona, followed in descending order of importance by L'Hospitalet de Llobregat, Badalona, Sabadell, Terrassa, Santa Coloma de Gramenet, Mataró, Cornellà de Llobregat, Sant Boi de Llobregat, Rubí; Sant Cugat del Vallès, El Prat de Llobregat, Viladecans, Granollers, Cerdanyola del Vallès, Vilanova i la Geltrú, Mollet del Vallès, Castelldefels, Esplugues de Llobregat, Sant Feliu de Llobregat, Gavà, Vilafranca del Penedès, Ripollet, Sant Joan Despí, Sant Adrià de Besòs, Barberà del Vallès, Montcada i Reixac, Premià de Mar, Sant Vicenç dels Horts, Martorell, Sant Andreu de la Barca, el Vendrell and Sant Pere de Ribes.

In the case of the metropolitan urban region of Valencia, almost two-thirds of the POR lay within 13 municipalities whose POR exceeded 10,000, headed by Valencia itself which contained almost 42% of the POR of the metropolitan urban region[255].

The metropolitan capital of Sevilla itself contained almost 49% of the POR of the entire metropolitan urban region. As a whole almost 71% of the POR lay within some 7 municipalities whose POR exceeded 10,000 – in addition to Sevilla these municipalities were Dos Hermanas, Alcalá de Guadaíra, Mairena del Aljarafe, Utrera, Palacios y Villafran and La Rinconada.

In the case of the metropolitan urban region of Bilbao, the municipalities whose POR exceeded 10,000 accounted for 68% of the whole POR of the metropolitan region. These nine municipalities were headed by Bilbao, with just over 31% of the POR of its metropolitan urban region, followed by Barakaldo, Getxo, Portugalete, Basauri, Santurtzi, Galdakao, Leioa and Sestao.

In the case of the metropolitan urban region of Zaragoza one found more than 80% of the POR located within the metropolitan capital, with the remainder located in the other municipalities, none of which exceeded the 10,000 level[256].

By contrast in the metropolitan urban region of Málaga there were just 3 municipalities with a POR in excess of 10,000, which accounted for almost 85% of the total POR of the metropolitan urban region. These 3 municipalities were headed by Málaga itself, accounting for almost 73% of the total POR, followed by Torremolinos and Benalmádena.

[255] The remaining municipalities included, in descending order of importance, Torrent, Sagunto, Paterna, Mislata, Burjassot, Alaquàs, Xirivella, Manises, Algemesí, Sueca, Quart de Poblet and Aldaia.
[256] Following Zaragoza the highest POR was located within the municipalities of Utebo (POR = 5,641); Alagón (POR = 2,400) and Zuera (POR = 2,344).

POR of the met. system	MAD	BCN	VAL	SEV	BIL	ZAR	MÁL	Metropolitan urban regions	SPAIN
1991									
Agriculture	46,306	25,390	40,398	53,718	9,798	17,809	12,482	205,901	1,536,824
%	*2.19*	*1.37*	*6.26*	*12.07*	*2.37*	*6.12*	*5.35*	*3.44*	*10.59*
Industry	513,403	710,956	200,565	83,564	135,912	92,473	36,528	1,773,401	3,658,971
%	*24.30*	*38.43*	*31.09*	*18.78*	*32.85*	*31.76*	*15.65*	*29.60*	*25.21*
Construction	210,625	167,649	62,844	59,270	41,435	24,995	32,981	599,799	1,681,797
%	*9.97*	*9.06*	*9.74*	*13.32*	*10.02*	*8.58*	*14.13*	*10.01*	*11.59*
Services	1,342,357	945,949	341,374	248,349	226559	155,903	151,439	3,411,930	7,636,616
%	*63.54*	*51.13*	*52.91*	*55.82*	*54.76*	*53.54*	*64.88*	*56.95*	*52.61*
Total	211,2691	1,849,944	645,181	444,901	413,704	291,180	233,430	5,991,031	14,514,208
2001									
Agriculture	32,263	17,999	30,810	33,168	7,183	11,995	6,230	139,648	1,034,784
%	*1.24*	*0.89*	*4.28*	*6.82*	*1.66*	*3.69*	*2.40*	*2.04*	*6.34*
Industry	366,537	519,800	153,153	59,207	92,693	79,255	22,117	1,292,762	2,998,658
%	*14.03*	*25.74*	*21.29*	*12.18*	*21.36*	*24.38*	*8.53*	*18.86*	*18.36*
Construction	264,202	186,941	78,734	54,116	45,447	27,865	34,947	692,252	1,916,693
%	*10.11*	*9.26*	*10.94*	*11.13*	*10.48*	*8.57*	*13.49*	*10.10*	*11.74*
Services	1,949,037	1,294,441	456,754	339,682	288,536	206,022	195,855	4,730,327	10,379,578
%	*74.62*	*64.11*	*63.49*	*69.87*	*66.50*	*63.36*	*75.58*	*69.01*	*63.56*
Total	2,612,039	2,019,181	719,451	486,173	433,859	325,137	259,149	6,854,989	16,329,713

Table 5.2. Principal economic sectors of the economically active resident population (POR) of the metropolitan urban regions (1991 and 2001)[257]

[257] INE (2001) (own elaboration)

5.2. Locally-based jobs (LTL)

In 2001 some 42.5% (6,491,959) of Spain's locally-based jobs (LTL) were contained within the seven principal metropolitan urban regions. More than two thirds of these jobs were located in the metropolitan urban regions of Madrid (2,528,350 LTL, representing 38.9% of the metropolitan system and Barcelona (1,903,291 LTL, representing 29.3%), as indicated by Figure 5.2, with the remaining proportion distributed between Valencia (662,263 LTL, representing 10.20%), Sevilla (454,432 LTL, representing 7.00%), Bilbao (386,626 LTL, representing 5.96%), Zaragoza (312,640 LTL, representing 4.82%) and Málaga (244,357 LTL, representing 3.76%).

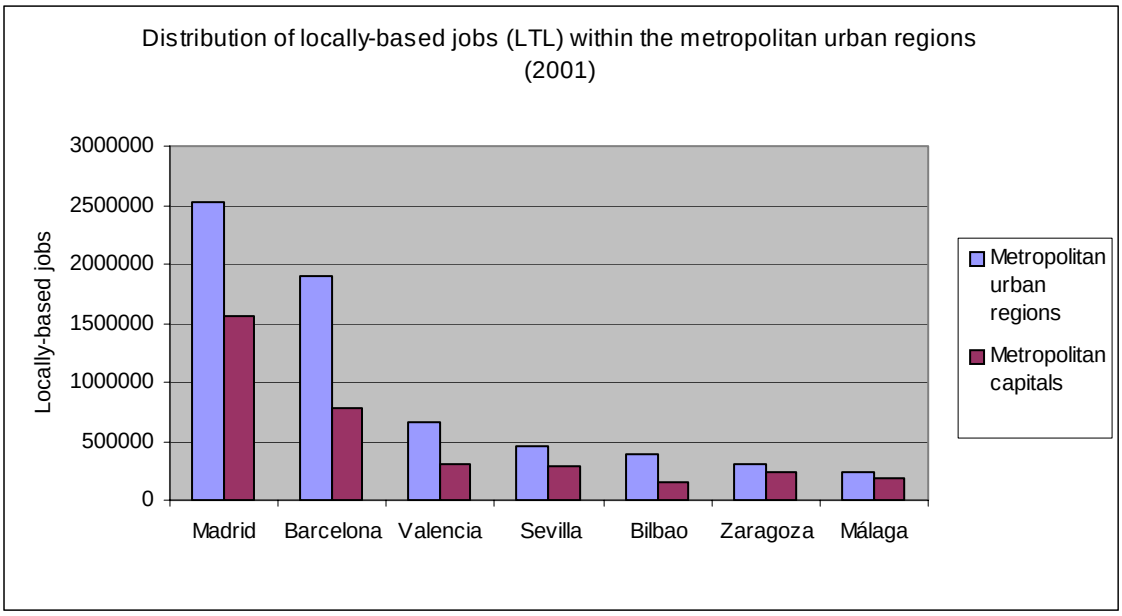


Figure 5.2. Locally-based jobs (LTL) of the metropolitan urban regions (2001)[258]

The metropolitan urban region of Sevilla stood out for having a higher proportion of its LTL in the agricultural sector (6.70%) than both the metropolitan system (1.96%) and Spain as a whole (6.33%). (See Table 5.3 and Figure 5.4.) Málaga (3.96%), Zaragoza (3.72%) and Valencia (2.37%) each had a higher proportion of their locally-based jobs in agriculture than the whole of the metropolitan system. Of the seven metropolitan urban regions, that of Barcelona had the lowest proportion of its locally-based jobs in this sector (0.88%).

[258] INE (2001) (own elaboration)

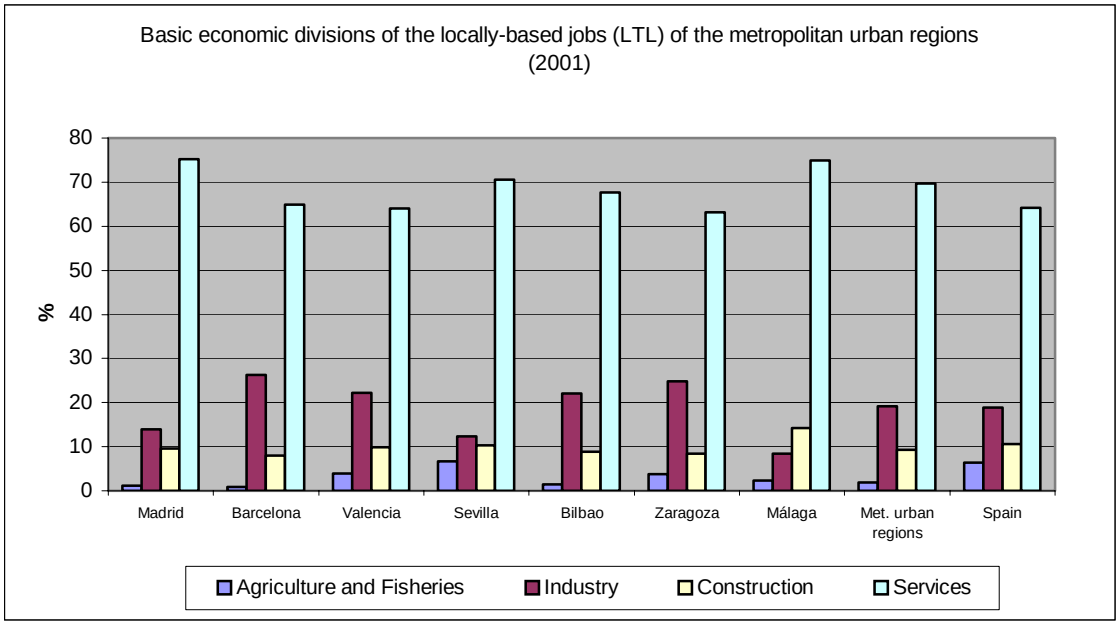
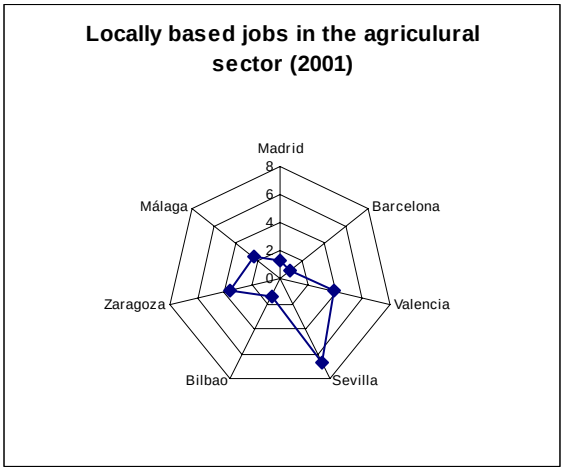
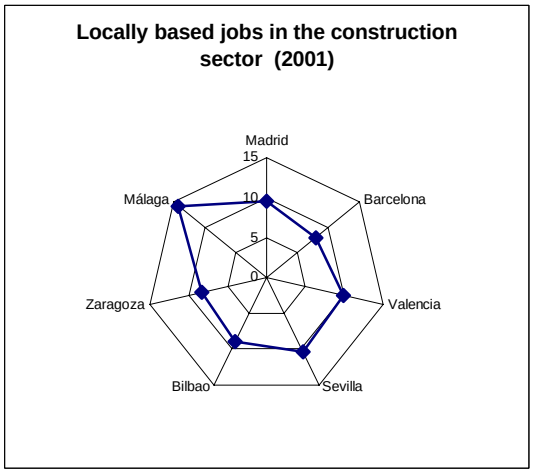


Figure 5.3. Economic divisions of the locally-based jobs (LTL) of the metropolitan urban regions (2001)[259]



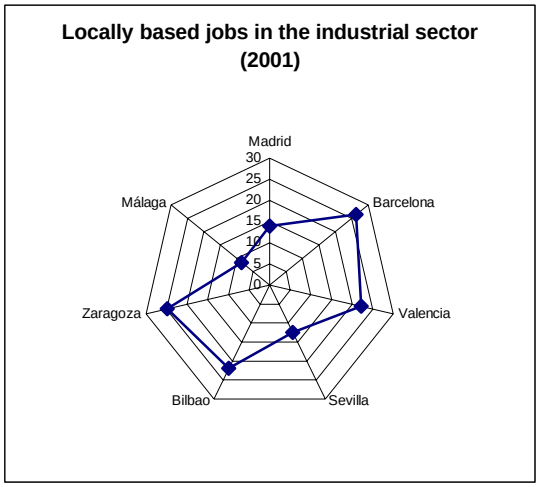


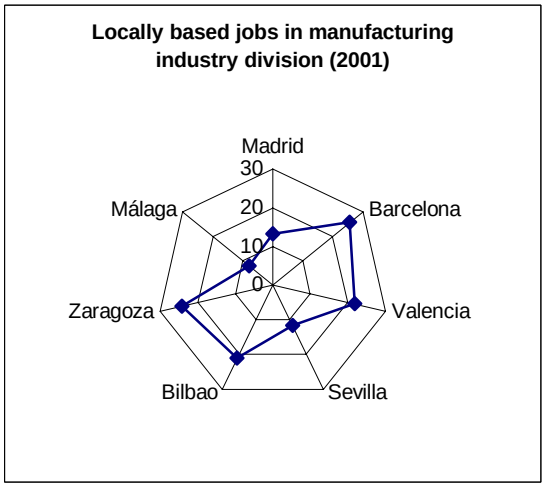
Figures 5.4 and 5.5. Locally-based jobs of the metropolitan urban regions in the agricultural and construction sectors (2001)[260]

The metropolitan urban region of Barcelona stood out for the highest representation of locally-based jobs in the industrial sector (26.30%), significantly higher than that of both the metropolitan system (19.11%) and Spain (18.91%). (See Table 5.3 and Figure 5.6.) The metropolitan urban regions of Zaragoza (24.80%), Valencia (22.21%) and Bilbao (22.04%) similarly had higher proportions of their LTL in the industrial sector than the metropolitan system and Spain. These were followed by those of Madrid (13.97%), Sevilla (12.38%) and Málaga (8.47%). With regard to locally-based jobs in

[259] INE (2001) (own elaboration)
[260] INE (2001) (own elaboration)

manufacturing industry, the overall representation of the LTL followed the same general order with Barcelona (25.64%) standing out as the most important of the seven metropolitan urban regions. (See Table 5.3 and Figure 5.7.)



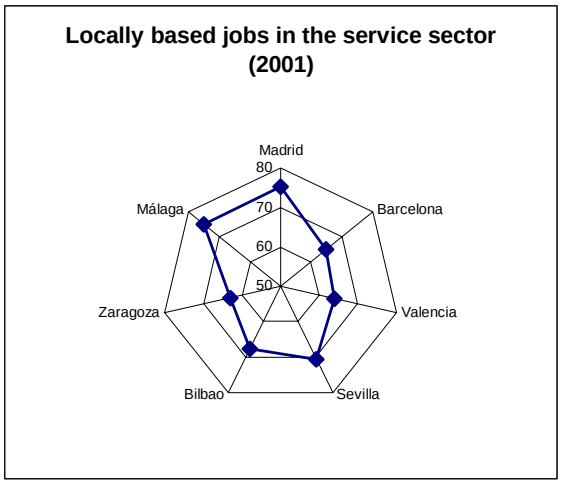


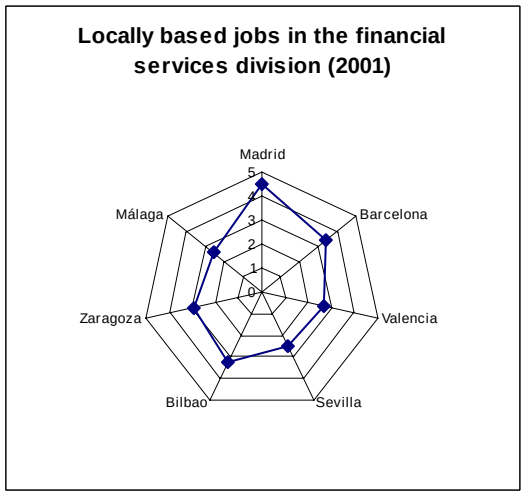
Figures 5.6 and 5.7. Locally-based jobs of the metropolitan urban regions in the industrial sector and manufacturing industry division (2001)[261]

In terms of the locally-based jobs in the service sector, the highest proportion of these was found in the metropolitan urban region of Madrid (75.25), followed closely by those of Málaga (74.99%) and Sevilla (70.58%), all of which had a higher representation of service sector jobs than the metropolitan system (69.68) and Spain (64.17%). (See Table 5.3 and Figure 5.8.) Bilbao (67.64%, Barcelona (64.86%), Valencia (63.99%) and Zaragoza (63.12%) all had a lower proportion of their LTL in the service sector than the Spanish metropolitan system.

However in some of the key divisions within the service sector, one observes for example that the metropolitan urban regions of Madrid (4.53%) and Barcelona (3.40%) led the ranking for locally-based jobs in the financial services division (Table 5.3 and Figure 5.9), as well as in the property activities and business services division (12.70% and 10.37%) respectively. In the case of locally-based jobs in the public administration, the ranking of the metropolitan urban regions was led by that of Sevilla (10.21%) and followed by those of Madrid (9.57%), Zaragoza (8.81%) and Málaga (8.40%), all above the national and metropolitan system proportions. (See Table 5.3 and Figure 5.10.)

[261] INE (2001) (own elaboration)





Figures 5.8 and 5.9. Locally-based jobs of the metropolitan urban regions in the service sector and financial services division (2001)[262]

In terms of education, the metropolitan urban region of Bilbao (7.52%) led the ranking, followed by the metropolitan urban regions of Sevilla (7.09%), Málaga (6.94%) and Valencia (6.59%), all lying above the corresponding proportions for the metropolitan system (6.20%) and Spain at large (6.21%). (See Table 5.3 and Figure 5.11.)

Looking at the concentration of the LTL within each of the metropolitan urban regions in 2001, in the case of Madrid, more than 88% of the LTL was distributed amongst 24 municipalities with LTL in excess of 10,000[263]. However just 2.8% of the total LTL was located within 10 municipalities whose LTL lay in the 5,000-10,000 range. As in the case of the metropolitan urban region of Barcelona, following Madrid, which contained almost 62% of the total LTL, the next highest concentration of LTL was found in the municipalities of Alcalá de Henares, Alcobendas and Getafe, each of which contained between 2-2.5% of the entire LTL of the metropolitan urban region.

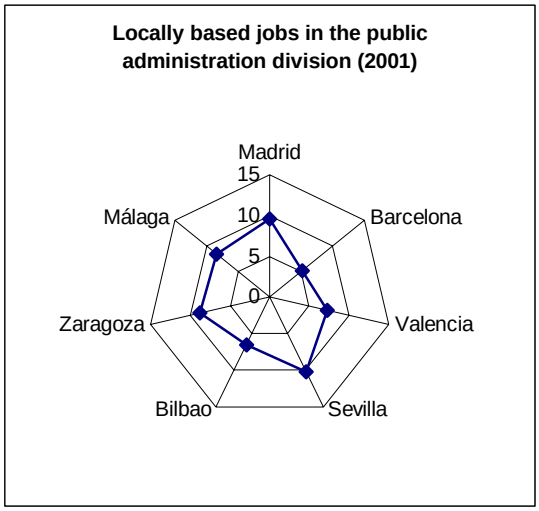
Turning to the metropolitan urban region of Barcelona, just over 80% of the LTL was located within thirty municipalities with more than 10,000 LTL[264]. A further 10% of the LTL was located in 28 municipalities with LTL in the range 5,000-10,000. Barcelona itself accounted for over 40% of the LTL of its metropolitan urban region, but there was a significant difference between the ranking of Barcelona and the next largest

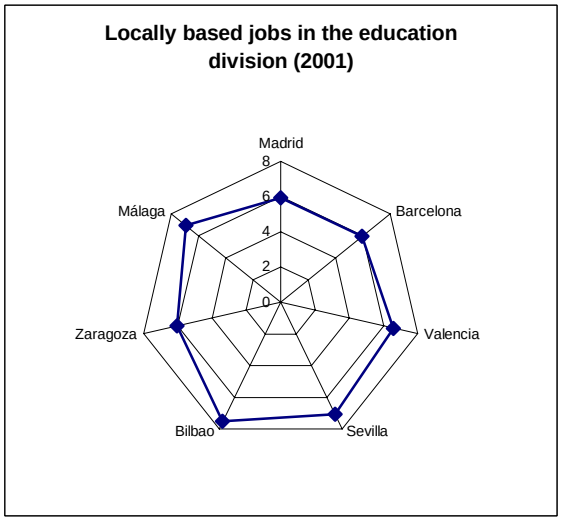
[262] INE (2001) (own elaboration)

[263] Madrid, Alcalá de Henares, Alcobendas, Getafe, Fuenlabrada, Leganés, Móstoles, Torrejón de Ardoz, Alcorcón, Guadalajara, Coslada, Las Rozas de Madrid, San Sebastián de los Reyes, Pozuelo de Alarcón, Tres Cantos, Arganda del Rey, Majadahonda, Valdemoro, Pinto, San Fernando de Henares, Parla, Collado Villalba, Aranjuez and Colmenar Viejo.

[264] Barcelona, Sabadell, Terrassa, L' Hospitalet de Llobregat, Badalona, Mataró, el Prat de Llobregat, Granollers, Cornellà de Llobregat, Rubí, Sant Cugat del Vallès, Martorell, Sant Boi de Llobregat, Vilanova i la Geltrú, Santa Coloma de Gramenet, Cerdanyola del Vallès, Barberà del Vallès, Montcada i Reixac, Santa Perpètua de Mogoda, Esplugues de Llobregat, Mollet del Vallès, Gavà, Viladecans, Vilafranca del Penedès, Sant Feliu de Llobregat, Sant Joan Despí, Sant Andreu de la Barca, Castelldefels, Parets del Vallès and Sant Adrià de Besòs.

concentration of LTL found within Sabadell, Terrassa and L'Hospitalet de Llobregat, which each proportioned in the order of 3.5% of the LTL of the metropolitan urban region.





Figures 5.10 and 5.11. Locally-based jobs of the metropolitan urban regions in the public administration and education divisions (2001)[265]

[265] INE (2001) (own elaboration)

LTL (%) (2001)	MAD	BCN	VAL	SEV	BIL	ZAR	MÁL	Met. syst.	SPAIN
Agriculture and Fisheries	*1.22*	*0.88*	*3.96*	*6.70*	*1.44*	*3.72*	*2.37*	*1.96*	*6.33*
Agriculture	1.21	0.81	3.86	6.67	1.08	3.71	2.21	1.89	5.99
Fisheries	0.01	0.07	0.11	0.02	0.36	0.02	0.15	0.06	0.34
Industry	*13.97*	*26.30*	*22.21*	*12.38*	*22.04*	*24.80*	*8.47*	*19.11*	*18.91*
Extractive industries	0.05	0.03	0.05	0.07	0.08	0.12	0.04	0.05	0.25
Manufacturing industry	13.24	25.64	21.64	11.54	21.04	24.23	7.90	18.41	18.01
Energy	0.69	0.62	0.53	0.77	0.91	0.46	0.53	0.66	0.64
Construction	*9.56*	*7.96*	*9.83*	*10.34*	*8.89*	*8.35*	*14.17*	*9.25*	*10.59*
Services	*75.25*	*64.86*	*63.99*	*70.58*	*67.64*	*63.12*	*74.99*	*69.68*	*64.17*
Commerce	13.73	15.96	17.18	17.03	14.91	14.77	18.45	15.26	15.45
Hotel trade	5.68	5.49	5.01	5.79	5.86	4.83	9.11	5.66	6.53
Transport	9.19	6.44	6.29	6.10	6.63	5.83	7.19	7.48	5.61
Financial	4.53	3.40	2.67	2.53	3.24	2.94	2.56	3.64	2.77
Property and business services	12.70	10.37	8.12	8.40	9.92	7.88	8.71	10.70	7.80
Public administration	9.57	5.12	7.19	10.21	6.54	8.81	8.40	7.81	8.08
Education	5.92	5.91	6.59	7.09	7.52	6.03	6.94	6.20	6.21
Health and social welfare	6.01	6.35	5.95	7.20	7.06	7.02	7.28	6.35	6.17
Other social activities	3.97	3.57	3.26	3.29	3.41	3.09	3.35	3.63	3.17
Home-based activities	3.91	2.25	1.73	2.92	2.53	1.93	2.98	2.92	2.38
Extra-territorial organisations	0.04	0.01	0.01	0.01	0.01	0.00	0.01	0.02	0.01
TOTAL	100	100	100	100	100	100	100	100	100,00

Table 5.3. Distribution of the locally-based jobs (LTL) within the metropolitan urban regions, the metropolitan system and Spain (2001)[266]

[266] INE (2001) (own elaboration)

Looking at the case of the metropolitan urban region of Valencia, just 62.5% of the LTL was found within municipalities whose individual LTL exceeded 10,000. These included Valencia itself, with almost 46% of the LTL, Paterna, Sagunto, Torrent, Quart de Poblet, Almussafes, Aldaia and Manises. As with the other metropolitan urban regions the difference between the local employment of Valencia and Paterna stood out with just 3.5% of the total LTL being located within Paterna. However the case of Valencia is significant compared to the other metropolitan urban regions in that some 16 municipalities with LTL in the 5,000-10,000 range contributed to almost 18% of the entire LTL of the metropolitan urban region.

In the case of the metropolitan urban region of Sevilla, one found more than 74% of the LTL located in just 4 municipalities – Sevilla, with almost 62% of all the LTL, Dos Hermanas, Alcalá de Guadaíra and Utrera. Dos Hermanas contained just 5.5% of all the LTL, again highlighting the significant contribution of the principal municipality in proportioning employment in the metropolitan urban region. Some six municipalities had their LTL in the 5.000-10.000 range, contributing to almost 10% of the overall LTL of the metropolitan territory.

Turning to the metropolitan urban region of Bilbao, just under 62% of the LTL was found located within the seven municipalities with individual LTL in excess of 10,000 (Bilbao, Barakaldo, Getxo, Basauri, Leioa, Galdakao and Zamudio) with almost 39% of all the LTL within Bilbao itself. Barakaldo contained some 6.4% of all the LTL of the metropolitan urban region. Of the ten municipalities whose individual LTL was in the 5,000-10,000 range, together they comprised almost 10% of the overall LTL of the metropolitan urban region.

In the case of the metropolitan urban region of Zaragoza, 78.6% of the LTL was found to lie within Zaragoza itself, with a further 2.7% in the municipality of Figueruelas with more than 8,600 LTL. The remainder of the LTL of the metropolitan urban region was distributed in the 263 municipalities with less than 5,000 LTL.

Finally, the metropolitan urban region of Málaga stood out for more than 90% of its LTL being located in just 3 municipalities (Málaga, Torremolinos and Benalmádena), whose individual LTL were in excess of 10,000. Málaga contained almost 78% of the total LTL of the metropolitan urban region, followed by Torremolinos with just 7.2% of the total LTL, again indicating a significant difference and the high concentration of locally-based jobs in the principal municipality. Alhaurín de la Torre was the only municipality

with LTL in the 5,000-10,000 range, accounting for just 2% of the total LTL of the metropolitan territory.

Looking at the spatial distribution of the locally-based jobs within the metropolitan urban regions of Madrid and Barcelona, as indicated by Table 5.4 almost 62% of the total metropolitan LTL of Madrid lay within a distance of 10 km from the centre, all 1.56 million of which were contained within the metropolitan capital[267].

Distance from centre (km)	Metropolitan urban region of Madrid		Metropolitan urban region of Barcelona	
	LTL (2001)	Percentage of met. LTL	LTL (2001)	Percentage of met. LTL
<10	1,562,697	61.81	1,015,518	53.36
10-20	160,747	6.36	271,173	14.25
20-30	408,746	16.17	378,388	19.88
30-40	180,376	7.13	84,065	4.42
40-50	74,111	2.93	84,994	4.47
50-60	66,174	2.62	36,863	1.94
60-70	22,578	0.89	23,636	1.24
70-80	14,783	0.58	8,296	0.44
80-90	8,010	0.32	184	0.01
90-100	5,808	0.23	53	0.00
100-110	6,665	0.26	121	0.01
110-120	3,463	0.14	-	-
120-130	6,846	0.27	-	-
130-140	2,528	0.10	-	-
140-150	950	0.04	-	-
150-160	3,634	0.14	-	-
160-170	140	0.01	-	-
170-180	50	0	-	-
180-190	12	0	-	-
190-200	8	0	-	-
200-210	18	0	-	-
210-220	4	0	-	-
TOTAL	2,528,350	100	1,903,291	100

Table 5.4. Spatial distribution of the locally-based jobs (LTL) within the metropolitan urban regions of Madrid and Barcelona[268]

By contrast, the equivalent central core of the metropolitan urban region of Barcelona, comprising eight municipalities of the *Barcelona de les Rondes* grouping, i.e. Sant Adrià de Besòs, L'Hospitalet de Llobregat, Esplugues de Llobregat, Santa Coloma de Gramenet, Sant Just Desvern, El Prat de Llobregat, Badalona and Cornellà de Llobregat, in addition to the metropolitan capital, contained just 53.36% of the total metropolitan LTL. In this core grouping almost 41% of the LTL lay within the metropolitan capital, with the remainder distributed amongst the other municipalities.

[267] The distances quoted in this section refer to road distance from the origin (centre of the metropolitan capital) to the destination (centre of the municipality).
[268] INE (2001) (own elaboration)

With the exception of Sant Just Desvern, each of these other municipalities contained more than 10,000 LTL.

In the case of Madrid some 6.4% of the total jobs of the metropolitan urban region (160,747 LTL) was contained within a distance of 10-20 km from the core, within the municipalities of Alcobendas, San Sebastián de los Reyes, Pozuelo de Alarcón, Coslada and Tres Cantos, each with more than 10,000 LTL. At the equivalent distance from the centre in Barcelona one found 27 municipalities[269], accounting for just over 14% of the total jobs of the metropolitan urban region (271,173 LTL), with the municipalities of Sant Joan Despí, Sant Feliu de Llobregat, Montcada i Reixac, Sant Boi de Llobregat, Cerdanyola del Vallès, Sant Cugat del Vallès, Viladecans, Barberà del Vallès, Gavà, Santa Perpètua de Mogoda, Mollet del Vallès and Rubí all standing out for having in excess of 10,000 LTL.

At a distance of 20-30 km from their respective centres, in both metropolitan urban regions one found a greater concentration of population than in the 10-20 km ring. In the case of Madrid the 23 municipalities[270] accounted for almost 16.2% of the total metropolitan jobs (408,746 LTL). The municipalities in this ring with greater than 10,000 LTL included Leganés, Majadahonda, Getafe, Alcorcón, Torrejón de Ardoz, San Fernando de Henares, Móstoles, Fuenlabrada, Las Rozas de Madrid, Pinto and Colmenar Viejo.

In the case of Barcelona almost 20% of the total metropolitan jobs (378,388 LTL) was contained within some 37 municipalities[271], including the metropolitan sub-centres of Sabadell, Terrassa, Granollers and Matarò, and other municipalities with greater than 10,000 LTL such as Castelldefels, Sant Andreu de la Barca, Parets del Vallès and Martorell. In cumulative terms some 87.5% of the total metropolitan jobs of Barcelona (1,665,079 LTL) was located within a distance of 30 km from the centre, compared to 84.3% (2,132,190 LTL.) in the case of Madrid.

[269] Sant Joan Despí, Sant Feliu de Llobregat, Montcada i Reixac, Sant Boi de Llobregat, Montgat, Cerdanyola del Vallès, Ripollet, Tiana, La Llagosta, Sant Cugat del Vallès, Molins de Rei, Viladecans, Sant Vicenç dels Hort, El Masnou, Santa Coloma de Cervelló, Alella, Barberà del Vallès, Sant Climent de Llobregat, Gavà, Pallejà, Badia del Vallès, Santa Perpètua de Mogoda, Mollet del Vallès, Rubí, Teià, Sant Fost de Campsentelles and El Papiol.

[270] Leganés, Majadahonda, Getafe, Alcorcón, Paracuellos de Jarama, Torrejón de Ardoz, Rivas-Vaciamadrid, San Fernando de Henares, Móstoles, Cobeña, Mejorada del Campo, Fuenlabrada, Ajalvir, las Rozas de Madrid, Boadilla del Monte, Velilla de San Antonio, Algete, Pinto, Colmenar Viejo, Fuente el Saz de Jarama, Daganzo de Arriba, Villaviciosa de Odón and Torrelodones.

[271] Premià de Mar, Martorelles, El Palma de Cervelló, Cervelló Torrelles de Llobregat, Sabadell, Santa Maria de Martorelles, Montmeló, Castelldefels, Sant Andreu de la Barca, Sant Quirze del Vallès, Premià de Dalt, Polinyà, Montornès del Vallès, Vilassar de Mar, Vallirana, Vilassar de Dalt, Corbera de Llobregat, Parets del Vallès, Castellbisbal, Palau-solità i Plegamans, Cabrils, Vilanova del Vallès, Lliçà de Vall, Cabrera de Mar, Martorell, Terrassa, Begues, Lliçà d'Amunt, Vallromanes, Castellar del Vallès, Granollers, Sentmenat, Mataró, Caldes de Montbui, Canovelles and Ullastrell.

In the 30-40 km ring from the centre of Madrid, one found 34 municipalities[272], out of which just five, Parla, Alcalá de Henares, Arganda del Rey and Valdemoro all stood out with great than 10,000 LTL. These 34 municipalities accounted for 7.13% of Madrid's total metropolitan jobs (180,376 LTL). In the case of Barcelona at this same distance one found 30 municipalities[273], representing 4.42% of the total metropolitan jobs (84,065 LTL), not one of which had more than 10,000 LTL. Almost 91.5% of the total metropolitan jobs of Madrid (2,312,566 LTL) was located within a distance of 40 km from the centre, compared with 91.9% (1,749,144 LTL) of Barcelona's total metropolitan jobs, at this same distance.

In the case of the metropolitan urban region Barcelona, the 40-50 km band contained a marginally greater proportion of the total metropolitan jobs (4.47% or 84,994 LTL) than the 30-40 km band, comprising some 44 municipalities[274]. Vilanova i la Geltrú and Vilafranca del Penedès were the only two municipalities of this grouping with in excess of 10,000 LTL. By contrast, in the case of the metropolitan urban region of Madrid, this same band comprising some 58 municipalities[275] contained 2.93% of the total metropolitan jobs (74,111 LTL). Collado Villalba was the only municipality of this grouping to stand out with more than 10,000 LTL. In cumulative terms some 96.37% of the total metropolitan jobs of Barcelona (1,834,138 LTL) was located within a distance of 50 km from the centre, compared to 94.4% (2,386,677 LTL) in the case of Madrid.

Of the remaining outer rings of the metropolitan urban region of Madrid, the 50-60 km ring contained the 2 municipalities of Aranjuez and Guadalajara, each with in excess of 10,000 LTL and together proportioning over 40,000 LTL. This ring represented 2.62%

[272] Humanes de Madrid, Parla, Villanueva del Pardillo, Alcalá de Henares, San Agustín del Guadalix, Valdeolmos-Alalpardo, Moraleja de Enmedio, Loeches, Torrejón de la Calzada, Arganda del Rey, Galapagar, Brunete, Valdemoro, El Molar, San Martín de la Vega, Villanueva de la Cañada, Torres de la Alameda, Arroyomolinos, Valdetorres de Jarama, Griñón, Hoyo de Manzanares, Camarma de Esteruela, Fresno de Torote, Colmenarejo, Serranillos del Vall, Campo Real, Cubas de la Sagra, Torrejón de Velasco, Casarrubuelos, Soto del Real, Meco, Navalcarnero, Ciempozuelos and Valdemorillo.

[273] Argentona, Matadepera, La Roca del Vallès, Viladecavalls, Castellví de Rosanes, Franqueses del Vallès, Abrera, Santa Eulàlia de Ronçana, Olesa de Bonesvalls, Sant Esteve Sesrovires, Gelida, L'Ametlla del Vallès, Sant Andreu de Llavaneres, Olesa de Montserrat, Esparreguera, Òrrius, Dosrius, Cardedeu, Sant Feliu de Codines, La Garriga, Caldes d'Estrac, Bigues i Riells, Sitges, Vacarisses, Sant Vicenç de Montalt, Masquefa, Sant Llorenç d'Hortons, Subirats, Arenys de Mar and Llinars del Vallès.

[274] Sant Pere de Ribes, Collbató, Avinyonet del Penedès, Sant Llorenç Savall, Figaró-Montmany, Sant Sadurní d'Anoia, Canet de Mar, Cànoves i Samalús, Vilalba Sasserra, Arenys de Munt, Rellinars, Sant Antoni de Vilamajor, Sant Cugat Sesgarrigues, Tagamanent, Castellbell i el Vilar, Gallifa, Sant Quirze Safaja, Sant Pere de Vilamajor, Piera, El Bruc, Vilanova i la Geltrú, Hostalets de Pierola, Monistrol de Montserrat, Sant Pol de Mar, La Granada, Castellterçol, Santa Fe del Penedès, Sant Iscle de Vallalta, Vilafranca del Penedès, Sant Vicenç de Castellet, Aiguafreda, Canyelles, Sant Cebrià de Vallalta, Sant Celoni, Castellcir, Torrelavit, Olèrdola, Vallbona d'Anoia, Santa Maria de Palau, Calella, Puigdàlber, Castellgalí, Les Cabanyes and Cubelles.

[275] Pedrezuela, Quijorna, Valverde de Alcalá, Morata de Tajuña, Collado Villalba, Sevilla la Nueva, Batres, Pozuelo del Rey, Anchuelo, Villalbilla, El Escorial, El Casar, Manzanares el Real, El Vellón, Alpedrete, Talamanca de Jarama, Corpa, Carranque, Azuqueca de Henares, Ribatejada, Valdepiélagos, Ugena, Illescas, El Alamo, Miraflores de la Sierra, Venturada, Guadalix de la Sierra, El Boalo, Valdeavero, Perales de Tajuña, Seseña, Santos de la Humosa, El Viso de San Juan, Santorcaz, Nuevo Baztán, Titulcia, Yeles, Torrejón del Rey, Villanueva de Perales, Navalagamella, Redueña, Valdilecha, Moralzarzal, Villamanta, Collado Mediano, Guadarrama, Valdenuño Fernández, Cabanillas de la Sierra, Numancia de la Sagra, Becerril de la Sierra, Alovera, Tielmes, Villanueva de la Torre, Cedillo del Condado, San Lorenzo de El Escorial, Navalafuente, Torrelaguna and Yuncos.

of the entire metropolitan jobs (66,174 LTL), meaning that 97% of the Madrid's total metropolitan jobs was contained within a distance of 60 km from the core. The remaining 3% of Madrid's total metropolitan jobs (141,673 LTL) lay in the area between 60 and 220 km from the core, distributed in municipalities all with less than 4,000 LTL. In the case of the metropolitan urban region of Barcelona, the remaining 3.63% of the metropolitan jobs (69,153 LTL) lay within a range of 50-110 km from the core, with 1.94% (36,863 LTL) and 1.24% (23,686 LTL) lying in the 50-60 Km and 60-70 km rings respectively. Apart from the municipalities of El Vendrell (8,711 LTL) at a distance of 63.89 km, Pineda de Mar (6,806 LTL) at a distance of 52.8 km and Malgrat de Mar (5,609 LTL) at a distance of 57.87 km, the remaining municipalities all had less than 5,000 LTL.

Figures 5.12 and 5.13 illustrate the spatial distribution of the locally-based jobs for the municipalities of the metropolitan urban regions of Madrid and Barcelona, relative to the distance from the respective metropolitan capitals.

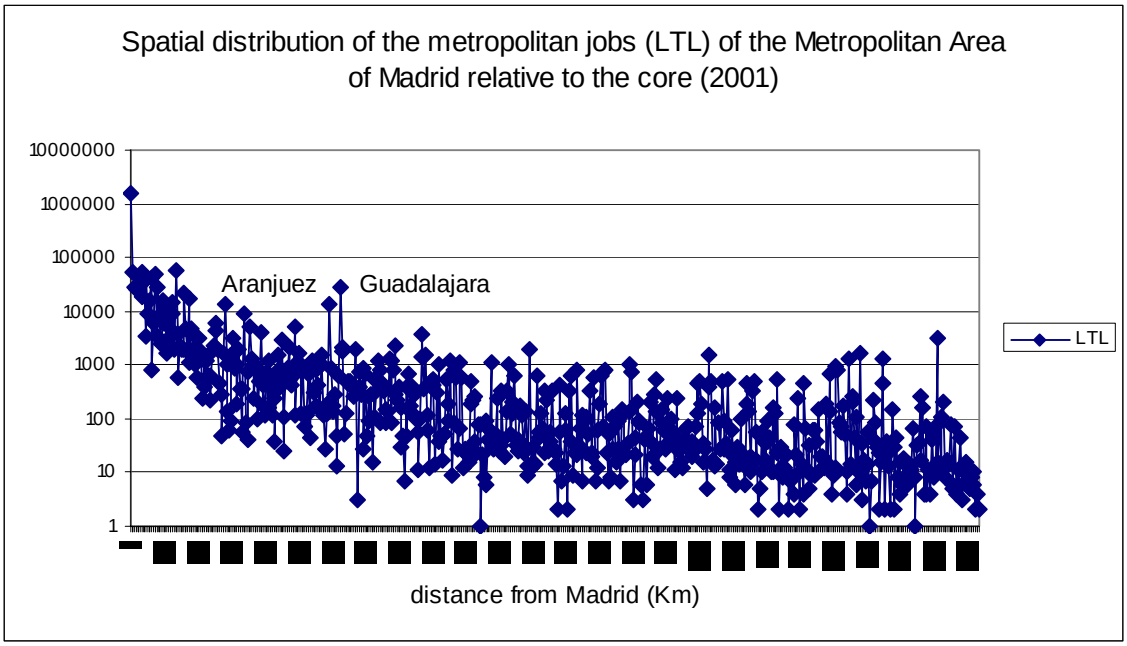


Figure 5.12. Spatial distribution of the locally-based jobs (LTL) of the metropolitan urban region of Madrid (2001)[276]

[276] INE (2001) (own elaboration)

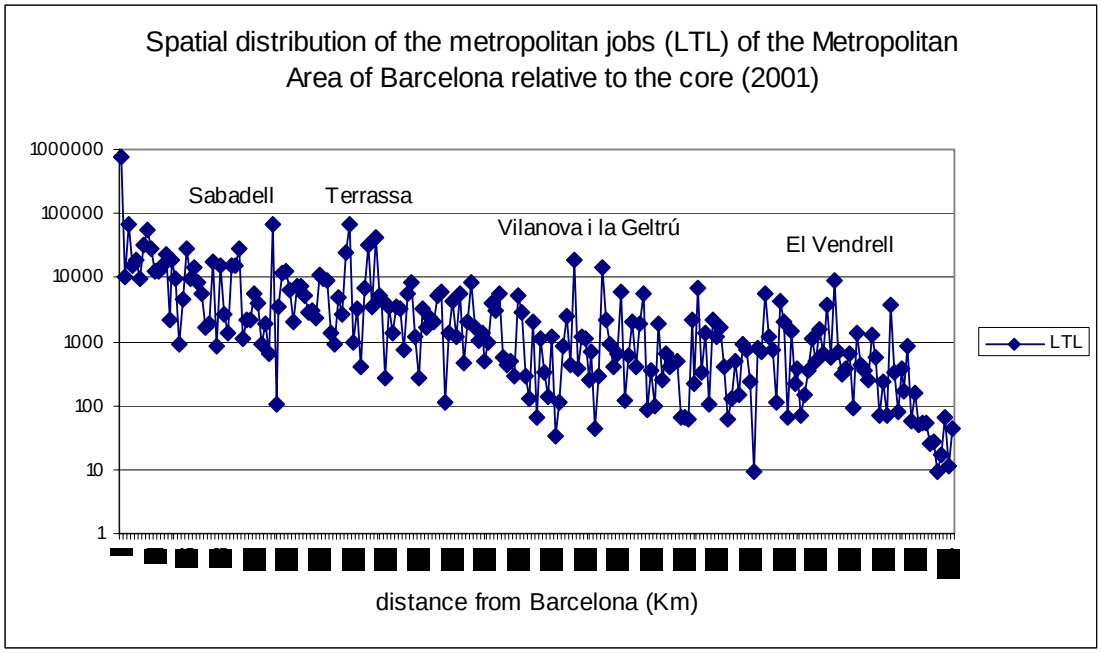


Figure 5.13. Spatial distribution of the locally-based jobs (LTL) of the metropolitan urban region of Barcelona (2001)[277]

[277] INE (2001) (own elaboration)

5.3. Job ratio

The *job ratio* is an indicator of the relation between the supply and demand of labour in a spatial unit, which permits determining whether a municipality is an *importer* or *exporter of labour*. It is expressed as the ratio between the locally-based jobs (LTL) and the economically active population (POR). Therefore values of greater than 1 are indicative of a spatial unit which imports workers, whereas values of less than 1 indicate a spatial unit which is a net exporter of its economically active resident population.

Applying this indicator to the seven Spanish metropolitan urban regions, in the case of Madrid, just 62 of its 609 municipalities were characterised as importers of labour[278], of which only Tres Cantos (1.38), Arganda del Rey (1.35), Alcobendas (1.23), Madrid (1.21), Pinto (1.10) and Valdemoro (1.05) had their LTL in excess of 10,000. By contrast of the same LTL range, the municipalities of Guadalajara (0.96), San Fernando de Henares (0.90), San Sebastian de los Reyes (0.89), Las Rozas de Madrid (0.86), Pozuelo de Alarcón (0.86), Torrejón de Ardoz (0.82), Aranjuez (0.81), Majadahonda (0.78), Getafe (0.76), Colmenar Viejo (0.74), Alcalá de Henares (0.73), Coslada (0.73), Collado Villalba (0.62), Fuenlabrada (0.57), Alcorcón (0.53), Leganés (0.53), Móstoles (0.46) and Parla (0.38) turned out to be exporters of labour, unable to proportion sufficient employment to meet the full needs of their own resident population.

Looking as the case of that of Barcelona, in 2001 some 42 of the 227 municipalities were importers of workers[279]. Of the municipalities with more than 10,000 locally-based jobs previously addressed in Section 5.2, Martorell (2.27), Santa Perpètua de Mogoda (1.60), Parets del Vallès (1.47), Barberà del Vallès (1.37), Montcada i Reixac (1.29), Granollers (1.25), Barcelona (1.21), El Prat de Llobregat (1.15) and Sant Andreu de la Barca (1.12) stood out as importers of labour. On the other hand other municipalities important for the magnitude of their locally-based employment such as Vilafranca del

[278] In descending order of the job ratio: Yebes, Zorita de los Canes, Ajalvir, Quer, Humanes de Madrid, Villarrubio, Trillo, Lominchar, Yeles, Seseña, Moraleja de Enmedio, Humanes, Almonacid de Zorita, Selas, Ocaña, Loeches, Tres Cantos, La Acebeda, Alovera, Arganda del Rey, Daganzo de Arriba, Ledanca, La Huerce, Vindel, Armuña de Tajuña, Camarma de Esteruela, Martajada, Santo Domingo-Caudil, Dosbarrios, Alcolea del Pinar, Lozoyuela-Navas-Sieteiglesias, Alcobendas, Lastras del Pozo, Atienza, La Iglesuela, Madrid, La Miñosa, Monasterio, Valderrebollo, Maqueda, San Agustín del Guadalix, Torija, Paracuellos de Jarama, Fresnedilla, Griñón, Somosierra, Barcience, Pinto, Maranchón, Matillas, Pegueritos, Millana, Valdemoro, Illescas, Villanueva de Alcorán, Belinchón, Viñuelas, Torremocha de Jarama, Pantoja, Gascones, Atanzón and Illán de Vacas.

[279] In descending order of the job ratio: Polinyà, Massanes, Martorell, Castellbisbal, Abrera, Lliçà de Vall, Martorelles, Olèrdola, Castellet i la Gorna, Santa Oliva, Palau-solità I Plega, Santa Perpètua de Mogoda, el Papiol, Sant Just Desvern, Cabrera de Mar, Parets del Vallès, Santa Maria de Miralles, Pacs del Penedès, Vallfogona de Riucorb, Barberà del Vallès, Sant Esteve Sesrovir, Tagamanent, Montcada i Reixac, Granollers, Castellví de Rosanes, Salamanca, Montornès del Vallès, Barcelona, Sentmenat, Torrelavit, Sant Feliu de Buixal, el Prat de Llobregat, Bellver, Sant Celoni, Sant Andreu de la Barca, Sant Sadurní d'Anoia, Hostalric, Vacarisses, Calella, Fogars de la Selva, Viladecavalls and la Garriga.

Penedès (0.98), Rubí (0.95), Sant Joan Despí (0.94), Sant Cugat del Vallès (0.94), Mataró (0.90), Terrassa (0.87), Gavà (0.86), Sabadell (0.86), Sant Adrià de Besòs (0.83), Vilanova i la Geltrú (0.81), Cornellà de Llobregat (0.79), Cerdanyola del Vallès (0.77), Esplugues de Llobregat (0.74), Sant Boi de Llobregat (0.69), Mollet del Vallès (0.68), Sant Feliu de Llobregat (0.66), L'Hospitalet de Llobregat (0.65), Badalona (0.63), Viladecans (0.55), Castelldefels (0.53) and Santa Coloma de Gramenet (0.39) were found to be exporters of labour, thereby unable to meet the full employment needs of their own economically active resident population. However it needs to be recognised that the majority of these municipalities with lower job ratios immediately adjoin the metropolitan capital, where clearly their employment needs are satisfied.

Turning to the metropolitan urban region of Valencia, some 27 of the 152 metropolitan municipalities could be seen as importers of labour[280], of which Almussafes (3.83), Quart de Poblet (1.38), Aldaia (1.21), Paterna (1.20), Manises (1.02) and Valencia (1.01) were important for the magnitude of their LTL being in excess of 10,000. On the other hand other equally important municipalities with LTL over 10,000 such as Sagunto (0.88) and Torrent (0.66) turned out to be export more labour than they import.

In the case of the metropolitan urban region of Sevilla, the pattern is very similar to that of Málaga, with just 4 of the 60 municipalities being classified as importers of labour, of which Sevilla (1.18) and Alcalá de Guadaíra (1.00) were the only two with an LTL of more than 10,000. By contrast Utrera (0.80) and Dos Hermanas (0.69), both with LTL in excess of 10,000 were classified as exporters of labour.

Looking at the case of the metropolitan urban region of Bilbao, 23 of the 104 metropolitan municipalities were able to be classified as importers of labour under the job ratio indicator[281]. Of these 23 municipalities just Zamudio (7.84) and Bilbao (1.10) stood out as being significant by each proportioning more than 10,000 LTL. By contrast Leioa (0.93), Galdakao (0.83), Basauri (0.77), Barakaldo (0.70) and Getxo (0.54), which were all important municipalities in the functional configuration of the metropolitan urban region, each with more than 10,000 LTL, were all classified as exporters of local labour.

[280] In descending order of the job ratio: Beniparrell, Almussafes, Marines, Massalfassar, Albuixech, Yémeda, Riba-roja de Túria, Sollana, Quart de Poblet, Cheste, Rafelbuñol, Silla, Aldaia, Paterna, Víllora, Museros, Alpuente, Alcàsser, Benagéber, Bonrepòs i Mirambell, Garaballa, Manises, Massanassa, Valencia, Higueruelas, Picassent, Millares.
[281] In descending order of the job ratio: Zamudio, Gizaburuaga, Loiu, Arakaldo, Bedia, Zaratamo, Arrankudiaga, Sondita, Derio, Igorre, Ajangiz, Lemoa, Murueta, Valle de Trápaga-Trapagaran, Mungia, Muskiz, Amurrio, Amoroto, Bilbao, Zierbena, Sukarrieta, Lezama and Ayala.

The application of the job ratio indicator to the metropolitan urban region of Zaragoza produced the curiosity of the metropolitan capital, the only municipality of its metropolitan urban region with an LTL in excess of 10,000, being an exporter of labour (0.94). Just 24 of the 265 metropolitan municipalities could be characterised as being importers of labour[282], but other than the case of Figueruelas, with an LTL of 8,563 and a job ratio of 18.07) all of these were of relative insignificance in terms of their combined employment provision.

Finally in the case of the metropolitan urban region of Málaga could be seen as importers of labour - Torremolinos (1.03) and Málaga (1.01) - with Benalmádena, the third ranking municipality of the metropolitan urban region in terms of its LTL in excess of 10,000 standing out as an exporter of labour (0.96).

[282] In descending order of the job ratio: Figueruelas, Cuarte de Huerva, La Puebla de Alfindén, Sobradiel, Cadrete, La Zaida, Belchite, Villanueva de Gállego, Epila, Pedrosa, La Puebla de Híjar, El Burgo de Ebro, Bagüés, Estercuel, Bisimbre, Cariñena, María de Huerva, Pina de Ebro, Zuera, El Frasno, Penseque, Alfajarín, Osera de Ebro and Fombuena.

5.4. Economic diversification

The analysis of the spatial distribution of economic activity or workplaces, making use of data facilitated by the Ministry of Work and Social Affairs (MTAS), allows for evaluating the strengths and weaknesses of the local economies of the different metropolitan urban regions. One of the key factors which helps in understanding the functional characteristics of the different metropolitan territories is the degree of diversification or specialisation of the economic activity found within those territories. The index of economic diversification index (E_1)[283] has been applied drawing upon the distribution of local jobs according to the NACE-93 classification, where the maximum value (ln (60)) = 4.09434456. The closer the index of economic diversification of a given territory approaches the maximum value, the greater the heterogeneity and complexity of its local economy, indicating a more balanced economic structure. By contrast, the closer the index of economic diversification of a given territory approaches zero, the more restricted and fragile its local economy.

	Index of economic diversification (2001)	
	Metropolitan urban region	Metropolitan capital
Madrid	3.2096	3.10105
Barcelona	3.3265	3.19258
Valencia	3.28048	3.0798
Sevilla	3.07908	3.0535
Bilbao	3.29530	3.09686
Zaragoza	3.30237	3.21227
Málaga	3.06929	3.06985
SPAIN	3.26644	

Table 5.5. Index of economic diversification of the metropolitan urban regions and metropolitan capitals (2001)[284]

As can be observed from Table 5.5, in 2001 the index of economic diversification of Spain as a whole was (3.2664). Barcelona stood out as the most diversified of the metropolitan urban regions (3.3265), followed closely by Zaragoza (3.3027), Bilbao (3.2953), Valencia (3.28048), Madrid (3.2096), Sevilla 3.07908) and Málaga (3.06929).

[283] Index of economic diversification (E_1):

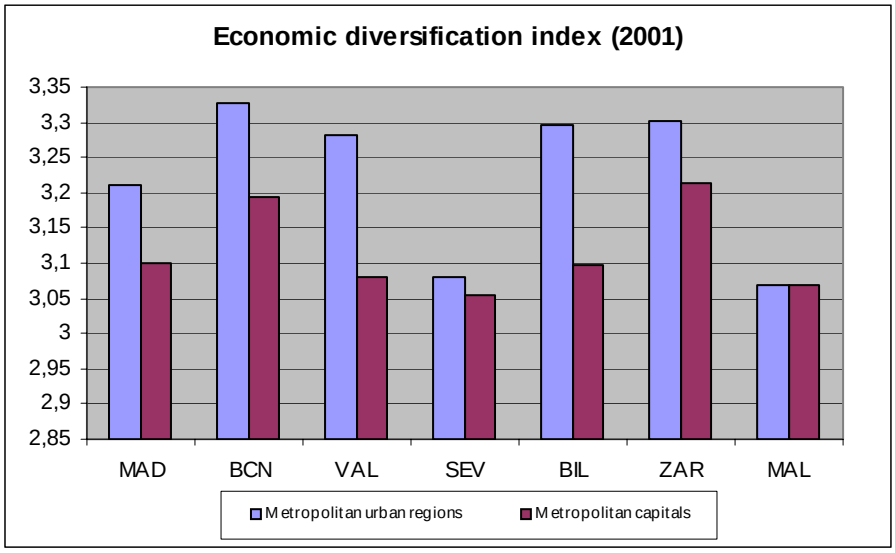
$$E_1 = -\sum_{j=1}^{J}\left[\frac{X_{rj}}{X_r} \bullet \ln\left(\frac{X_{rj}}{X_r}\right)\right]$$

Varies between 0 (maximum specialisation) and logarithm of 605 (number of sectors – maximum diversification)
X_{rj} - value of the variable X in the region r and in the sector j
X_r - value of the variable X in the region r for all of the sectors

[284] MTAS (2001 and 2004) (own elaboration)

In terms of the metropolitan capitals Zaragoza was the most diversified (3.21277), followed by Barcelona (3.19258), Madrid (3.10105), Bilbao (3.09686), Valencia (3.0798), Málaga (3.06985) and Sevilla (3.0535).

What can be detected from Figures 5.14 and 5.15 is the general tendency of a reduction in the economic diversification of the metropolitan urban regions between 2001 and 2004. It will be recalled from Section 5.1 (Economically active resident population) that between 1991 and 2001 the POR underwent a marked shift in the sense of a proportional decrease of employment in the agricultural and industrial sectors, and a concomitant proportional increase in employment in the service sector. Such shifts can easily be interpreted as a reduction in the diversification of the economy and a move towards greater specialisation, a phenomenon which would appear to be on the increase and is clearly reflected by the comparative data for the indices of economic diversification for 2001 and 2004.

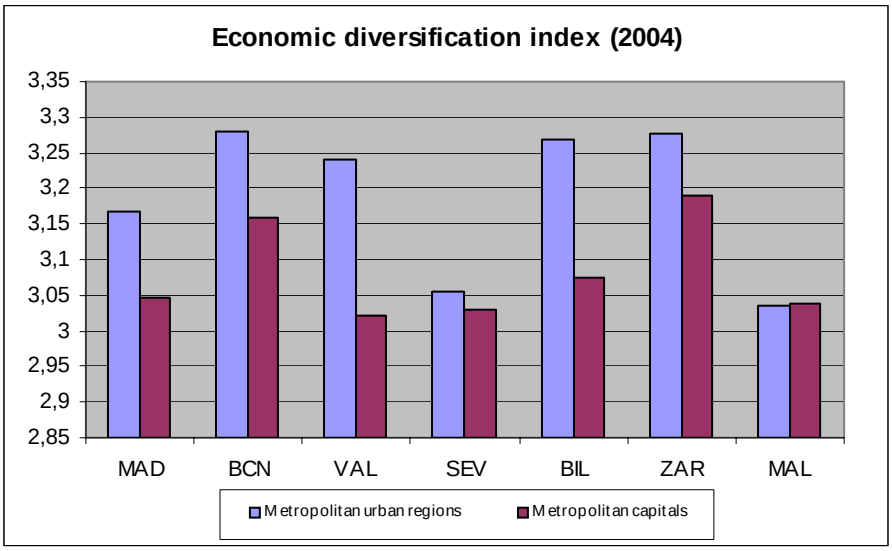


Figures 5.14. Index of economic diversification of the metropolitan urban regions (2001)[285]

In the case of the metropolitan urban region of Madrid, just 11 of the 609 metropolitan municipalities indicated indices of economic diversification greater than 3, however these municipalities account for 71.70% of the total LTL of the metropolitan urban region. Those municipalities in this category with in excess of 10,000 LTL included Arganda del Rey (the highest scoring municipality with an index of economic diversification of 3.26881, located at a distance of some 33 km from the centre of the metropolitan urban region), Torrejón de Ardoz, Colmenar Viejo, Madrid, Alcalá de

[285] MTAS (2001 and 2004) (own elaboration)

Henares, Fuenlabrada, Valdemoro, San Fernando de Henares and Guadalajara[286]. In the case of the remaining municipalities important for their high contribution of locally-based jobs (i.e. in excess of 10,000 LTL), namely Pinto, Móstoles, Aranjuez, Getafe, Alcorcón, Leganés, Coslada, Alcobendas, Las Rozas de Madrid, Majadahonda, Collado Villalba, Pozuelo de Alarcón, Parla and San Sebastián de los Reyes, their indices of economic diversification all lay above 2.6, with the exception of Tres Cantos (2.03089).



Figures 5.15. Index of economic diversification of the metropolitan urban regions (2004)[287]

Intervals of the diversification index	MAD	BAR	VAL	SEV	BIL	ZAR	MÁL
> 3 (89)	11 (71.70%)	54 (78.55%)	10 (62.16%)	2 (66.28%)	2 (39.33%)	1 (78.58%)	1 (77.98%)
2.5 - 2.99 (157)	102 (23.59%)	87 (18.81%)	56 (31.09%)	16 (15.66%)	54 (54.76%)	20 (10.41%)	4 (16.57%)
2 - 2.49 (188)	149 (3.88%)	53 (2.26%)	39 (3.29%)	16 (9.48%)	36 (5.47%)	26 (3.78%)	3 (2.05%)
1.5 - 1.99 (125)	135 (0.60%)	20 (0.22%)	32 (2.77%)	16 (5.56%)	7 (0.21%)	71 (2.80%)	5 (2.27%)
< 1.5 (95)	212 (0.24%)	13 (0.15%)	15 (0.69%)	10 (3.03%)	5 (0.22%)	147 (4.42%)	17 (1.14%)
Metropolitan municipalities	609	227	152	60	104	265	26

Table 5.6. Distribution of the metropolitan municipalities of the metropolitan urban regions with regard to the indices of economic diversification, with their share of the locally-based jobs (LTL) (2001)[288]

[286] Azuqueca de Henares was the only municipality of the metropolitan urban region of Madrid with locally-based jobs (LTL) in the 5,000-10,000 range and with an index of economic diversification above 3.
[287] MTAS (2001 and 2004) (own elaboration)
[288] MTAS (2001 and 2004) and INE (2001) (own elaboration)

Turning to the metropolitan urban region of Barcelona, some 54 of the 227 municipalities had indices of economic diversification above 3, accounting for 78.55% of the locally-based jobs of the metropolitan urban region. Of these 54 municipalities, those with greater than 10,000 LTL included Granollers, Sant Feliu de Llobregat, Sant Boi de Llobregat, Barcelona, Sant Adrià de Besòs, Barberà del Vallès, Sabadell, Terrassa, Rubí, Parets del Vallès, Mollet del Vallès, Santa Perpètua de Mogoda, Badalona, Esplugues de Llobregat, Sant Andreu de la Barca, Sant Joan Despí, Cerdanyola del Vallès, Mataró, Cornellà de Llobregat, Vilafranca del Penedès, el Prat de Llobregat, Martorell and Viladecans[289]. Of the remaining municipalities important for their high contribution of locally-based jobs (i.e. in excess of 10,000), namely Montcada i Reixac, Gavà, L'Hospitalet de Llobregat, Castelldefels, Sant Cugat del Vallès, Sant Quirze del Vallès, Santa Coloma de Gramenet and Vilanova i la Geltrú, all had indices of economic diversification lying above 2.8.

Ten of the 152 municipalities of the metropolitan urban region of Valencia had their indices of economic diversification higher than 3, which accounted for 62.16% of the locally-based jobs. Out of these 10 municipalities, Paterna (the highest scoring municipality with an index of economic diversification of 3.32714), Torrent, Valencia, Sagunto and Manises lay within the greater than 10,000 LTL range, while Alboraya, Alaquàs, Moncada, Riba-roja de Túria and Catarroja each had locally-based jobs lying in the 5,000-10,000 range. Of the other municipalities with a high representation of LTL, both Aldaia and Quart de Poblet had indices of economic diversification lying above 2.9, whereas Almussafes stood out as the exception with a much lower index of economic diversification of just 1.50076.

In the case of the metropolitan urban region of Sevilla just 2 of the 60 metropolitan municipalities of its metropolitan urban region had their index of economic diversification lying above 3, namely Alcalá de Guadaíra (3.16884) and Sevilla (3.0535). In both cases these municipalities had in excess of 10,000 locally-based jobs, accounting jointly for 66.28% of the LTL of the whole metropolitan urban region. The indices of economic diversification of Dos Hermanas and Utrera, both with more than 10,000 LTL, stood at 2.94635 and 2.2809 respectively.

[289] Other municipalities of the Barcelona metropolitan urban region with an index of economic diversification above 3 and with locally-based jobs (LTL) in the 5,000-10,000 range included Caldes de Montbui (the highest scoring municipality of the metropolitan urban region with an index of economic diversification of 3.26465), Esparreguera, La Garriga, Molins de Rei, Lliçà de Vall, Castellar del Vallès, Ripollet, Vilassar de Mar, Sant Vicenç dels Horts, Franqueses del Vallès, Premià de Mar, Malgrat de Mar, Sant Celoni, El Masnou and Montornès del Vallès.

Two municipalities of the metropolitan urban region of Bilbao had indices of economic diversification lying above 3, representing almost 40% of its LTL. Of these 2 municipalities just Bilbao itself (with an index of 3.09686) had more than 10,000 LTL, while Sopelana (with an index of 3.004953) had just over 2,000 LTL. However almost 55% of the locally-based jobs of the metropolitan urban region were located in municipalities registering indices of economic diversification in the 2.8-3 range, including the municipalities of Zamudio, Getxo, Basauri, Galdakao, Barakaldo and Leioa, each with more than 10,000 LTL.

In the case of the metropolitan urban region of Zaragoza, it will be recalled from Section 5.2 that the metropolitan capital was the only one with more than 10,000 locally-based jobs, which coincided with the highest index of economic diversification (3.21227) thereby accounting for 78.58% of all the locally-based jobs of the metropolitan urban region. Figueruelas, the next highest municipality in terms of locally-based jobs had an index of economic diversification of just 0.47782.

Finally in the case of the metropolitan urban region of Málaga, the metropolitan capital was the only municipality of the metropolitan urban region with an index of economic diversification greater than 3 (3.06985), accounting for just almost 78% of the LTL of the metropolitan urban region. Benalmádena and Torremolinos, the only other 2 municipalities with more than 10,000 LTL, both had indices of economic diversification in excess of 2.6.

What stands out from the comparison between the seven metropolitan urban regions is that the vast proportion of the municipalities which together account for the highest concentration of the locally-based jobs indicate being the highest scoring municipalities with regard to their degree of economic diversification. In the case of Barcelona, more than 97% of the LTL are concentrated in municipalities with indices of economic diversification higher than 2.5. In the metropolitan urban region of Madrid the corresponding municipalities account for 95.28% of the LTL, followed by 94.55% in Málaga, 94.1% in Bilbao, 93.25% in Valencia, 89% in Zaragoza and 81.94% in Sevilla.

5.5. Economic specialisation

Another measure, complementary to the index of economic diversification, useful for establishing the strengths of the local economies of the different metropolitan urban regions is the index of economic specialisation which also draws upon data provided by the Ministry of Work and Social Affairs (MTAS). The index of economic specialisation, or location quotient (LQ), measures the percentage share of employment in a given sector locally relative to the percentage share nationally (LQ = Local %/National %). A location quotient of more than 1.0 for a given sector therefore indicates a higher proportion of total employment in that sector within a specific location, than the total employment at a national level[290].

Tables 5.7-5.13 indicate the indices of economic specialisation for each of the seven principal Spanish metropolitan urban regions, where the index of economic specialisation or location quotient is greater than 1.2. Looking firstly at the metropolitan urban region of Madrid (Table 5.7), some 18 activities were recorded with an index of economic specialisation greater than 1.2, out of which 5 were of an industrial nature and 13 belonged to the service sector. As might be expected of the capital city, there was a strong presence of centralised functions such as extra-territorial organisations (3.76148), together with transport and energy related activities, computer related activities (2.75054), post and telecommunications (2.3574), high precision manufacturing, and publishing and printing, amongst others. In nearly all these cases, with the exception of high precision manufacturing and publishing related activities, the metropolitan capital was more specialised than the remainder of the metropolitan urban region. There was a clear specialisation in the manufacture of media related equipment (32) in the remainder of the metropolitan urban region, with some 30 municipalities recording indices of economic specialisation greater than 1.2, out of which 5 such municipalities[291] had indices of economic specialisation of over 10.

[290] The location quotient (QL):

$$QL_{rj} = \frac{x_{rj}}{x_r} \Big/ \frac{x_{pj}}{x_p} \qquad (0 \leq QL_{rj} \leq \infty)$$

X_{rj} - value of the variable X in the location r and in the sector j
X_r - value of the variable X in the location r for all the sectors (60)
X_{pj} - value of the variable X in the country in the sector j
X_p - value of the variable X in the country for all the sectors (60)

[291] Daganzo de Arriba (25.64917), Torres de la Alameda (17.94367), Villaseca de la Sagra (16.93056), Arganda del Rey (12.52786) and El Viso de San Juan (10.17061).

NACE-93 Code	ECONOMIC SECTOR	INDEX OF ECONOMIC SPECIALISATION	
		Metropolitan urban region of Madrid	Metropolitan capital
99	Extra-territorial organizations and bodies	3.76148	**5.88736**
62	Air transport	3.67699	**5.89506**
11	Extraction of crude petroleum and natural gas + service activities, excl..	3.37289	**4.80217**
72	Computer and related activities	2.75054	**3.13934**
64	Post and telecommunications	2.3574	**2.92098**
61	Water transport	2.2481	**2.17115**
33	Manufacture of medical, precision and optical instruments, watches & clocks	2.19832	1.18918
30	Manufacture of office machinery and computers	2.18598	**1.38811**
22	Publishing, printing and reproduction of recorded media	1.83482	**1.78389**
95	Private household with employed persons	1.76931	**2.06167**
74	Other business activities	1.69504	**2.0634**
66	Insurance and pension funding, except compulsory social security	1.67772	**2.37177**
73	Research and development	1.60907	**2.23168**
65	Financial intermediation, except insurance and pension funding	1.48122	**1.98563**
67	Activities auxiliary to financial intermediation	1.3938	**1.71758**
92	Recreational, cultural and sporting activities	1.37514	**1.35955**
63	Supporting & auxiliary transport activities; activities of travel agencies	1.32431	**1.43252**
32	Manufacture of radio, television and communication equipment and apparatus	1.32332	0.62964

Table 5.7. Index of economic specialisation for the metropolitan urban region of Madrid (2004), for all NACE-93 2-digit sectors with a location quotient of at least 1.2[292]

In the case of that of Barcelona (Table 5.8), some 23 activities were recorded with indices of economic specialisation measuring at least 1.2, out of which 13 were of an industrial nature and 10 belonged to the service sector. One sees the importance of the textile industry (2.60989) and other manufacturing industries; publishing and printing (1.8355); insurance and pension funding (1.61939); computer related activities (1.51814) and research and development (1.51633) in particular.

[292] MTAS (2004) (own elaboration)

NACE-93 Code	ECONOMIC SECTOR	INDEX OF ECONOMIC SPECIALISATION	
		Metropolitan urban region of Barcelona	Metropolitan capital
17	Manufacture of textiles	2.60989	0.57327
24	Manufacture of chemicals, and chemical products	2.47535	**1.87425**
34	Manufacture of motor vehicles, trailers and semi-trailers	1.99435	**2.42461**
32	Manufacture of radio, television and communication equipment and apparatus	1.92328	**1.22179**
22	Publishing, printing and reproduction of recorded media	1.8355	**1.99918**
31	Manufacture of electrical machinery and apparatus n.e.c.	1.77142	1.04935
25	Manufacture of rubber and plastic products	1.66969	0.41247
66	Insurance and pension funding, except compulsory social security	1.61939	**3.15232**
33	Manufacture of medical, precision and optical instruments, watches & clocks	1.59851	1.16552
18	Manufacture of wearing apparel; dressing and dyeing of fur	1.59381	0.98245
21	Manufacture of pulp, paper and paper products	1.57288	0.60871
72	Computer and related activities	1.51814	**2.31035**
73	Research and development	1.51633	**1.72489**
63	Supporting & auxiliary transport activities; activities of travel agencies	1.49327	**1.93387**
30	Manufacture of office machinery and computers	1.48123	0.92767
29	Manufacture of machinery and equipment n.e.c.	1.47372	0.53484
28	Manufacture of fabricated metal products, except machinery and equipment	1.34742	0.41841
92	Recreational, cultural and sporting activities	1.33247	**1.70486**
70	Real estate activities	1.31505	**1.59648**
51	Wholesale trade & commission trade, except of motor vehicles & motorcycles	1.28217	1.16509
93	Other services activities	1.27447	**1.31618**
99	Extra-territorial organizations and bodies	1.25928	**2.75608**
74	Other business activities	1.23916	**1.75584**

Table 5.8. Index of economic specialisation for the metropolitan urban region of Barcelona (2004), for all NACE-93 2-digit sectors with a location quotient of at least 1.2[293]

A number of these activities were more concentrated in the metropolitan capital as indicated by the higher value of the index of economic specialisation in Table 5.8, just as some others were more concentrated in the rest of the metropolitan urban region, by virtue of the lower corresponding values in the Barcelona itself. For example the indices of economic specialisation for the manufacture of textiles (17) in some 104 municipalities were higher than 1.2, with scores of over 20 in some 22 of these such municipalities[294], indicating twenty times more jobs in this sector than those at the national level. Similarly some 81 municipalities recorded indices of economic specialisation greater than 1.2 for the manufacture of rubber and plastic products (25), out of which 5 municipalities[295] had indices of economic specialisation of over 20.

The metropolitan urban region of Valencia (Table 5.9) was characterised by some 14 activities whose indices of economic specialisation were greater than 1.2, out of which eight were industrially related, 5 were related to the service sector and just one to agriculture and forestry. The manufacture of office equipment was the highest scoring activity (4.73722), but was an activity located beyond the limits of the metropolitan capital. Some 10 municipalities recorded indices of economic specialisation for this activity greater than 1.2, with the municipality of la Pobla de Vallbona clearly standing out (471.27153). This was followed by furniture manufacturing (2.26143) again with a higher representation beyond Valencia itself. A total of 55 municipalities recorded indices of economic specialisation greater than 1.2 for furniture manufacturing, out of which 12 municipalities[296] had indices of over 10. Research and development also scored highly within the metropolitan urban region of Valencia (2.11337) and even more highly within the metropolitan capital (2.62419).

[293] MTAS (2004) (own elaboration)
[294] Massanes (139.4046), Masllorenç (53.15979), Mediona (50.14756), Castellbell i el Vilar (47.81752), Dosrius (42.6192), la Pobla de Montornès (39.87928), Monistrol de Montserrat (35.92196), Sant Llorenç Savall (33.36018), Hostalric (29,53246), Sant Pere de Vilamajor (29.05322), l'Estany (27.6834), Cabrera de Mar (27.60834), Argentona (27.54052), Olesa de Montserrat (27.2089), Torrelles de Foix (26.12478), Tordera (25.4121), la Llacuna (25.33279), Sant Iscle de Vallalta (24.45589), Rellinars (23.51053), Centelles (21.3594), Castellví de la Marca (20.26623) and el Masnou (20.06235).
[295] Sant Cugat Sesgarrigues (56.67014), Pacs del Penedès (41.48874), Polinyà (26.43987), Llinars del Vallès (23.73111) and Sant Feliu de Buixalleu (23.07684).
[296] Beniparrell (25.79267), Higueruelas (20.44466), Silla (18.14425), Albal (17.43413), Alcàsser (17.42932), Vinalesa (14.31415), Massanassa (14.07602), Albalat de la Ribera (13.73258), Lugar Nuevo de la Corona (13.17722), Paiporta (11.7794), Benagéber (10,75692) and Alaquàs (10.17656).

NACE-93 Code	ECONOMIC SECTOR	INDEX OF ECONOMIC SPECIALISATION	
		Metropolitan urban region of Valencia	Metropolitan capital
30	Manufacture of office machinery and computers	4.73722	0.38565
36	Manufacture of furniture; manufacturing n.e.c.	2.26143	0.63619
73	Research and development	2.11337	**2.62419**
02	Forestry, logging and related forest activities	1.75395	**3.27635**
34	Manufacture of motor vehicles, trailers and semi-trailers	1.73683	0.05065
20	Manufacture of wood & of products of wood & cork and of straw & plaiting...	1.56532	0.50481
63	Supporting & auxiliary transport activities; activities of travel agencies	1.40997	**1.84125**
51	Wholesale trade & commission trade, except of motor vehicles & motorcycles	1.36933	0.93836
25	Manufacture of rubber and plastic products	1.36857	0.11295
71	Renting of machinery & equipment without operator & of personal & household	1.29721	**1.40954**
41	Collection, purification and distribution of water	1.26592	**1.52733**
90	Sewage and refuse disposal, sanitation and similar activities	1.23338	1.13849
33	Manufacture of medical, precision and optical instruments, watches & clocks	1.22367	**1.21061**
31	Manufacture of electrical machinery and apparatus n.e.c.	1.21194	0.6168

Table 5.9. Index of economic specialisation for the metropolitan urban region of Valencia (2004), for all NACE-93 2-digit sectors with a location quotient of at least 1.2[297]

The metropolitan urban region of Sevilla (Table 5.10) stood out for the importance of agricultural related activities (1.61286), the highest value of the index of economic specialisation for all of the seven metropolitan urban regions, though in fact the prime importance of the metropolitan urban region lay in the manufacture of transport related equipment (2.2832). This activity was concentrated within the metropolitan capital (3.25692) though clearly the converse was the case with regards to the agricultural activity. The remaining eight economic activities with indices of economic specialisation greater than 1.2 lay within the industrial (3) and service (5) sectors.

[297] MTAS (2004) (own elaboration)

NACE-93 Code	ECONOMIC SECTOR	INDEX OF ECONOMIC SPECIALISATION	
		Metropolitan urban region of Sevilla	Metropolitan capital
35	Manufacture of other transport equipment	2.2832	**3.25692**
01	Agriculture, hunting and related service activities	1.61286	0.2196
71	Renting of machinery & equipment without operator & of personal & household	1.55919	0.93944
41	Collection, purification and distribution of water	1.44928	**2.07416**
16	Manufacture of tobacco products	1.43622	**1.98033**
90	Sewage and refuse disposal, sanitation and similar activities	1.32607	**1.55985**
99	Extra-territorial organizations and bodies	1.26871	**1.85963**
40	Electricity, gas, steam and hot water supply	1.26685	**1.45069**
91	Activities of membership organization n.e.c.	1.2222	**1.81986**
85	Health and social work	1.21793	**1.90128**

Table 5.10. Index of economic specialisation for the metropolitan urban region of Sevilla (2004), for all NACE-93 2-digit sectors with a location quotient of at least 1.2[298]

Turning to the case of the metropolitan urban region of Bilbao (Table 5.11), of the 20 activities whose economic specialisation indices were greater than 1.2, 11 were industrially related, 8 were related to the service sector and just one to agriculture and forestry. The ranking was headed by petroleum related extraction and refinement (9.44053 and 4.49432), though the former had a greater presence in the metropolitan capital (18.577) than the latter. These were followed by a series of traditional manufacturing industry activities, as well as computer related activities (1.91777), water transportation (1.65392), high precision instrument manufacturing (1.63599), research and development (1.47807) and financial related activities (1.31991) amongst others. However in nearly all cases the indices of economic specialisation for the industrial sector activities were weighted in favour of the rest of the metropolitan urban region[299], beyond the metropolitan capital, while the corresponding indices for the service sector activities were concentrated within Bilbao itself.

[298] MTAS (2004) (own elaboration)

[299] For example, with regard to the manufacture of coke and petroleum refinement (23), this were heavily concentrated in just 4 municipalities: Muskiz (576.02876), Castro-Urdiales (41.67063), Barakaldo (7.01194) and Valle de Trápaga-Trapagaran (2.11357); whereas other manufacturing industry activities such as fabricated metallic products (28), rubber and plastic products (25), electrical machinery (31) and basic metals (27) were more widely distributed amongst 53, 46, 33 and 28 municipalities respectively.

NACE-93 Code	ECONOMIC SECTOR	INDEX OF ECONOMIC SPECIALISATION	
		Metropolitan urban region of Bilbao	Metropolitan capital
11	Extraction of crude petroleum and natural gas + service activities, excl..	9.44053	**18.577**
23	Manufacture of coke, refined petroleum products and nuclear fuel	4.49432	0.06147
27	Manufacture of basic metals	3.97253	0.19107
31	Manufacture of electrical machinery and apparatus n.e.c.	2.66324	0.49752
37	Recycling	2.64529	**2.71343**
25	Manufacture of rubber and plastic products	2.28461	0.14881
35	Manufacture of other transport equipment	2.10085	0.18625
28	Manufacture of fabricated metal products, except machinery and equipment	2.06801	0.57402
40	Electricity, gas, steam and hot water supply	1.95506	**4.14417**
72	Computer and related activities	1.91777	**2.73316**
90	Sewage and refuse disposal, sanitation and similar activities	1.90652	**3.10154**
61	Water transport	1.65392	**2.87483**
33	Manufacture of medical, precision and optical instruments, watches & clocks	1.63599	**1.68019**
99	Extra-territorial organizations and bodies	1.63177	**3.98399**
80	Education	1.58897	**2.17067**
29	Manufacture of machinery and equipment n.e.c.	1.58285	0.63991
73	Research and development	1.47807	**1.46261**
66	Insurance and pension funding, except compulsory social security	1.38391	**2.82496**
02	Forestry, logging and related forest activities	1.31991	**1.23258**
85	Health and social work	1.20539	**1.21592**

Table 5.11. Index of economic specialisation for the metropolitan urban region of Bilbao (2004), for all NACE-93 2-digit sectors with a location quotient of at least 1.2[300]

In the metropolitan urban region of Zaragoza some thirteen activities were registered with economic specialisation indexes greater than 1.2. (Table 5.12) These comprised 9 industrially related activities and 4 service sector activities. The metropolitan urban region of Zaragoza stood out for the importance of motor vehicle manufacturing (4.89357), but with much higher indices of economic specialisation in the municipalities

within which these jobs were located[301]. Other important categories for the metropolitan urban region were those related to the manufacture of machinery and equipment (3.2353), electrical machinery (2.65208), media related equipment (2.13471) and furniture (1.87406), as well as a number of traditional manufacturing industry activities. Finally there was a clear presence of jobs in the financial intermediation sector (1.22935) and research and development (1.22426), two sectors which were more strongly represented within the metropolitan capital than the wider metropolitan urban region.

NACE-93 Code	ECONOMIC SECTOR	INDEX OF ECONOMIC SPECIALISATION	
		Metropolitan urban region of Zaragoza	Metropolitan capital
34	Manufacture of motor vehicles, trailers and semi-trailers	4.89357	1.19435
29	Manufacture of machinery and equipment n.e.c.	3.2353	**3.0125**
31	Manufacture of electrical machinery and apparatus n.e.c.	2.65208	**2.35215**
32	Manufacture of radio, television and communication equipment and apparatus	2.13471	**1.78988**
36	Manufacture of furniture; manufacturing n.e.c.	1.87406	**1.52699**
21	Manufacture of pulp, paper and paper products	1.68136	**1.83233**
25	Manufacture of rubber and plastic products	1.57652	0.8885
28	Manufacture of fabricated metal products, except machinery and equipment	1.48906	0.90374
90	Sewage and refuse disposal, sanitation and similar activities	1.34553	**1.69367**
27	Manufacture of basic metals	1.23785	**1.24016**
65	Financial intermediation, except insurance and pension funding	1.22935	**1.60793**
73	Research and development	1.22426	**1.3912**
85	Health and social work	1.21687	**1.51474**

Table 5.12. Index of economic specialisation for the metropolitan urban region of Zaragoza (2004), for all NACE-93 2-digit sectors with a location quotient of at least 1.2[302]

Finally in the case of the metropolitan urban region of Málaga (Table 5.13), a total of 14 activities were recorded with indices of economic specialisation lying above 1.2,

[300] MTAS (2004) (own elaboration)
[301] An activity located principally in the municipality of Figueruelas (91.26785), but also in Belchite (43,19399), Epila (39,32161), Alagón (27,71108), Pedrola (26,41632), Borja (24,53201), Sobradiel (17,85232), Fuentes de Ebro (16,43142), Calatorao (13,85898), Lecineña (12,23759), Herrera de los Navarros (7,18182), Utebo (6,41679), Mediana de Aragón (5,76382), Cuarte de Huerva (4,88229), Gallur (3,74395), La Muela (3,34894) Villanueva de Gallego (1,97768).
[302] MTAS (2004) (own elaboration)

comprising 11 service sector activities, 2 industrially related activities and construction. One sees the importance of the manufacturing of electronic equipment (3.25464), with an even greater importance in the metropolitan capital (4.18803). The sector of air transport was also important (2.31405), again concentrated within Málaga itself (2.9783). Nearly all the other activities with an index of economic specialisation greater than 2 lay within the service sector, with the exception of energy supply and construction.

NACE-93 Code	ECONOMIC SECTOR	INDEX OF ECONOMIC SPECIALISATION	
		Metropolitan urban region of Málaga	Metropolitan capital
32	Manufacture of radio, television and communication equipment and apparatus	3.25464	**4.18803**
62	Air transport	2.31405	**2.9783**
71	Renting of machinery & equipment without operator & of personal & household	2.00065	**1.86342**
90	Sewage and refuse disposal, sanitation and similar activities	1.66991	**1.72485**
91	Activities of membership organization n.e.c.	1.5862	**1.69274**
65	Financial intermediation, except insurance and pension funding	1.46387	**1.85698**
85	Health and social work	1.45878	**1.75812**
70	Real estate activities	1.45613	**1.23541**
63	Supporting & auxiliary transport activities; activities of travel agencies	1.43149	**1.2919**
99	Extra-territorial organizations and bodies	1.37795	**1.6415**
64	Post and telecommunications	1.36102	**1.67356**
40	Electricity, gas, steam and hot water supply	1.28186	**1.64543**
45	Construction	1.20987	1.08835
55	Hotels and restaurants	1.20541	0.80972

Table 5.13. Index of economic specialisation for the metropolitan urban region of Málaga (2004), for all NACE-93 2-digit sectors with a location quotient of at least 1.2[303]

Tables 5.14 and 5.15 indicate the respective indices of economic specialisation for the seven metropolitan urban regions and metropolitan capitals, with regard to a grouping of innovative economic sectors. These relate to publishing and printing (22); high precision manufacturing of equipment and electrical goods (29, 30 and 31); transportation (60, 61 and 62); post and telecommunications (64); financial related activities (65, 66 and 67); computer related activities (72); and research and development (73).

[303] MTAS (2004) (own elaboration)

NACE-93 Code	ECONOMIC SECTOR	INDEX OF ECONOMIC SPECIALISATION						
		MAD	BCN	VAL	SEV	BIL	ZAR	MÁL
22	Publishing, printing and reproduction of recorded media	1.83482	1.8355	0.93317	0.63781	1.09692	0.80647	0.63042
29	Manufacture of machinery and equipment n.e.c.	0.68126	1.47372	0.93282	0.61194	1.58285	3.2353	0.41314
30	Manufacture of office machinery and computers	2.18598	1.48123	4.73722	1.04005	0.66479	0.39185	0.3026
31	Manufacture of electrical machinery and apparatus n.e.c.	1.05174	1.77142	1.21194	0.62528	2.66324	2.65208	0.32031
60	Land transport; transport via pipelines	1.00609	1.05589	1.12396	1.0232	1.08384	1.19567	1.10864
61	Water transport	2.2481	0.33908	0.30657	0.25772	1.65392	0.03074	0.04957
62	Air transport	3.67699	0.21614	1.07339	0.31411	0.2569	0.16018	2.31405
64	Post and telecommunications	2.3574	1.03631	0.76563	1.16062	1.15426	0.89661	1.36102
65	Financial intermediation, except insurance and pension funding	1.48122	1.07592	1.10747	1.02157	1.06464	1.22935	1.46387
66	Insurance and pension funding, except compulsory social security	1.67772	1.61939	1.12842	0.96202	1.38391	0.99217	0.94991
67	Activities auxiliary to financial intermediation	1.3938	0.95697	0.97692	0.8118	1.1161	1.0526	1.18467
72	Computer and related activities	2.75054	1.51814	0.73282	0.83778	1.91777	0.82788	1.10767
73	Research and development	1.60907	1.51633	2.11337	0.79026	1.47807	1.22426	0.29182

Table 5.14. Index of economic specialisation for the metropolitan urban regions (2004), for a selection of innovative sectors[304]

[304] MTAS (2004) (own elaboration)

NACE-93 Code	ECONOMIC SECTOR	INDEX OF ECONOMIC SPECIALISATION						
		MAD	BCN	VAL	SEV	BIL	ZAR	MÁL
22	Publishing, printing and reproduction of recorded media	1.78389	1.99918	0.95332	0.73559	1.52372	0.89048	0.69028
29	Manufacture of machinery and equipment n.e.c.	0.43165	0.53484	0.46508	0.55617	0.63991	3.0125	0.50784
30	Manufacture of office machinery and computers	1.38811	0.92767	0.38565	1.31165	0.60268	0.41865	0.28478
31	Manufacture of electrical machinery and apparatus n.e.c.	0.62868	1.04935	0.6168	0.81892	0.49752	2.35215	0.35833
60	Land transport; transport via pipelines	0.83345	0.89319	1.08075	0.95536	1.22389	1.22484	1.14323
61	Water transport	2.17115	0.70469	0.34452	0.42719	2.87483	0.04026	0.04469
62	Air transport	5.89506	0.19271	0.05728	0.53967	0.12233	0.20978	2.9783
64	Post and telecommunications	2.92098	1.85053	1.36622	1.82305	1.81986	1.15872	1.67356
65	Financial intermediation, except insurance and pension funding	1.98563	1.7302	2.17506	1.77173	2.58015	1.60793	1.85698
66	Insurance and pension funding, except compulsory social security	2.37177	3.15232	2.23812	1.6231	2.82496	1.28819	1.20097
67	Activities auxiliary to financial intermediation	1.71758	1.11899	1.20053	0.89279	1.51117	1.28885	1.18267
72	Computer and related activities	3.13934	2.31035	1.06257	1.29972	2.73316	1.05102	1.32927
73	Research and development	2.23168	1.72489	2.62419	1.24369	1.46261	1.3912	0.34187

Table 5.15. Index of economic specialisation for the metropolitan capitals (2004), for a selection of innovative sectors[305]

[305] MTAS (2004) (own elaboration)

From Table 5.14 it can be seen that the metropolitan urban regions of Barcelona and Madrid stood out for the presence of jobs within the printing and publishing sectors, with indices of economic specialisation of 1.8355 and 1.83482 respectively. Looking at the high precision manufacturing sectors, the metropolitan urban region of Zaragoza was important for the manufacture of machinery and equipment (3.2353), followed by Bilbao (1.58285) and Barcelona (1.47372).

The metropolitan urban region of Valencia stood out for the importance of office machinery and computer manufacturing (4.73722), followed by Madrid (2.18598) and Barcelona (1.48123). The manufacturing of electrical machinery was important in the metropolitan urban region of Bilbao (2.66324), followed by Zaragoza (2.65208), Barcelona (1.77142) and Valencia (1.211194).

With regard to the transportation sectors, the metropolitan urban region of Madrid stood out for the importance of jobs within air transportation (3.67699), followed by Málaga (2.31405). More curiously the metropolitan urban region of Madrid also stood out for the importance of employment in the water transportation sector (2.2481), owing to the physical presence of headquarters related to maritime activities. The metropolitan urban region of Bilbao was also important for this sector (1.65392).

The post and telecommunications sector had a high profile in the two metropolitan urban regions of Madrid (2.3574) and Málaga (1.36102).

Financial related activities had an important presence in the metropolitan urban regions of Madrid (on all counts - 65, 66 and 67), Málaga and Zaragoza (65); and Barcelona and Bilbao (66).

The metropolitan urban region of Madrid indicated an important presence of jobs in the computer sector (2.75054) followed by Bilbao (1.91777) and Barcelona (1.51814).

Finally with regard to the metropolitan urban regions, that of Valencia stood out for the high profile of jobs within the research and development sector (2.11337), followed by those of Madrid (1.60907), Barcelona (1.51633) and Bilbao (1.47807).

In terms of the presence of these innovative sectors within the metropolitan capitals (Table 5.15), Barcelona, Madrid and Bilbao all stood out for the high representation of jobs within the publishing and printing sectors. Madrid and Sevilla stood out for the jobs

within the office machinery and computer manufacturing sector, as did Zaragoza for jobs in the electrical machinery manufacturing sector. The importance of the transportation sectors in the metropolitan urban regions of Madrid, Málaga and Bilbao can be seen to be reflected at the scale of the respective metropolitan capitals. There appeared to be an important presence of jobs in the different financial sector divisions in all of the metropolitan capitals, as was the case with jobs in the post and telecommunications sector. Computer related activities had an important presence in the metropolitan capitals of Madrid, followed by Bilbao, Barcelona, Málaga and Sevilla. Finally research and development was well represented in all of the metropolitan capitals, with the exception of Málaga, led by Valencia and followed by Madrid, Barcelona, Bilbao, Zaragoza and Sevilla.

5.6. Gross domestic product (GDP)

This section addressing the area of gross domestic product (GDP) as well as the following three sections, relating to imports and exports, the activity rate and unemployment, all draw upon data by necessity at the provincial level, owing to the absence of corresponding data for the municipalities of the seven metropolitan urban regions.

As indicated by Table 5.16 and Figure 5.15, in 2001 the highest rates of GDP per capita were found in the provinces of Madrid (25,490 PPS), followed by Vizcaya (22,719 PPS), Barcelona (22,448 PPS) and Zaragoza (20,401 PPS) all with levels above that recorded for Spain as a whole (18,894). By contrast the GDP per capita for the provinces of Valencia (18,745 PPS) lay marginally below that for Spain, with those for Sevilla (14,816 PPS) and Málaga (14,343 PPS) lying well below the national figure. While the index for Spain (92.4) lay below that relative to the EU25 block of countries (100), Madrid (124.6), Vizcaya (111.1) and Barcelona (109.7) were all positioned above the European index. Zaragoza lay marginally below (99.7) the EU25 index, with Valencia lying further below (91.6), and Sevilla and Málaga well below (72.4 and 70.1 respectively).

Metropolitan provinces	2000		2001		2002		Average EU 25 = 100 2000-2002
	Value (PPS)	Index (EU 25 = 100)	Value (PPS)	Index (EU 25 = 100)	Value (PPS)	Index (EU 25 = 100)	
Madrid	24,270	122.9	25,490	124.6	26,833	126.7	124.7
Barcelona	21,785	110.3	22,448	109.7	23,552	111.2	110.4
Valencia	18,032	91.3	18,745	91.6	20,012	94.5	92.5
Sevilla	13,996	70.9	14,816	72.4	16,000	75.6	73.0
Vizcaya	21,907	110.9	22,719	111.1	24,153	114.0	112.0
Zaragoza	19,558	99.0	20,401	99.7	21,950	103.6	100.8
Málaga	13,588	68.8	14,343	70.1	14,801	69.9	69.6
SPAIN	18,114	91.7	18,894	92.4	20,034	94.6	92.9

Table 5.16. GDP per capita of the 'metropolitan' provinces (2000-2002)[306]

This same position was reflected over the period 2000-2002, as indicated by the average values of GDP per capita relative to the EU index in Table 5.16. Consequently there appears a clear division between the poorer performing southern metropolitan provinces of Málaga and Sevilla, and to a much lesser extent Valencia, and the remaining metropolitan provinces of Madrid, Vizcaya, Barcelona and Zaragoza, well positioned with regard to the rest of Europe.

[306] INE (own elaboration)

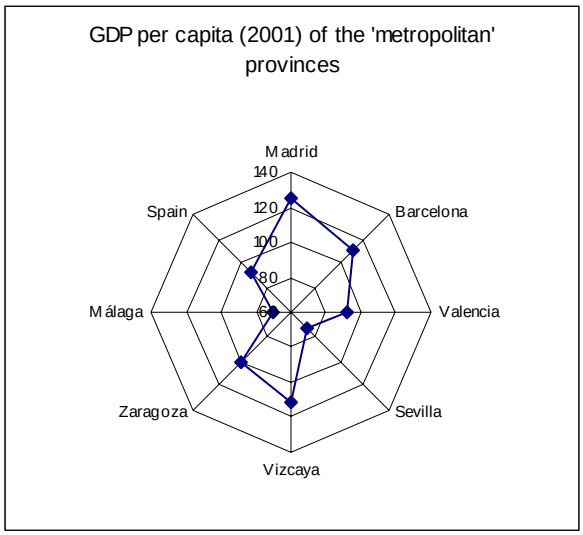


Figure 5.16. GDP per capita of the Spanish provinces (2001)[307]

[307] INE (own elaboration)

5.7. Imports and exports

While data relating to exports and imports is not available at the municipal level, thereby permitting the full comparison between the seven principal metropolitan urban regions, this section examines the theme as it relates to the seven 'metropolitan' provinces.

Table 5.17 indicates the magnitude of the exports and imports of the seven 'metropolitan' provinces and Spain as a whole during 2004. In the first place it can be seen that these provinces accounted for the consumption of almost 62% of Spain's total imports and generated almost 49% of the country's exports. Clearly Spain is a net 'consumer' of goods, importing more goods than it generates (E/I = 0.71) as is the sum of the seven metropolitan provinces (E/I = 0.56). This pattern is repeated in the provinces of Barcelona (E/I = 0.61), Madrid (E/I = 0.32), Málaga (E/I = 0.73), Valencia (E/I = 0.86) and Vizcaya (E/I = 0.71). However both Sevilla and Zaragoza both stand out as being net 'producers' in the sense of exporting more goods than they import (E/I = 1.05 and 1.07 respectively).

While there was little difference in the magnitude of the national share of the goods imported by Barcelona and Madrid in 2004 (24.57% and 23.43% respectively), turning specifically to exports, the difference between the two provinces is significant. Barcelona generated 21.22% of Spain's exports in 2004, more than twice the magnitude of that generated by Madrid (10.44%).

These were followed by Valencia (6.95%), Zaragoza (4.45%), Vizcaya (3.44%), Sevilla (1.45%) and Málaga (0.71%). This descending order is repeated taking into account the sum of the values of the imports and exports, highlighting the division between the 'southern' provinces of Sevilla and Málaga, and the remainder of the 'metropolitan' provinces.

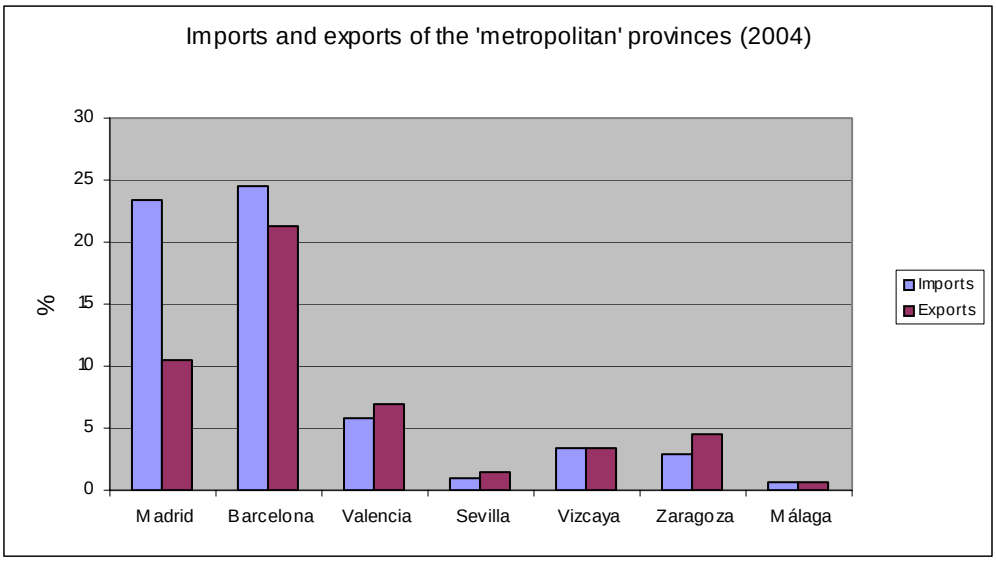


Figure 5.17. Contribution of the metropolitan provinces to Spain's imports and exports (2004)[308]

[308] Agencia Tributaria, Ministerio de Hacienda, Información estadística sobre el Comercio Exterior (diciembre 2004) (own elaboration)

Province	Imports (I)		Exports (E)		E/I	Total	
	Euros (000)	% of Spain	Euros (000)	% of Spain		Euros (000)	% of Spain
Madrid	48,527,706	23,43	15,293,678	10,44	0,32	63,821,384	18,05
Barcelona	50,894,260	24,57	31,077,406	21,22	0,61	81,971,666	23,18
Valencia	11,896,915	5,74	10,182,291	6,95	0,86	22,079,206	6,24
Sevilla	2,018,831	0,97	2,120,996	1,45	1,05	4,139,827	1,17
Vizcaya	7,071,491	3,41	5,044,788	3,44	0,71	12,116,279	3,43
Zaragoza	6,071,903	2,93	6,524,552	4,45	1,07	12,596,455	3,56
Málaga	1,420,739	0,69	1,038,151	0,71	0,73	2,458,890	0,70
TOTAL	127,901,845	61,75	71,281,862	48,67	0,56	199,183,707	56,33
SPAIN	207,129,961	100,00	146,460,358	100,00	0,71	353,590,319	100,00

Table 5.17. Imports and exports of the 'metropolitan' provinces (2004)[309]

[309] Agencia Tributaria, Ministerio de Hacienda, Información estadística sobre el Comercio Exterior (diciembre 2004) (own elaboration)

5.8. Economic activity

The rate of economic activity seeks to provide an overview of the proportion of the population in the 15-64 years of age range who are in actual fact classified as economically active.

The general tendency of the increase in the activity rate over the period 2002-2006 can be observed from Table 5.18, across all of the 'metropolitan' provinces and at the national level, as well as for males and females alike. In 2002 the highest rate for both sexes was found in Barcelona, followed by Valencia, Madrid and Sevilla, with activity rates lying above that for Spain. At that time, the activity rates for Vizcaya, Málaga and Zaragoza lay below the national rate. In 2006 Madrid led the ranking of the metropolitan provinces, followed by Barcelona and Valencia, with rates over that for Spain. The activity rate for Zaragoza lay marginally below the national figure, with those for Sevilla, Vizcaya and Málaga lying even further below.

	Activity rate (%) Both sexes	Activity rate (%) Males	Activity rate (%) Females
2002 (first 3 month period)			
Madrid	56.26	69.20	44.50
Barcelona	56.87	68.83	45.68
Valencia	56.45	69.63	44.08
Sevilla	54.86	69.59	41.01
Vizcaya	52.25	63.55	41.92
Zaragoza	50.77	65.06	37.27
Málaga	51.03	67.58	35.59
SPAIN	53.55	66.59	41.23
2006 (first 3 month period)			
Madrid	63.09	72.24	54.64
Barcelona	62.19	71.96	52.87
Valencia	59.57	71.00	48.42
Sevilla	57.21	69.84	44.85
Vizcaya	56.57	67.70	46.25
Zaragoza	57.20	68.66	46.00
Málaga	54.43	65.83	43.83
SPAIN	57.98	68.93	47.47

Table 5.18. Economic activity rates of the 'metropolitan' provinces (2002-2006)[310]

What is also clear from Table 5.18 is the gap between the activity rates for men and women in all of the metropolitan provinces, reflecting the same gap at the national level. However there would appear to be an indication of the reducing of that gap over the four year period at least, with a relatively higher proportion of economically active women in the workforce. For example in the case of Zaragoza, in 2002 the gap

[310] INE, Encuesta de Población Activa, Primer Trimestre 2002 and 2006

between the activity rates for men and women stood at almost 28 points, reducing to less than 23 points in 2006. Similarly in the case of Barcelona the gap between men and women reduced from 23 points in 2002 to some 19 points in 2006.

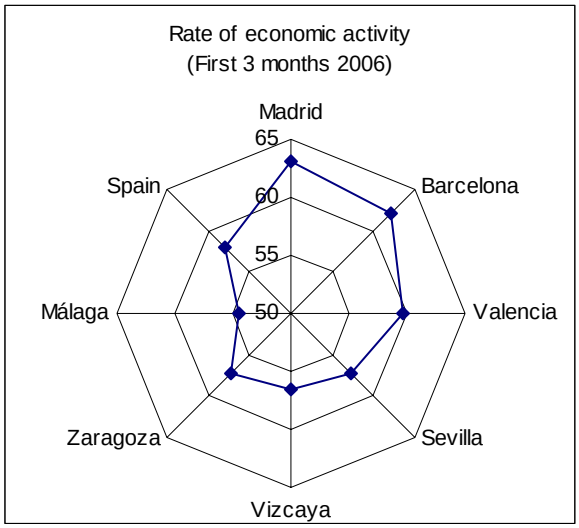


Figure 5.18. Rate of economic activity of the 'metropolitan' provinces (2006)[311]

[311] INE, Encuesta de Población Activa, Primer Trimestre 2006

5.9. Unemployment

An examination of the unemployment rates for the metropolitan provinces provides further evidence of the division in the economic structure between the 'southern' metropolitan urban regions and the remainder of the metropolitan system. In 2002, the highest unemployment rates of the seven provinces were recorded in Sevilla (20.56%), followed by Málaga (14.39%) and Vizcaya (11.68%), all lying above the rate of 11.47% for Spain as a whole. At that time unemployment was lowest in Zaragoza (5.20%), followed by Madrid (7.34%), Valencia (10.46%) and Barcelona (10.98%).

The general tendency in the period 2002-2006 was for a reduction in unemployment. By 2006 the unemployment of Vizcaya had reduced (8.52%) in relative terms, placing it below the rate of 9.07% for Spain, along with Valencia (8.09%), Barcelona (7.01%), Zaragoza (6.59%) and Madrid (5.92%). However the unemployment rates recorded for Sevilla (13.35%) and Málaga (12.48%) still remained higher than the national rate.

	Unemployment rate (Both sexes)	Unemployment rate Males	Unemployment rate Females
2002 (first 3 month period)			
Madrid	7.34	5.13	10.45
Barcelona	10.89	8.29	14.56
Valencia	10.46	7.68	14.58
Sevilla	20.56	15.92	27.96
Vizcaya	11.68	7.94	16.85
Zaragoza	5.20	3.36	8.25
Málaga	14.39	11.52	19.47
SPAIN	11.47	8.18	16.50
2006 (first 3 month period)			
Madrid	5.92	4.61	7.53
Barcelona	7.01	5.70	8.71
Valencia	8.09	6.15	10.87
Sevilla	13.35	10.39	17.85
Vizcaya	8.52	6.40	11.39
Zaragoza	6.59	4.73	9.31
Málaga	12.48	9.02	17.32
SPAIN	9.07	6.81	12.22

Table 5.19. Unemployment rates of the 'metropolitan' provinces (2002-2006)[312]

As was seen previously with the activity rate (Section 5.8), what can be detected over the 2002-2006 period is a lessening in the division between the unemployment rates for men and women in all of the metropolitan provinces. In 2002 there was an 8 point division between unemployment for men and women, reducing to a 5.5 point division in 2006. In Sevilla, clearly the worst case of the metropolitan provinces for its high

[312] INE, Encuesta de Población Activa, Primer Trimestre 2002 and 2006

unemployment, in 2002 this stood at almost 28% for women and almost 16% for men, a division of 12 points. By 2006 the corresponding figures were almost 18% for women and over 10% for men, demonstrating a division of 7 points.

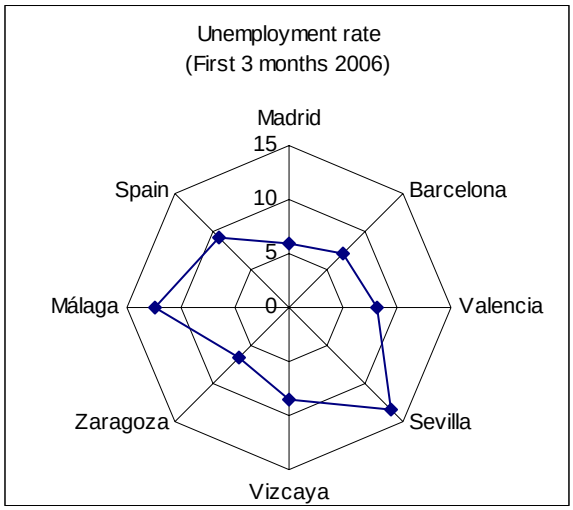


Figure 5.19. Unemployment rates (%) of the metropolitan provinces (2006)[313]

[313] INE, Encuesta de Población Activa, Primer Trimestre 2006

Concluding remarks

If the previous chapter addressing the social structure of the Spanish metropolitan system identified the dominance of Madrid and Barcelona over the remaining metropolitan urban regions, this is even more accentuated considering the economic structure of the system. While the combined seven metropolitan urban regions account for approximately 42% of Spain's economically active population (POR) and the locally-based jobs (LTL), what stands out is that two thirds of this proportion is located within the metropolitan urban regions of Madrid and Barcelona.

In terms of the economic activities in which the locally-based jobs are located, the metropolitan region of Sevilla is characterised for having a proportionally higher representation of employment within the agriculture sector. Barcelona, Zaragoza, Bilbao and Valencia each have a proportionally higher number of jobs in the industrial sector, with the highest proportion of jobs in the manufacturing industry division being concentrated in the metropolitan urban region of Barcelona. Madrid, Málaga and Sevilla each stand out for the importance of local employment in the service sector, however when broken down to individual divisions, such as the financial sector, Madrid and Barcelona both lead the ordering of the metropolitan urban regions.

Comparing the spatial distribution of the locally-based jobs, in the case of Madrid there is a much greater concentration of these within the metropolitan capital and the immediately adjoining municipalities than is the case in Barcelona. The metropolitan urban region of Barcelona is characterised by a much more dispersed concentration of these jobs.

The analysis of the job ratio indicated the general tendency for municipalities to be exporters of labour, and in many cases even the municipalities of each of the seven metropolitan regions, important for the magnitude of the locally-based jobs (in excess of 10,000 LTL), were exporters of labour, rather than importers.

The metropolitan urban region of Barcelona was characterised as the most economically diversified of the seven cases in 2001. Barcelona was followed by Zaragoza, Bilbao and Valencia, each with indices superior to that of Spain as a whole, then Madrid, Sevilla and Málaga. However during the period 2001-2004 there was a marked tendency towards a reduction in the degree of economic diversification – reflecting the overall shift from agricultural and industrial based employment to

employment in the service sector, as witnessed by the evolution of the share of POR in the different sectors over the ten year period between 1991 and 2001, and therefore greater specialisation in broad terms.

The analysis of the index of economic specialisation indicated the relative strengths of the respective employment categories across the seven metropolitan urban regions, in this way adding greater detail to the general vision proportioned by the analysis of the locally-based employment in the broad economic divisions.

In terms of GDP per capita, the provinces of Madrid, Vizcaya and Barcelona were all positioned above the average rate for the EU25 countries in 2001, with Zaragoza lying marginally below, followed by Valencia, and Sevilla and Málaga positioned well below. The same positioning was reflected in the 2000-2002 period, indicating a division between the poorer performing southern metropolitan urban regions (Málaga and Sevilla), and to a much lesser extent Valencia, and the remaining metropolitan urban regions of Madrid, Vizcaya, Barcelona and Zaragoza.

With regards to imports and exports, the provinces of the metropolitan urban regions were the principal generators of Spain's imports (almost 62%) and exports (almost 49%), according to figures for 2004. Madrid and Barcelona shared a similar proportion as receptors of the imports but in terms of exports, Barcelona generated over 21% of Spain's total exports, compared with the 10% generated by Madrid. This in part reflected the characterisation of Barcelona's economic base, with the importance of the industrial sector and manufacturing industrial activities. Sevilla and Zaragoza were the only two metropolitan provinces whose exports exceeded their imports.

The activity rates in 2006 for the metropolitan provinces of Madrid, Barcelona and Valencia were all higher than that for the whole of Spain, with that of Zaragoza lying marginally below the national rate. Sevilla, Vizcaya and Málaga all indicated activity rates lying below the national rate. What was observed as well was a closing in the differential between the activity rates for men and women over the 2000-2006 period, with those for women being les than those for men.

This same pattern was witnessed in the analysis of the unemployment rates, for the metropolitan provinces, based upon 2006 figures. Zaragoza, Madrid, Valencia and Barcelona all had the lowest rates of unemployment, lying below the national rate, in

contrast to Sevilla, Málaga and Vizcaya, with higher unemployment than the national figures.

In completing this review of the economic structure of the metropolitan urban regions, as with the review of the social structure carried out in Chapter4, what is apparent is the *critical mass* of the metropolitan urban regions with regard to Spain as a whole, but also the *critical mass* of Madrid and Barcelona within Spain's metropolitan system. This latter critical mass is visible in the concentration of employment activity within the two metropolitan urban regions, the degree to which both urban regions generate the imports and exports, albeit with Barcelona's greater capacity for generating exports.

However the similarities end when one considers the economic base and the diversification and specialisation of the two leading metropolitan urban regions. In this sense the two areas demonstrate a degree of implicit *complementarity*, with Madrid specialising in more service sector related activities, whereas Barcelona's economic strengths lie in the greater industrial activity. These factors help to contribute to Barcelona being the most economically diversified of the Spanish metropolitan urban regions.

Therefore, on the basis of the evidence placed forward in this chapter, it is considered wholly reasonable to conclude, from an economic perspective, that the *bicephalous* nature of the Spanish urban system is plainly manifest.

PART III: EUROPE: TOWARDS INCREASED INTEGRATION

"People live in places, power rules through flows."

Manuel Castells (1989) *The Informational City* (p. 349).

"Above all, spatial policy formulation at the European scale is a challenge to the imagination. (…) European integration requires not only new governmental structures and physical infrastructure links but also new mental maps and removal of Cartesian inhibitions."

Richard H. Williams (1996) *European Union Spatial Policy and Planning* (pp. 264-265).

"Europe needs cities and regions which are strong and good to live."

LEIPZIG CHARTER on Sustainable European Cities (2007).

CHAPTER 6. – EUROPEAN SPATIAL POLICY[314]

Introduction

At the Informal Ministerial meeting on Urban Development and Territorial Cohesion took place in Leipzig (Germany) on 24-25 May 2007, the European Ministers responsible for Territorial Development adopted the *Territorial Agenda of the European Union* (*Towards a More Competitive Europe of Diverse Regions*) (CEC, 2007b). The tabling of this document was highly significant in that it marked the stage to which evolving spatial policy had reached, up until that date, within the changing and expanding European territory. Indeed it is only within recent years that the *territorial dimension* of spatial policy has been explicitly addressed. Previously, policy seeking to correct the spatial disparities within the changing Europe, changing in the sense of reflecting the territorial expansion from a Europe comprising six member States in 1957 to one comprising twenty seven countries at 1st January 2007, was framed in social and economic terms. However today spatial policy is explicitly referred to in the 'trinity' between the *social*, *economic* and *territorial dimensions*.

The objective of this chapter is to provide an historical overview of the evolution of European spatial policy over the last twenty years, with particular reference to the policies directed towards overcoming the regional disparities of the European Union (EU), in its various forms. Up until the 6th enlargement of the EU in 2004 (EU25)[315], Spain was considered one of the 'four cohesion countries', together with Greece, Ireland and Portugal, owing to its inferior economic positioning relative to other countries of the EU. However in view of the enlargements of the EU which took place in May 2004 (with the incorporation of the Czech Republic, Estonia, Cyprus, Latvia, Lithuania, Hungary, Malta, Poland, Slovenia and Slovakia) and in January 2007[316], when Bulgaria and Rumania entered the EU, Spain's positioning in terms of its overall regional disparities has changed in relative terms.

The most significant EU spatial policy has in the main been directed towards overturning the dominant spatial territorial model of Europe, characterised by the core and periphery, which will be discussed in depth in the following Chapter (*Chapter 7.*

[314] An earlier version of some of the issues addressed in this chapter was contained in Roca and Burns (2003), as part of a series of studies commissioned by the ODECAT of the Generalitat de Catalunya. http://www.odecat.net/html/welcome.htm

[315] Treaty of accession signed 16 April 2003, entering into force on 1 May 2004, OJ l 236 dated 23 September 2003

European Urban System). At this stage it is suffice to recall that this core comprises the territory lying between London, Hamburg, Munich, Milan and Paris; and that it is within this core, or *pentagon*, where some 46.5% of the EU27 GDP is concentrated. Around one third of the European population lives within this area, which covers just 14% of the EU territory. The concerted drive towards a more polycentric and balanced model of urban and regional development throughout the EU territory seeks to correct this territorial imbalance.

The chapter is structured in three principal parts. The first part examines the content of the EU Treaties, from the Treaty of Rome (1957) up until the Treaty establishing a Constitution for Europe (2004), with particular regard to the changing legislative emphasis on aspects of cohesion, making reference as well to the evolving Lisbon process. The second part evaluates the changes within formal European policy guidance through an examination of key documents such as the *European Regional and Spatial Planning Charter* (1983), the *European Spatial Development Perspective* (1999) in both its draft and final forms and the *Territorial Agenda of the European Union* (2007b). The progress on achieving cohesion, in its varying forms, is dealt with in the third part.

[316] Treaty of accession signed 25 April 2005, entering into force on 1 January 2007, OJ L 157 dated 21 June 2005

6.1. European Treaties

6.1.1. Treaty establishing the European Economic Community (Treaty of Rome) (1957)[317]

The first attempts towards the formation of a Europe-wide body at a higher territorial scale than that of national states in the aftermath of the Second World War were carried out through the creation of the European Coal and Steel Community (ECSC) in 1952. The objective of this body, through the pooling of Franco-German coal and steel production, was to strengthen Franco-German solidarity, put paid to the war period and enable the move towards European integration. The six participating Member States, France, Germany, Italy, Belgium, Luxembourg and the Netherlands agreed to relinquish part of their sovereignty in favour of the Community.

In the mid-1950s, a committee was set up under the Presidency of Paul-Henri Spaak, the Belgian Minister of Foreign Affairs, to consider the creation of a European common market. The two proposals of the said committee lay in the creation of a general common market and an atomic energy community. The signing of the "Treaties of Rome" in March 1957[318] demonstrated the joint commitment of Belgium, the Federal Republic of Germany, France, Italy, Luxembourg and The Netherlands for the establishment of a European Economic Community (EEC) as well as the European Atomic Energy Community (EURATOM). The purpose of the EEC, as set out in Article 2 of the *Treaty establishing the European Economic Community*, lay in the establishment of a "common market and progressively approximating the economic policies of Member States, to promote throughout the Community a harmonious development of economic activities, a continuous and balanced expansion, an increase in stability, an accelerated raising of the standard of living and closer relations between the states belonging to it." In order to achieve these objectives, Article 3 of the Treaty made reference to the elimination of customs duties; the establishment of a common customs tariff and a common commercial policy towards third countries; the abolition of obstacles to the freedom of movement for people, services and capital between the Member States; the adoption of common policies in agriculture and transport; the institution of a system to avoid the distortion of competition; procedures for co-ordinating the economic policies of Member States and remedying disequilibria in their balance of payments; the approximation of the laws of the Member States to ensure the

[317] Treaty signed 25 March 1957, entering into force on 1 January 1958, not published in the Official Journal. (See http://eur-lex.europa.eu/en/treaties/index.htm#founding)
[318] 50 years celebrated with the Berlin Declaration of March 2007

proper functioning of the common market; the creation of a *European Social Fund*; the creation of a *European Investment Bank*; and finally the association of the overseas countries and territories to enable increased trade and the joint promotion of economic and social benefit.

6.1.2. Merger Treaty (1965)[319]

This Treaty, signed in Brussels, replaced the hitherto three existing Councils of Ministers (EEC, ECSC and EURATOM) and the two existing Commissions (EEC and EURATOM) with just one single Council and a single Commission. The creation of the Council and the Commission coincided with the institution of a single operative budget.

6.1.3. Single European Act (1986)[320]

The Single European Act, in the wake of the Treaties of Accession of the United Kingdom, Ireland and Denmark in 1972[321]; Greece in 1979[322]; and Spain and Portugal in 1985[323], represented the first overall reform of the former Treaties. It was important for setting the objectives of achieving the Single European Market (SEM) by 1992 (Articles 13-19) and from the point of view of the addressing the issue of economic and social cohesion (Sub-section IV – Economic and social cohesion).

Article 23 of the Act stipulated the addition of a Title V to Part Three of the EEC Treaty, on Economic and Social Cohesion. Article 130A of the Treaty would read:

> In order to promote its overall development, the Community shall develop and pursue its actions leading to the strengthening of its economic and social cohesion.
>
> In particular the Community shall aim at reducing disparities between the various regions and the backwardness of the least-favoured regions.

[319] Treaty signed 8 April 1965, entering into force on 1 July 1967, OJ 152 dated 13 July 1967
[320] Treaty signed 28 February 1986, entering into force on 1 July 1987, OJ L 169 dated 29 June 1987
[321] Treaty of accession signed 22 January 1972, entering into force on 1 January 1973, OJ L 73 dated 27 March 1972
[322] Treaty of accession signed 28 May 1979, entering into force on 1 January 1981, OJ L 291 dated 19 November 1979
[323] Treaty of accession signed 12 June 1985, entering into force 1 January 1986, OJ L 302 dated 15 November 1985

Article 130b went on to state:

> Members shall conduct their economic policies, and shall coordinate them, in such a way as, in addition, to attain the objectives set out in Article 130a. The implementation of the common policies and of the internal market shall take into account the objectives set out in Article 130a and in Article 130c and shall contribute to their achievement. The Community shall support the achievement of these objectives by the action it takes through the structural Funds (European Agricultural Guidance and Guarantee Fund, Guidance Section, European Social Fund, European Regional Development Fund), the European Investment Bank and the other existing financial instruments.

Clearly it was the incorporation of Ireland, Greece, Spain and Portugal into the Community and the recognition of the then divide between their levels of socioeconomic development and those of the other Member States, which contributed to the need for the elaboration of cohesion policy.

6.1.4. Treaty on European Union (Maastricht Treaty) (1992)[324]

The Maastricht Treaty went beyond the stages of merely furthering economic integration, to the extent of paving the way for political integration. This was crucial in the wake of the demise of the political divide between Western and Eastern Europe which had been present since the end of the Second World War. The political dimensions of the Community were expressed in the Maastricht Treaty through the objectives of strengthening the democratic legitimacy of the institutions; improving the effectiveness of the institutions, establishing economic and monetary union; developing the Community social dimension; and lastly establishing a common foreign and security policy.

The Treaty itself created the European Union, comprising the three pillars of the European Communities (the European Community (EC as distinct from the European Economic Community (EEC)), the European Coal and Steel Community (ECSC) and EURATOM); common foreign and security policy (CFSP); and cooperation in the field of justice and home affairs (JHA).

The importance of the regional dimension was recognised through the creation of the Committee of the Regions and enabling the Committee to have an advisory role.

[324] Treaty signed 7 February 1992, entering into force on 1 November 1993, OJ C 191 dated 29 July 1992

In policy terms the Treaty established six new areas encompassing trans-European networks; industrial policy; consumer protection; education and vocational training; youth and culture.

Articles 129b, 129c and 129d of Title XII (Trans-European Networks) sought to promote interconnection and interoperability of national networks as well as access to such networks, in the areas of transport, telecommunications and energy infrastructures, as a means of helping to maximise the benefits deriving from an area without internal frontiers. The special needs of linking island, landlocked and peripheral regions with the central regions of the Community were identified.

The provisions of Title XIV of the Treaty, addressing the issue of economic and social cohesion, provided the legal basis for consolidating and further developing the Community's action in this field, as well as the creation of the Cohesion Fund itself. From a spatial planning perspective, the Treaty contained revisions to the concepts of economic and social cohesion within Articles 130a-130e, first addressed in the 1986 Single European Act. Article 130a of the Treaty on European Union stated:

> In order to promote its overall harmonious development, the Community shall develop and pursue its actions leading to the strengthening of its economic and social cohesion.
>
> In particular, the Community shall aim at reducing disparities between the levels of development of the various regions and the backwardness of the least favoured regions, including rural areas.

The Treaty placed emphasis on the aspect of *harmonious* development, as well as the *levels of development* between the regions, identifying *rural areas* as requiring special attention.

Article 130B introduced the requirement for the preparation of progress reports towards the achievement of economic and social cohesion on a three yearly basis.

> (…) The Commission shall submit a report to the European Parliament, the Council, the Economic and Social Committee and the Committee of the Regions every three years on the progress made towards achieving economic and social cohesion and on the manner in which the various means provided for in this Article have contributed to it. This report shall, if necessary, be accompanied by appropriate proposals. (…)

However it was Article 130d of the Treaty which specifically addressed the establishment of the Cohesion Fund:

(…) The Council, acting in accordance with the same procedure, shall before 31 December 1993 set up a Cohesion Fund to provide a financial contribution to projects in the fields of environment and trans-European networks in the area of transport infrastructure.

6.1.5 Treaty of Amsterdam (1997)[325]

The signing of the Amsterdam Treaty in 1997 represented the culmination of negotiations and agreement between the Member States, as formally required in the former Article N of the Treaty on European Union, addressing issues such as the rapid evolution of the international situation, the globalisation of the economy and its impact upon employment, the fight against terrorism, international crime, ecological problems and threats to public health.

Articles 158-162 reiterated the concept of economic and social cohesion. Article 158 stated:

> In order to promote its overall harmonious development, the Community shall develop and pursue its actions leading to the strengthening of its economic and social cohesion.
>
> In particular, the Community shall aim at reducing disparities between the levels of development of the various regions and the backwardness of the least favoured regions or islands, including rural areas.

thereby including the islands as being areas requiring special attention.

6.1.6 Treaty of Nice (2001)[326]

The Treaty of Nice represented the culmination of some 11 months of negotiations that took place within the context of an Intergovernmental Conference which opened in February 2000 and came into force in 2003. The Treaty largely addressed administrative issues which had not been resolved within the Treaty of Amsterdam, with regard to enlargement by revising the Treaties in terms of the size and composition of the Commission; the weighting of votes in the Council; the extension of qualified-majority voting; and finally enhanced cooperation.

[325] Treaty signed 2 October 1997, entering into force on 1 May 1999, OJ C 340 dated 10 November 1997
[326] Treaty signed 26 February 2001, entering into force on 1 February 2003, OJ C 80 dated 10 March 2001

6.1.7. Lisbon (2000) and Gothenburg (2001) Strategies

It is of vital importance to make reference to the EU's current policy objective of 'competitiveness' at the local and regional levels, and to place it in the context with which it arose, albeit that this was not through a Treaty. The need for competitiveness is argued as fundamental to permit the EU to meet crucial challenges, such as the augmented socio-economic disparities resulting from the last two enlargements, the economic restructuring provoked through globalisation, the technological revolution, the expansion of the knowledge-based economy and society, the ageing of the population and the increased immigration.

A broad strategy was adopted at the European Council meetings in Lisbon (2000) and Gothenburg (2001) aimed at increasing the competitiveness of the EU and achieving sustainable growth.

The Presidency Conclusions from the special meeting of the European Council held in Lisbon on 23-24 March 2000 stated the following:

> "5. The Union has today set itself a *new strategic goal* for the next decade: *to become the most competitive and dynamic knowledge-based economy in the world, capable of sustainable economic growth with more and better jobs and greater social cohesion*. Achieving this goal requires an *overall strategy* aimed at:
>
> - preparing the transition to a knowledge-based economy and society by better policies for the information society and R&D, as well as by stepping up the process of structural reform for competitiveness and innovation and by completing the internal market;
>
> - modernising the European social model, investing in people and combating social exclusion;
>
> - sustaining the healthy economic outlook and favourable growth prospects by applying an appropriate macro-economic policy mix" (CEC, 2000).

However the clear absence of any mention of the term 'environmental', together with the publication of the Communication from the Commission concerning a strategy for sustainable development (CEC, 2001a) led to an amendment of the Lisbon Strategy within the context of the special meeting of the European Council held in Gothenburg on 15-16 June 2001. The Presidency Conclusions from this meeting stated (*inter alia*):

> "1. The European Council met in Göteborg on 15 and 16 June to issue political guidance for the Union. It:
>
> (…)
> − agreed on a strategy for sustainable development and added an environmental dimension to the Lisbon process for employment, economic reform and social cohesion;
> (…)" (CEC, 2001b).

As a consequence, in addition to the economic and social reforms contained within the Lisbon Strategy, the Gothenburg amendment accorded it the environmental dimension.

6.1.8. Treaty establishing a Constitution for Europe (2004)[327]

The Treaty establishing a Constitution for Europe (2004), encompassing the final stage in the process of institutional reform of the European Union as initiated by the Treaty of Nice, was proposed on the misconception that it would be ratified by all the Member States. The Treaty was signed in Rome on 29th October 2004, after the accession of the Czech Republic, Estonia, Cyprus, Latvia, Lithuania, Hungary, Malta, Poland, Slovenia and Slovakia[328] thereby forming the EU25, with the expectation of ratification over the two following years thereby enabling its adoption before the end of 2006. The negative referendum results for France and The Netherlands have resulted in a kind of stalemate situation. To enter into force, the Treaty establishing a Constitution for Europe must be ratified by all the Member States, in accordance with each one's constitutional rules.

Despite the current "in-limbo" situation of the Treaty, it is nevertheless of interest to examine on the basis of it representing the Commission's most up-to-date statement regarding the theme of cohesion and in particular for the fact that for the first time the *territorial* aspect of cohesion appears alongside those of the *economic* and *social* aspects.

Article I-3 of Part I Title I (Definition and objectives of the Union) sets out the Union's objectives:

> 1. The Union's aim is to promote peace, its values and the well-being of its peoples.

[327] Treaty signed 29 October 2004, pending entry into force, OJ C 310 dated 16 December 2004
[328] OJ l 236 dated 23 September 2003

2. The Union shall offer its citizens an area of freedom, security and justice without internal frontiers, and an internal market where competition is free and undistorted.

3. The Union shall work for the sustainable development of Europe based on balanced economic growth and price stability, a highly competitive social market economy, aiming at full employment and social progress, and a high level of protection and improvement of the quality of the environment. It shall promote scientific and technological advance.

It shall combat social exclusion and discrimination, and shall promote social justice and protection, equality between women and men, solidarity between generations and protection of the rights of the child.

It shall promote economic, social and territorial cohesion, and solidarity among Member States.

It shall respect its rich cultural and linguistic diversity, and shall ensure that Europe's cultural heritage is safeguarded and enhanced.

4. In its relations with the wider world, the Union shall uphold and promote its values and interests. It shall contribute to peace, security, the sustainable development of the Earth, solidarity and mutual respect among peoples, free and fair trade, eradication of poverty and the protection of human rights, in particular the rights of the child, as well as to the strict observance and the development of international law, including respect for the principles of the United Nations Charter.

5. The Union shall pursue its objectives by appropriate means commensurate with the competences which are conferred upon it in the Constitution.

Section 3 of Chapter III of Title III of Part III of the Constitution contains the provisions for economic, social and territorial cohesion. Article III-220 reaffirms the content of Article 158 of the Treaty of Amsterdam (1997):

In order to promote its overall harmonious development, the Union shall develop and pursue its action leading to the strengthening of its economic, social and territorial cohesion.

In particular, the Union shall aim at reducing disparities between the levels of development of the various regions and the backwardness of the least favoured regions.

Among the regions concerned, particular attention shall be paid to rural areas, areas affected by industrial transition, and regions which suffer from severe and permanent natural or demographic handicaps such as the northernmost regions with very low population density and island, cross-border and mountain regions.

In addition to placing equal importance on the ‘territorial’ considerations of cohesion, Article III-220 provides greater detail of the characteristics of the types of regions in

need, such as those suffering the effects of industrial transition, those with natural or demographic handicaps, the northernmost regions where the population density is very low, as well as cross-border and mountain regions.

Articles III-221, III-222, III-223 and III-224 of the Constitution expand upon the instruments for contributing towards the reduction of the overall regional disparities, such as the Structural Funds[329], European Investment Bank and other financial instruments; and the Cohesion Fund.

Furthermore the 'Protocol on Economic, Social and Territorial Cohesion' of the Treaty states clearly that:

> The Member States reaffirm that the promotion of economic, social and territorial cohesion is vital to the full development and enduring success of the Union.

Other references to the aspects of territorial cohesion can be found in Article I-14, 2. (c) (Areas of shared competence); Article II-96 (Access to services of general economic interest); and Part III (The policies and functioning of the Union) Title I (Provisions of general application).

6.1.9. Growth and jobs and the revitalisation of the Lisbon Agenda (2005)

At the mid-term review of the Lisbon Agenda in 2005, the view was taken that the Strategy was 'not on track to deliver the expected results' (CEC, 2005). In order to preserve the EU's model of sustainable development for the future, the competitiveness of the Union required strengthening, and the economy required being dynamised. In the words of the Commission's President, José Manuel Barroso:

> "Europe must do better. What we are proposing today is to release Europe's tremendous economic potential. This is needed to maintain the European model of society we value so much. This is the foundation for social justice and opportunity for all. Our ambition is undiminished. The overall Lisbon goals were right, but the implementation was poor. The lesson from the last five years is that we must re-focus this agenda to deliver results. With this new strategy, I believe we have the right tools to achieve our goals. The real issue is not about facts and figures on paper. It is about their impact on people's lives: how we pay for our education, pensions, social services and health care. With these proposals, we have

[329] European Agricultural Guidance and Guarantee Fund, Guidance Section; European Social Fund; and European Regional Development Fund.

made tough choices and tough judgements. Our vision is, and remains, sustainable development. The Commission will be undeterred in its push for economic renewal" (CEC, 2005, p. 1).

Faced with the situation of an ageing population within Europe and increased international competition from countries such as China and India, the recommendation was that Europe needed to raise its productivity growth and employ more people. The programme to meet these objectives, focused principally on growth and jobs, comprised three principal areas:

1. Making Europe a more attractive place to invest and work;
2. Knowledge and innovation for growth; and
3. Creating more and better jobs.

These three areas are reflected in other policy documentation from the Commission, which will be examined below in Section 6.3.4 and 6.3.6.

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This historical overview of the basic legislation providing the legal basis of the European Union from 1957 up until the present day indicates the narrowing in the focus of the EU activities. Moreover it introduces from a legislative perspective the increasing importance of the territorial dimension of spatial policy which will be explored further in Section 6.3 (Progress on cohesion).

6.2. Evolution of European Spatial Policy Guidelines

6.2.1. European Regional/Spatial Planning Charter (1983)

At the Conference of European Ministers responsible for Spatial/Regional Planning held in Torremolinos in May 1983[330], under the auspices of the Council of Europe, the said Ministers agreed upon the adoption of a 'Charter on regional and spatial planning' at the wider European level (CEMAT, 1983). This Charter marked a landmark in terms of European spatial policy, in the sense of its representing for the first time an explicit expression on the part of different European countries with representation on the Council[331] of the need for an institutional framework of spatial policy capable of interpretation at all levels of the public administration and by the citizens of Europe at large.

The Charter identifies the concept of regional/spatial planning, its European dimension, its characteristics and its operation. A series of fundamental objectives or basic principles are set out, in order to achieve a balanced socio-economic development of the regions; an improvement of the quality of life; a responsible management of natural resources and protection of the environment; and a rational use of land.

In the pursuit of regional/spatial planning, the Charter recognises that the achievement of these objectives is a political matter, through seeking the coordination between the different sectors involved, and facilitating the coordination and cooperation between all levels of the public decision making(local, regional, national and European). The requirement for and importance of public participation is highlighted.

The specific objectives of regional/spatial planning are reiterated in terms of the needs and opportunities at different spatial scales and geographical areas: rural areas; urban areas; frontier areas; mountain areas; regions with clear structural weaknesses; regions in decline; and finally coastal areas and islands. The Charter states explicitly that:

> "Urban areas contribute greatly to the development of Europe and usually present the problem of controlling their growth.
>
> A balanced urban structure requires the systematic implementation of plans for land use and the application of guidelines for the development of

[330] Under the conference theme 'Prospects of development and of spatial planning in maritime regions'.
[331] The Council of Europe Member States and signatories to the said Charter included Belgium, Denmark, France, Greece, Ireland, Italy, Luxembourg, Netherlands, Norway, Sweden, Turkey, United Kingdom, Germany, Iceland, Austria, Cyprus, Switzerland, Malta, Portugal, Spain and Liechtenstein.

economic activities for the benefit of the living conditions of town dwellers" (CEMAT, 1983).

The reference to the "balanced urban structure" is interesting in that it forms a key element of the spatial policy objectives later developed within the European Spatial Development Perspective (ESDP).

A full text of the Charter is contained in Appendix 4.

6.2.2. Background to the *European Spatial Development Perspective*

The Single European Act (1987) as well as the steps leading towards the Single European Market (1992) increased European concerns relating to models of regional development. The then Directorate General for Regional Policy and Cohesion[332] started to play an important role in advancing the understanding of spatial planning.

In 1991 the Committee of Spatial Development had been established, which brought together Ministers of Spatial Development of the member states. Also in 1991, the Dutch National Agency of Physical Planning published a report which developed the concept of supranational spatial planning, suggesting that state or national planning needed to take this dimension into account. The Treaty of Maastricht (1992) consciously introduced the idea of developing transport infrastructure at the European scale, through the Trans-European Networks of Transport (TENs).

In 1991 the European Commission published a study entitled *Europe 2000: Prospects for the development of the European territory* (CEC, 1991). This study analysed the pressures on the European territory arising from socioeconomic developments, as well as from regional, state and community interventions. *Europe 2000* identified two main regions of growth. These regions were the Northwest of Europe and the "north of the South", a belt that spread from the Northeast of Spain to the North of Italy and the South of Germany. This report emphasised the need for the balanced and harmonious development of the community territory.

The meeting of the (Informal) Council of Ministers responsible for Regional/Spatial Planning, which took place in Leipzig in 1994 adopted three fundamental strategic objectives for the European territory:

[332] Now simply Directorate General for Regional Policy (http://ec.europa.eu/regional_policy/index_en.htm)

i) economic and social cohesion
ii) sustainable development
iii) the strengthening of the coherence of the European continent

Three key principals were also agreed:

i) a more balanced and polycentric urban system
ii) parity of access to infrastructure and knowledge
iii) wise management and sustainable development of European natural and cultural heritage

The Leipzig Council instructed the Committee of Spatial Development to prepare a draft version of what would later become the European Spatial Development Perspective. The Council accepted a proposal of the Commission regarding the creation of a network of spatial planning research centres which would form a European Observatory of spatial planning and change, which was the origin of the European Spatial Planning Observation Network (ESPON).

A follow-up study to *Europe 2000* was published in 1994 - *Europe 2000+: Cooperation for the development of territorial ordering* (CEC, 1994). This study updated and extended the analysis of *Europe 2000*, and highlighted the need for the cooperation in the area of the spatial planning throughout the European territory.

Over the same period, a number of prospective studies were undertaken by the Commission, relating to different spatial territories and configurations within the European territory. Of particular relevance is one which addressed the Western Mediterranean (CEC, 1995), which examined this spatial territory in greater detail than the broader terms in which it had discussed within *Europe 2000+* (CEC, 1994).

As from 1993, preparatory work was undertaken to develop a document with a spatial and territorial strategy, directed towards the application of common objectives in aspects of spatial development. This strategy - the *European Spatial Development Perspective* (ESDP) (CEC, 1999) was finally approved in May 1999, at the Potsdam Informal Council of Ministers responsible for Spatial Development. The ESPD is not legally binding – rather it represents a commonly agreed intergovernmental framework of policy guidance for issues of spatial development across Europe.

6.2.3. *European Spatial Development Perspective* (ESPD) (1999)

Prior to examining the policy content of the ESPD, it is considered relevant to refer to the draft version of the said ESPD (CEC, 1997a), in order to highlight some specific characteristics of the Spanish metropolitan system, as it was viewed at that time. Clearly these observation need to be interpreted in the context of the 1990s. For example, the draft document identifies Barcelona as a regional centre in a process of change, emerging as a metropolis of Southern Europe (p. 18). Madrid is represented as an urban area of international standing (p. 19). The draft document highlights two important axis of development – namely that of Lisbon-Madrid-Barcelona-la Valle del Ródano, as well as Madrid-Bordeaux-Toulouse (p. 72). Valencia and Sevilla, together with Porto in Portugal, were represented as peripheral cities, with a weaker urban function, but where strategies of innovative development could be perceived (p.19).

Consequently each of these metropolitan urban regions could be seen in processes of change, some of which were suffering due to the question of their peripheral location, but with opportunities capable of contributing to their integration with the rest of the EU.

In its final version, the ESPD seeks to proportion a shared vision for the future development of the EU. It represents a general framework of reference, for effective spatial measures and proportions a vision for public decision making, in order to contribute to the formulation of policies and actions. The ESPD presents an analysis of the tendencies in European spatial planning, contains an agreement concerning the intentions and objectives for the EU territory, and refers to the possibilities for the application of these.

The ESPD seeks to proportion a shared vision for the future fabric of development in the European Union. It represents a general framework for effective spatial measures and proportions a vision for public and private decision making to assist in the formulation of their policies and actions. The ESPD will help to find the correct manner for the integration of different structures and their European territorial requirements in policy and – according to the existing responsibilities – to interrelate the tasks of different administrations.

The ESPD (CEC, 1999) is structured in two parts. The first part – *Achieving the balanced and sustainable development of the territory of the UE: the contribution of the spatial development policy* – sets out the criteria for spatial planning; while the second

part - *The territory of the UE: trends, opportunities and challenge*s - offers an analysis of a number of different aspects of territorial development of importance at the European scale. In this way the ESPD analyses trends in European spatial planning, contains an agreement for the policy objectives of the EU territory, and makes reference to its application.

The ESPD offers a detailed description of the European territory, of the European situation at the time (mid to late 1990s), as well as of the trends, perspectives and challenges to be faced to the following years. However, this description was not restricted to the spatial territory of the EU15, as an entire chapter was devoted to the then ‘candidate countries’ of the subsequent enlargement, which was presented as "an additional challenge for European spatial development policy" (CEC, 1999, Part A. Section 5).

The ESPD highlights the economic imbalances that hinder the realisation of a balanced, as well as sustainable, regional and territorial development. For example the economic power of the central zone of the EU is emphasised, especially the zone of the so-called 'pentagon', consisting of the land lying between the metropolises of London, Paris, Milan, Munich and Hamburg, where at that time 50% of the European GDP was produced but where only 40% of the community population was found, in an area that occupied 20% of the spatial territory of the EU15. This zone was seen as the only zone of global economic integration in Europe. The absence of other zones of outstanding growth in Europe at the time was seen as representing a disadvantage compared with other strong economic commercial blocs, such as the United States. Therefore, the ESPD considered the creation of new zones of economic importance as a necessity for the future competitiveness of the EU.

The ESPD raises similar concerns in relation to the subject of social cohesion. Along the southern limits of the EU, from Portugal stretching across the south of Spain, the south of Italy and up until Greece, as well as the new German Länder, the GDP per capita stood at approximately 50% and 65% of the European average. Although this difference was in a process of gradual decrease, the regional disparities nevertheless were high and moreover, the forecast at the time was that they would grow after the enlargement of the UE towards the east of Europe, programmed for 2004.

These disparities contributed to a representation of the European territory based upon the dichotomy of the core-periphery territorial model, where one found a prosperous

and dynamic core, contrasting with an underdeveloped and geographically remote periphery.

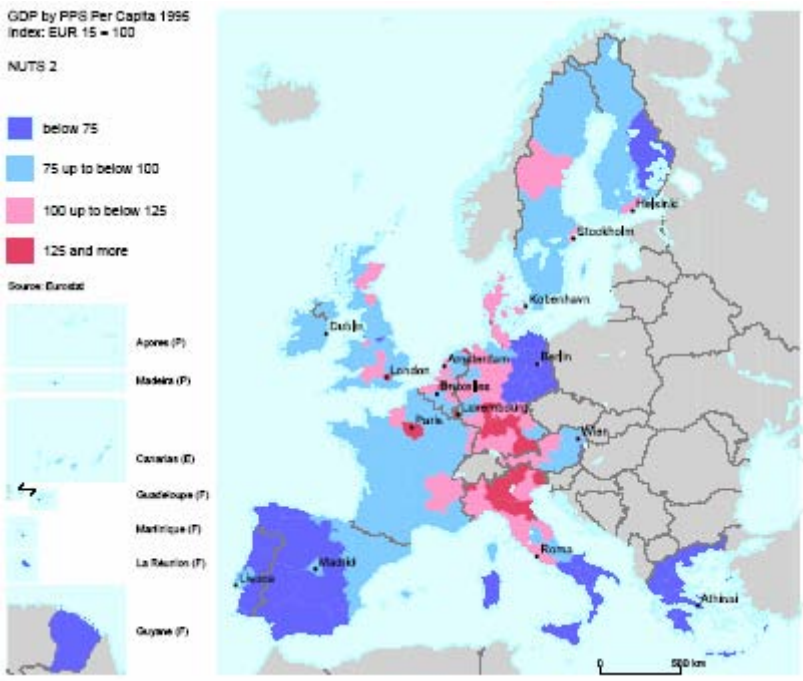

Figure 6.1. GDP of the EU15 in 1995[333]

Considering these regional disparities, according to the ESDP all those actively involved in spatial development needed to be conscious of spatial development policy guidelines. Furthermore:

> "The European Spatial Development Perspective is based on the EU aim of achieving a balanced and sustainable development, in particular by strengthening economic and social cohesion. In accordance with the definition laid down in the United Nations Brundtland Report, sustainable development covers not only environmentally sound economic development which preserves present resources for use by future generations but also includes a balanced spatial development. This means, in particular, reconciling the social and economic claims for spatial development with the area's ecological and cultural functions and, hence, contributing to a sustainable, and at larger scale, balanced territorial development. The EU will therefore gradually develop, in line with safeguarding regional diversity, from an Economic Union into an Environmental Union and into a Social Union" (CEC, 1999, par. 17).

This was reflected in the triangle of objectives, connecting the three basic goals of European policy:

1. economic and social cohesion

[333] CEC (1999), p. 8

2. conservation of natural resources and cultural heritage
3. more balanced competitiveness of the European territory

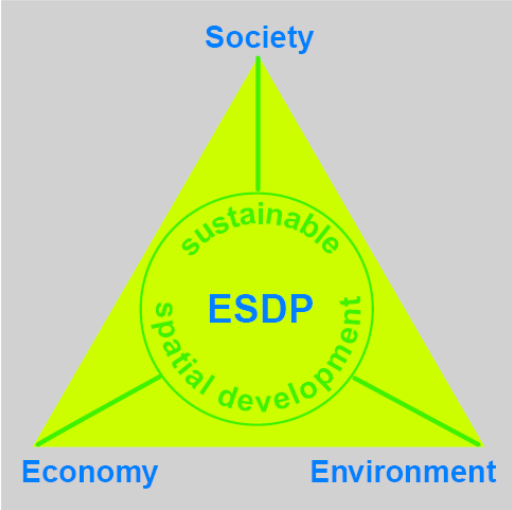

Figure 6.2. Triangle of objectives: a balanced and sustainable spatial development[334]

Part Three of the ESDP addresses the Policy Aims and Options for the European Territory. In broad terms these involve the establishment of a polycentric and balanced urban system (Section 3.2)[335], the promotion of integrated transport and communications contributing to the parity of access to infrastructure and knowledge throughout the whole EU (Section 3.3)[336], and the development and conservation of the natural and cultural heritage (Section 3.4)[337]. Of these three broad development issues it is the first two which are of prime importance for the purposes of the thesis.

6.2.3.1. Polycentric spatial development

At that time the core area was the only dynamic European area of economic integration within the world economy. With the exception of certain isolated islands of significant growth, including Barcelona and the Øresund Region, in and around Copenhagen (Denmark) and Malmö (Sweden), there was a continuing concentration of the highly performing global functions within the core area, lying between London, Paris, Milan, Munich and Hamburg.

[334] CEC (1999) p. 8
[335] 3.2 Polycentric Spatial Development and a New Urban-Rural Relationship; 3.2.1 Polycentric and Balanced Spatial Development in the EU; 3.2.2 Dynamic, Attractive and Competitive Cities and Urbanised Regions; 3.2.3 Indigenous Development, Diverse and Productive Rural Areas; and 3.2.4 Urban-Rural Partnership.
[336] 3.3 Parity of Access to Infrastructure and Knowledge; 3.3.1 An Integrated Approach for Improved Transport Links and Access to Knowledge; 3.3.2 Polycentric Development Model: A Basis for Better Accessibility; 3.3.3 Efficient and Sustainable Use of the Infrastructure; and 3.3.4 Diffusion of Innovation and Knowledge.
[337] 3.4 Wise Management of the Natural and Cultural Heritage; 3.4.1 Natural and Cultural Heritage as a Development Asset; 3.4.2 Preservation and Development of the Natural Heritage; 3.4.3 Water Resource Management - a Special Challenge for Spatial Development; 3.4.4 Creative Management of Cultural Landscapes; and 3.4.5 Creative Management of the Cultural Heritage.

Taking into consideration the then pending enlargement of the EU and the increasing integration of the national economies into the SEM and the world economy, it was recommended that the polycentric model would allow for the high concentration of population and economic, political and financial power within one single dynamic area to be avoided. The emergence of a relatively decentralised urban structure would contribute towards the potential of all the regions of Europe to be developed and in turn lead to the reduction in the regional disparities.

While in the past the investment had been encouraged in infrastructure links between the peripheries and the core, the spatial and polycentric development process proposed the following aspects:

- Strengthening several larger areas of global economic integration;
- Strengthening a more balanced polycentric system of metropolitan regions, city clusters and city networks;
- Promoting integrated spatial development strategies for city clusters in individual Member States including corresponding rural areas and their small cities and towns;
- Strengthening co-operation in the field of spatial development through cross border and transnational networks; and
- Promoting co-operation at regional, cross-border and transnational level with towns and cities in the countries of Northern, Central and Eastern Europe and the Mediterranean region; strengthening North-South links in Central and Eastern Europe and West-East links in Northern Europe.

According to the ESPD the challenges for the achievement of integrated development strategies for town and urban regions, permitting sustainable development included the following:

- Expanding the strategic role of the metropolitan regions and the gateway cities providing access to the territory of the EU (large ports, intercontinental airports, trade fair and exhibition centres, world-scale cultural centres) paying special attention to the peripheral regions;
- Checking urban expansion by building upon the notion of the ‘compact city’, particularly along coastal areas;
- Improving the economic base by building upon the territory’s potential and establishing innovative, diversified and job-creating economic activities;
- Promoting a mixture of functions and social groups, particularly in the largest urban areas, in order to combat social exclusion and restructure abd reuse areas in crisis and derelict industrial land;
- Prudent management of waste and resources (water, soil and energy) in order to safeguard the natural and cultural heritage and expanding natural areas;
- Increasing the accessibility of areas through the use of efficient and non-polluting transport.

6.2.3.2. Access to infrastructure

The ESDP recognises the importance of transport and telecommunication infrastructure in contributing to meeting the objectives of economic and social cohesion by creating links between areas, and in particular between central and peripheral areas, and between urban centres and the surrounding countryside.

The extension of the TEN needs to be based upon the notion of a polycentric territorial model, prioritising globally important economic areas once identified and paying attention to regions with severe geographical barriers to access and secondary links within regions. Moreover all regions should be able to benefit from access to intercontinental ports and airports.

Increases in passenger and freight transport pose an increasing burden upon the environment and the efficiency of transport systems. An appropriate spatial development policy, based upon public transport in urban areas, intermodal systems and shared infrastructure, would permit an integrated approach to environmental pressures arising from increased mobility, traffic congestion and land use.

Similarly access to knowledge and infrastructure is fundamental in the development of a knowledge-based society. Job markets and firms need dynamic innovation systems, effective technology transfer and the provision of education and training. Access to knowledge and the capacity for innovation are not spread evenly throughout the EU – rather they area concentrated where the economic dynamics are the strongest. Improving the level of education and training among the population of the regions in difficulty, by means of the dissemination of Information and Communication Technologies would contribute to combating these structural imbalances.

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To conclude this overview of the ESDP it is important to reiterate that the document was elaborated in order to for fulfil three principal functions at the European level. That is to tackle the spatial differences of well-being and prosperity (even though the Structural Funds have an important role with this objective of a more balanced development); optimising the entrepreneurial environments through dealing with unemployment, traffic congestion, and threats to the cultural and natural heritage; and

proportioning a spatial framework for the evaluation of the spatial impacts of sectoral policies.

It is also important to remember although the ESDP is a document offering guidance, without any legally binding obligations, it nevertheless proportions a framework of measures to facilitate cooperation in areas of spatial planning across state, regional and local borders. Therefore to a certain extent its success in offering policy guidance rests upon the political will of the member states and regions of the EU to apply the principles contained therein. Furthermore different forms of community funding exist, for example through programmes such as INTERREG, which encourages and facilitates transnational and interregional cooperation.

Polycentricity continues to be one of the key territorial objectives of the European Union. The support given to this policy objective is strong and widespread – for example at the Lisbon Conference of Ministers responsible for Spatial/Regional Planning[338] (CEMAT) held in 2006, the Minister adopted the text of a resolution on '*Polycentric development: promoting competitiveness, enhancing cohesion*'. The endorsement to polycentricity from the CEMAT will be further evidenced in Section 6.2.4.

However the policy discourse is not without its detractors. For example Paul Cheshire remarks that while the pursuit of a polycentric development system is aimed at spatial equity and increasing the competitiveness of Europe's system of cities, there is a paucity of evidence 'to support the view either that it is possible for policy to promote polycentricity or that – were it possible – doing so would make Europe's cities more competitive' (Cheshire, 2006, p. 1,237).

[338] 'Networks for sustainable spatial development of the European continent: Bridges over Europe'

6.2.4. Guiding principles for Sustainable Development of the European Continent (2000) (CEMAT)

The 12th Session of the European Conference of Ministers responsible for Regional Planning (CEMAT)[339], which took place on 7-8 September, 2000, in Hanover agreed a set of guiding principles for sustainable spatial development of the European Continent (CEMAT, 2000). These guiding principles 'stress the territorial dimension of human rights and democracy' and seek to 'define measures of spatial development policy by which people in all the member states of the Council of Europe can achieve an acceptable standard of living'.

The said guiding principles effectively provide support for the development guidance and policy options contained within the ESDP, but within a broad framework of encouraging Europe's economic competitiveness. The tacit acceptance of this policy objective is clear – "in a world subject to growing globalisation, the European continent must maintain its economic position" (CEMAT, 2000, p. 3).

The ten principles of a regionally more balanced development aimed at ensuring sustainable development in Europe comprise the following:

1. Promoting territorial cohesion through a more balanced social and economic development of regions and improved competitiveness
2. Encouraging development generated by urban functions and improving the relationship between town and countryside
3. Promoting more balanced accessibility
4. Developing access to information and knowledge
5. Reducing environmental damage
6. Enhancing and protecting natural resources and the natural heritage
7. Enhancing the cultural heritage as a factor for development
8. Developing energy resources while maintaining safety
9. Encouraging high quality, sustainable tourism
10 Limitation of the impacts of natural disasters

[339] The Council of Europe Member States and signatories to the accord concerning the Guiding principles included Belgium, Denmark, France, Greece, Ireland, Italy, Luxembourg, Netherlands, Norway, Sweden, Turkey, United Kingdom, Germany, Iceland, Austria, Cyprus, Switzerland, Malta, Portugal, Spain, Liechtenstein, San Marino, Finland, Hungary, Poland, Bulgaria, Czech Republic, Estonia, Lithuania, Romania, Slovak Republic, Slovenia, Andorra, Albania, Latvia, Macedonia, Moldova, Ukraine, Croatia, Russian Federation Georgia.

6.2.5. Leipzig Charter on Sustainable European Cities (2007)

The first ever joint Informal Ministerial meeting on Urban Development and Territorial Cohesion took place in Leipzig (Germany) on 24-25 May 2007, in the context of the German Presidency of the European Union. This resulted in the adoption of two key policy documents: the *Leipzig Charter on Sustainable European Cities* (CEC, 2007a) and the *Territorial Agenda of the European Union* (CEC, 2007b) the latter of which will be addressed in Section 6.2.6.

Both documents were essentially political statements from the Ministers in support of the spatial planning and territorial cohesion, and integrated urban development, within the overall context of European competitiveness, but are nevertheless important as they explicitly express the Ministers' current joint positions regarding sustainable cities within Europe and integrated spatial development.

The *Leipzig Charter* contains two broad recommendations:

1. Making greater use of integrated urban development policy approaches, recognising the importance of strategies for action by means of:
i) creating and ensuring high-quality public spaces;
ii) monitoring infrastructure and improving energy efficiency; and
iii) proactive innovation and educational policies

2. That special attention is paid to deprived neighbourhoods within the context of the city as a whole, again proposing the following strategies with regard to such deprived neighbourhoods:
i) pursuing strategies for upgrading the physical environment;
ii) strengthening the local economy and local labour market policy;
iii) proactive education and training policies for children and young people; and
iv) promotion of efficient and affordable urban transport.

6.2.6. Territorial Agenda of the European Union (2007)

The same Informal Ministerial meeting on Urban Development and Territorial Cohesion which took place in Leipzig (Germany) on 24-25 May 2007, adopted the *Territorial Agenda of the European Union, Towards a more competitive and sustainable Europe of diverse regions* (CEC, 2007b). This short eight paged policy paper (see Appendix 4) contains recommendations for integrated spatial development policy aims, through mobilising the potentials of European regions and cities for sustainable economic growth and more jobs (cf. revitalised Lisbon Agenda (2005) discussed in Section 6.1.9). The Agenda clearly recognises that Europe's competitiveness in the world will additionally be strengthened by drawing upon its territorial diversity in better and more innovative ways.

The *Territorial Agenda* is structured around four principal sections:

1. The future task of strengthening territorial cohesion;
2. The new challenges of strengthening regional identities and making better use of territorial diversity;
3. Setting out territorial priorities for the development of the EU; and
4. The implementation of the Territorial Agenda itself.

The six *territorial priorities* addressed within the third section are as follows:

i. the objective of strengthening polycentric development and innovation through networking of city regions and cities;

ii. the need for new forms of partnership and territorial governance between rural and urban areas;

iii. the desire to promote clusters of competition and innovation in Europe;

iv. the commitment to the strengthening and extension of Trans-European Networks

v. the commitment to Trans-European Risk Management including the aspects of climate change; and

vi. the requirement for strengthening ecological structures and cultural resources as the added value for development.

These broad priorities come as no surprise in the context of other policy statements[340], but what is of perhaps more interest is that the overall content of the *Territorial Agenda* was based upon a background document entitled *The territorial state and perspectives of the European Union, Towards a stronger European territorial cohesion in the light of the Lisbon and Gothenburg ambitions* (CEC, 2007c). This document effectively represents an implicit up-dating of the ESDP (CEC, 1999) and has been carried out drawing upon the content of the *Interim Territorial Cohesion Report* (CEC, 2004a) in light of the results coming out of the multiplicity of projects funded by the ESPON Programme. On this basis Faludi (2007) suggests the elaboration of this background document falls within what can realistically be termed 'evidence-based planning'.

What is of interest with the *Territorial state and perspectives* document is that the different analyses assessing the 'state', through the examination of the potential of territorial diversity for the EU and the impact of EU policies on territorial development, are all followed by a series of succinct 'observations for policy considerations' presented as the development of future 'perspectives'. Furthermore the somewhat 'watered-down' territorial priorities of the Territorial Agenda (CEC, 2007b) are expressed in the background document with much greater precision and clarity. These six *priorities for strengthening the structure of EU territory* (Part C, Section 4) are listed as:

> 4.1. Promoting a territorial policy for metropolitan regions, cities and other urban areas in a polycentric pattern as motors of Europe's development;
>
> 4.2. Strengthening urban-rural partnerships and ensuring a sufficient level of public services for balanced territorial development;
>
> 4.3. Promoting (trans-)national clusters of competitive and innovative activities;
>
> 4.4 Strengthening the main Trans-European Transport, ICT and energy networks to connect poles in the EU and their links to secondary networks;
>
> 4.5. Promoting Trans-European technological and natural risk management, including integrated development of coastal zones, maritime basins, river basins and mountain areas; and
>
> 4.6 Strengthening the main Trans-European ecological structures and cultural resources.

The pursuit of the first of these priorities is of critical importance in the context of this thesis. However in light of the structure of the thesis and in particular the content of

[340] For example most notably the ESDP (CEC, 1999); and as will be seen in Section 6.3.4 the Commission's Communication on *Cohesion policy and cities* (CEC, 2006a) as well as the Community Strategic Guidelines on Cohesion 2007-2013 (CEC, 2006c).

what is to follow within Chapters 7 (*European urban system*) and 8 (*European space of air passenger flows*), the discussion of the policy for metropolitan regions should be postponed until Chapter 9 (*Madrid and Barcelona within the European metropolitan hierarchy*).

6.3. Progress on cohesion

From Section 6.1 of this chapter it will be recalled that under the terms of Article 130D of the Treaty on European Union (1992)[341], the Cohesion Fund was set up in 1993 to provide financial help for projects in the fields of the environment and transport infrastructure. Finance from the Fund was directed to the four poorer of the then EU12 Community countries (Ireland, Greece, Spain and Portugal), with the aim the aim being to reduce the disparities between EU members' economies. Furthermore Article 130B required the preparation of reports on the progress towards cohesion on a three yearly basis. An overview of the four reports prepared under this requirement will indicate the evolving achievement of economic (and social) cohesion across the EU15 countries, the problems faced through the incorporation of the countries incorporated to form the EU27 bloc and the increasing importance placed on aspects of *territorial* cohesion.

6.3.1. First report on economic and social cohesion (1996)

The *First Report from the Commission on economic and social cohesion* (CEC, 1996) was prepared in 1996. This discussed the notion of cohesion (Chapter 1); recent trends in the convergence process and cohesion (Chapter 2); an overview of Member State policies and cohesion (Chapter 3); the policies of the EU (Chapter 4); Community structural policies and cohesion (Chapter 5); ways forward (Chapter 6); and closed with a series of conclusions (Chapter 7).

This first such report was concerned principally with the economic aspects of cohesion and convergence, though the report itself cautioned of the limits and risks of the measurement in the context of quantifying trends and policy impacts. The need was pointed out to avoid the reduction of the wider political aims of the EU to a debate on the relative merits of different macro- and microeconomic policies.

> "The Union's political goals of solidarity, mutual support and cohesion may be pursued through largely economic means, but (…) these goals, nevertheless, remain the irreducible ambitions which structure European society and help to determine its sense of identity" (CEC, 1996, p.14).

Furthermore the report indicated that 'negative convergence' needed to be avoided. Cohesion was concerned with increasing opportunities for the disadvantaged regions and social groups, and did not imply a reduction in employment or economic growth for

mothers. Economic convergence had to be seen as a means to an end, contributing towards widening opportunities and raising living standards and the quality of life in general. Cohesion should raise awareness of the need for sustainable development and for a long-term view over the use of natural resources.

The comparison of the economic and social conditions between the 15 Member States clearly highlighted Spain's poor performance as one of the cohesion four in the early 1990s, with particular regard to GDP per capita (see Figure 6.3), unemployment, employment in services and labour force participation of women, to name a few. From Figure 6.3 it can be appreciated that in the early 1990s, few parts of Spain had GDP per capita at a level above the average of the EU, with the exceptions being the regions of Madrid, Cataluña and Navarra.

6.3.2. Second report on economic and social cohesion (2001)

The second cohesion report was prepared in 2000 and adopted by the European Commission on 31 January 2001. The first noticeable contrast with the first cohesion report is that the second report – *Second report on economic and social cohesion* (CEC, 2001c) had the secondary title of *Unity, solidarity, diversity for Europe, its people and its territory*.

This second report was structured in three parts: Part One addressing the *situation and trends*, and broken down into the then three key elements of cohesion – *economic cohesion* (Section 1.1), *social cohesion* (Section 1.2) and *territorial cohesion* (Section 1.3) – as well as the *factors determining real convergence* (Section 1.4); Part Two discussed the *Contribution of Community Policies to Cohesion*; and finally Part Three concerned *The EU Budget and the Contribution of Structural Policies to Economic and Social Cohesion*.

Section 1.3 of the Second report (*Territorial cohesion: towards a more balanced development*) addressed the issue of territorial cohesion in the context of urban areas, rural areas, border regions and areas with specific geographical features.

[341] OJ C 224, dated 31 August 1992

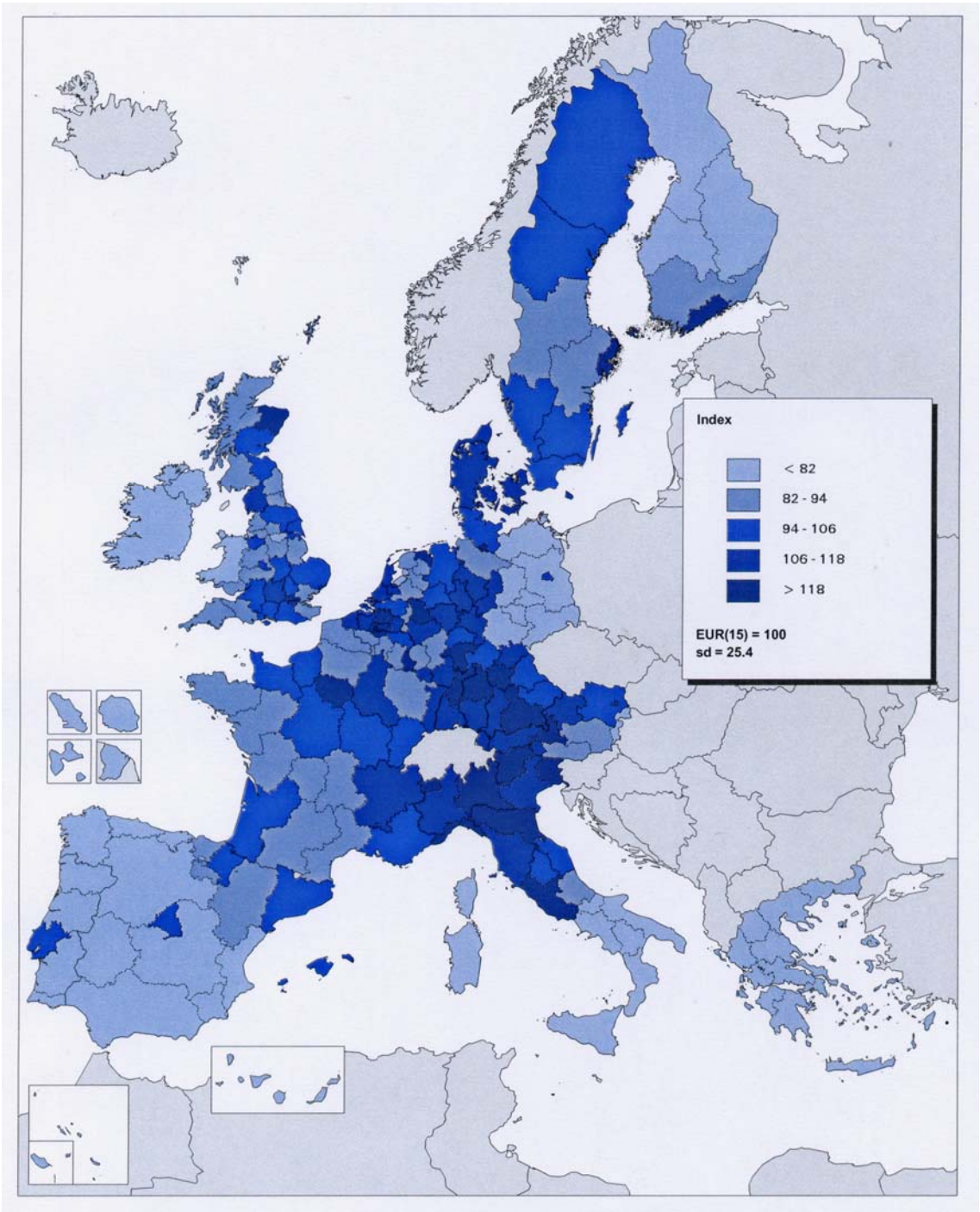


Figure 6.3. GDP per capita for the regions of the EU15 (1993)[342]

The orienting policies of the ESDP were all reiterated in this Second report. Chapter 3 in particular is directed towards analysing cohesion from the territorial perspective, highlighting the fact that lying behind the ESDP one finds the rationale for reducing the economic and social disparities throughout the EU territory. Furthermore the three basic policy pillars[343] are all directed towards the achievement of this challenge.

[342] CEC (1996)
[343] Polycentric spatial development and a new urban-rural relationship; the parity of access to infrastructure and knowledge; and wise management of the natural and cultural heritage.

The Report highlights the still then centralised character of the EU territory. In addition it recognises that even though the regions of the South-Western periphery have converged to a certain extent, this has not been sufficient to undermine the validity of the core-periphery territorial model. Furthermore the Report takes the view that the territorial model would be reinforced by the then pending enlargement of the EU territory with the accession of the Eastern and Central European countries.

To further develop this concept of the core-periphery territorial model, a previous study to the Second Report (Schürmann and Talaat, 2000) developed an accessibility index, measuring the time required to arrive from one region to others, weighted by its economic importance. This resulted in the European territory being classified as central, peripheral or simply 'other'. As can be observed in Figure 6.4 all the regions of the Iberian Peninsula were graded as peripheral regions, with an index of accessibility of less than 40% of the European average (including the candidate countries), together with Greece and Ireland, the two other 'cohesion countries' at that time.

The analysis of the European socio-economic situation in the *Second Report* proportions a description of the concentration of activities in the central regions, with regard to population density, GDP per capita and the spending in R + D. The theme of R + D was increasingly important, given that the activity, together with other activities with a high added value, tended to be concentrated in the more central regions, where the knowledge base and specialised infrastructure was more consolidated. This contributed to the growing polarisation within the EU and the concomitant concentration of activities with a generally lower added value in the peripheral regions.

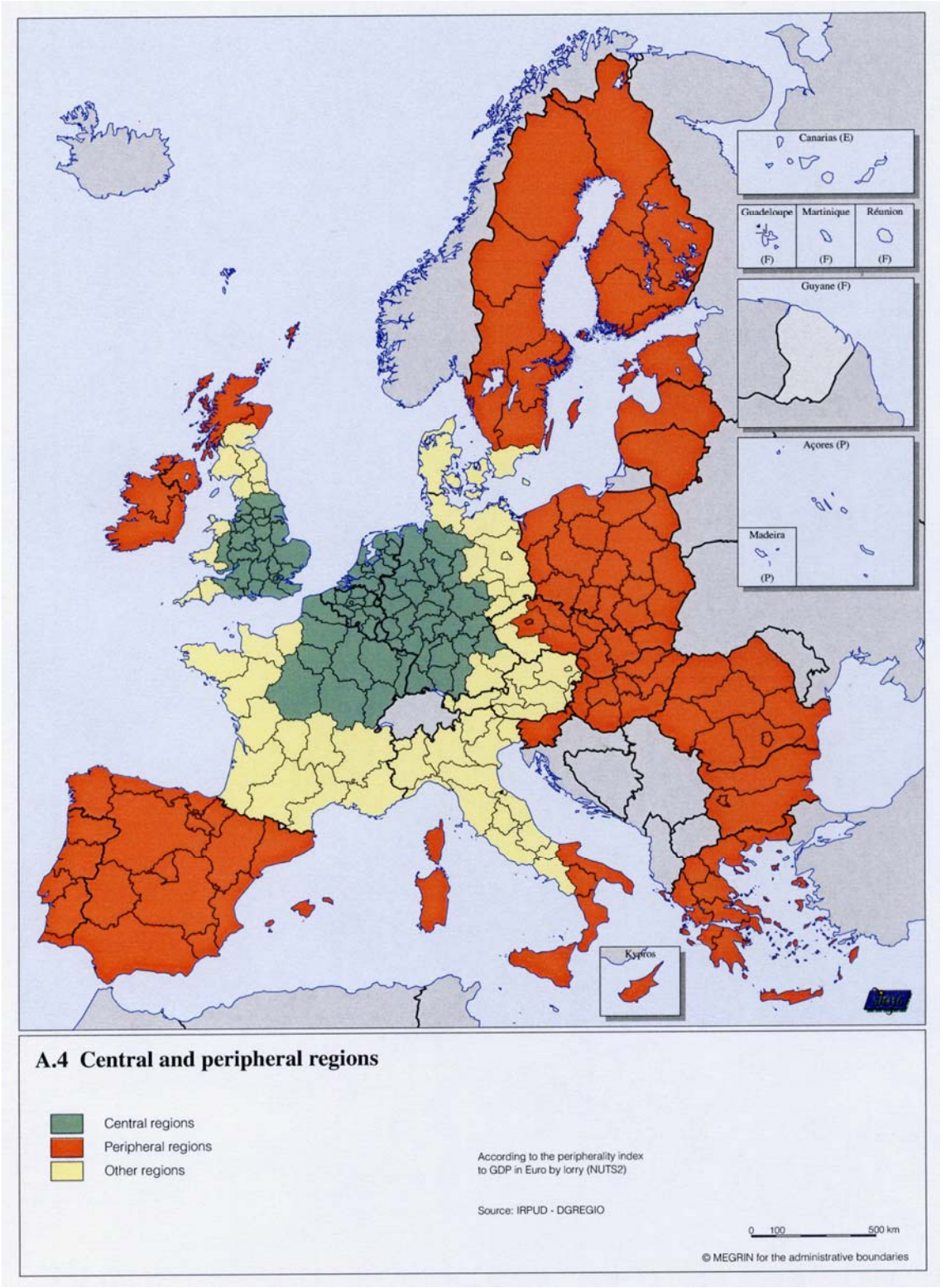


Figure 6.4. Central and peripheral regions[344]

The concentration of economic activity and population in a restricted central area, at that time representing 14% of the European territory with 33% of the European population and proportioning some 47% of the European GDP, has/had an adverse

impact not only in the peripheral regions, but also in the same central regions, through the negative environmental externalities, as well as excessive transit. For example, the bottlenecks in the railway networks, identified as priorities through the programme of Trans-European Networks (TENs) were concentrated in the central regions[345]. As 'compensation' for the overloading of the transport networks and the concentration of economic activity in the central regions, the peripheral regions were identified as being in a much better position from an environmental perspective. For example, in general the toxic emissions in the central regions were some 2.3 times higher than the corresponding measurements in the more peripheral regions[346]. Clear exceptions to this duality were the toxic emissions experienced in the heavily industrialised and congested areas of some the Central and Easter European regions.

See Figure 6.5 for the measure of GDP per capita in 1998. Here a stronger differentiation between the Spanish regions can be detected than was the case in the early 1990s (cf. Figure 6.3). By this time just Madrid and Navarra were in a stronger position, on par with the EU average, followed by Catalunya, Valencia, Aragon, the Basque Country, La Rioja, Cantabria and the Balearic Islands; then the remainder of Spain, with the exception of Extremadura in the least favourable position.

[344] CEC (2001c)
[345] See Map A5 of the Second cohesion report (CEC, 2001c)
[346] See Map A7 of the Second cohesion report (CEC, 2001c)

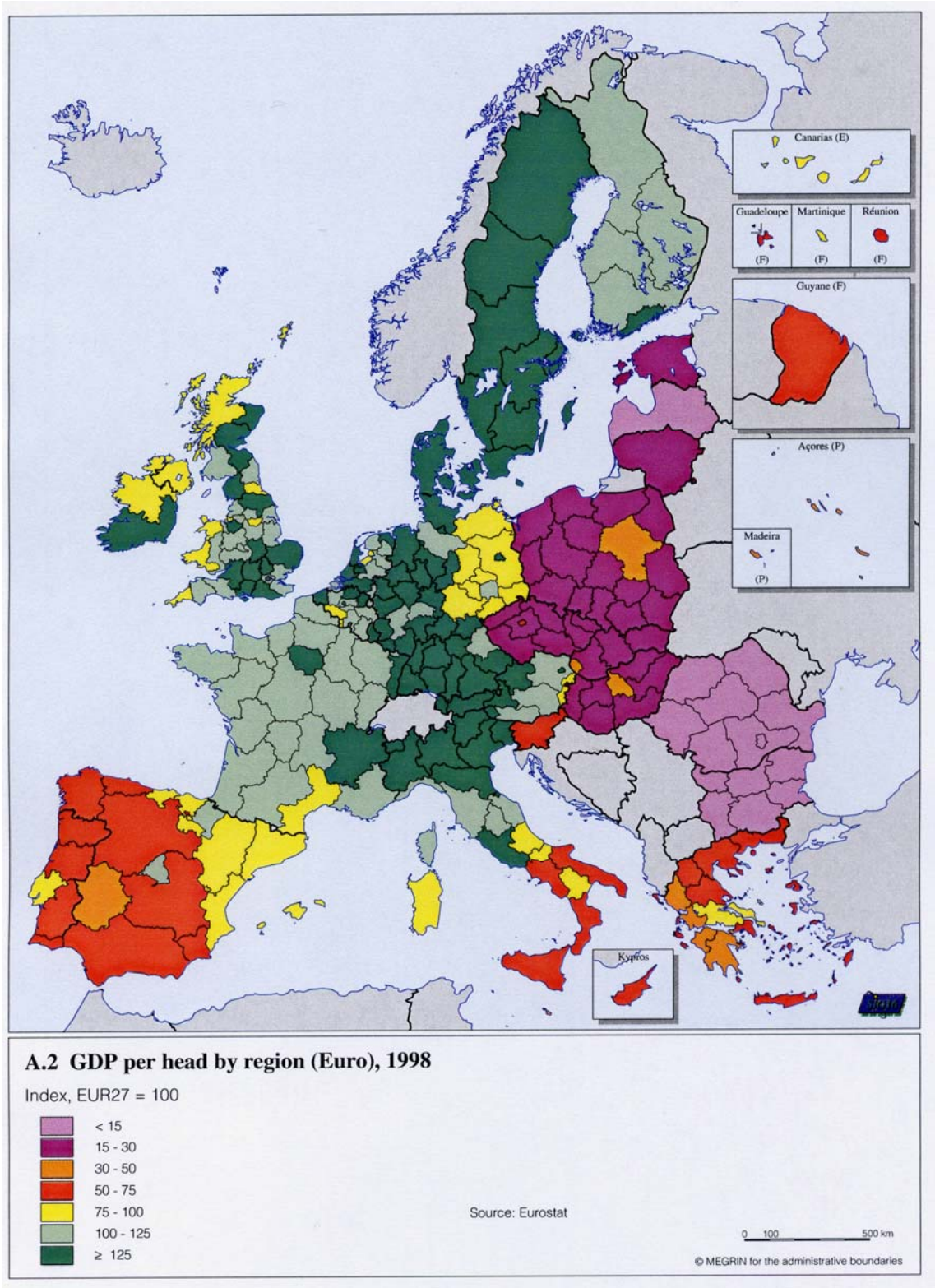


Figure 6.5. GDP per capita for the regions of the EU27 (1998)[347]

[347] CEC (2001c)

6.3.3. Third report on economic and social cohesion (2004)

The Third cohesion report (2004) (CEC, 2004b) contained the secondary title *A new partnership for cohesion: convergence competitiveness cooperation*.

The Third report was structure in four parts, addressing 1) cohesion, competitiveness, employment and growth – situation and trends; 2) the impact of Member State policies on cohesion, 3) the impact of Community policies: competitiveness, employment and cohesion, and finally 4) the impact and added value of structural policies.

The first part contained three sections addressing economic and social cohesion; territorial cohesion; and the factors determining growth, employment and competitiveness. The section dealing with territorial cohesion recognised the territorial imbalances threatening the harmonious development of the EU's economy in future years, such as the concentration of economic activity and population in the central core area; the disparities at national levels between the metropolitan urban regions and the remaining parts of the countries, especially in the case of the accession countries; the regional level territorial disparities not captured by measures of GDP and employment, such as sprawl ad disperse urban development; and within regions and cities where social disparities were accentuating social exclusion.

These territorial imbalances could be corrected, according to the Third report, through a coordinated approach to combat territorial disparities through a more spatially balanced pattern of economic development, as proposed by the ESDP (CEC, 1999). The promotion of balanced development was aimed at correcting the territorial imbalances in the distribution of towns and cities, as well as the intra-regional imbalances.

In general terms the Third report recognised that disparities in income and employment across the EU had narrowed over the previous decade, in particular since the mid-1990s. Figure 6.6 indicates the GDP per capita as at 2001. The image of Spain at that time is one of continued improvement, with Madrid, Catalunya, Navarra, La Rioja, the Basque Country and the Balearic Islands all displaying levels of GDP equal to or greater than the average EU25 level. What can be seen is a gradual improvement in the least well-off regions, with the lowest levels of GDP being experienced in just four regions – Andalucía, Galicia, Extremadura and Castilla-La Mancha. However there were still important deficits to make up between the least well-off and the remainder of the population, which at that time required long-term efforts and commitment.

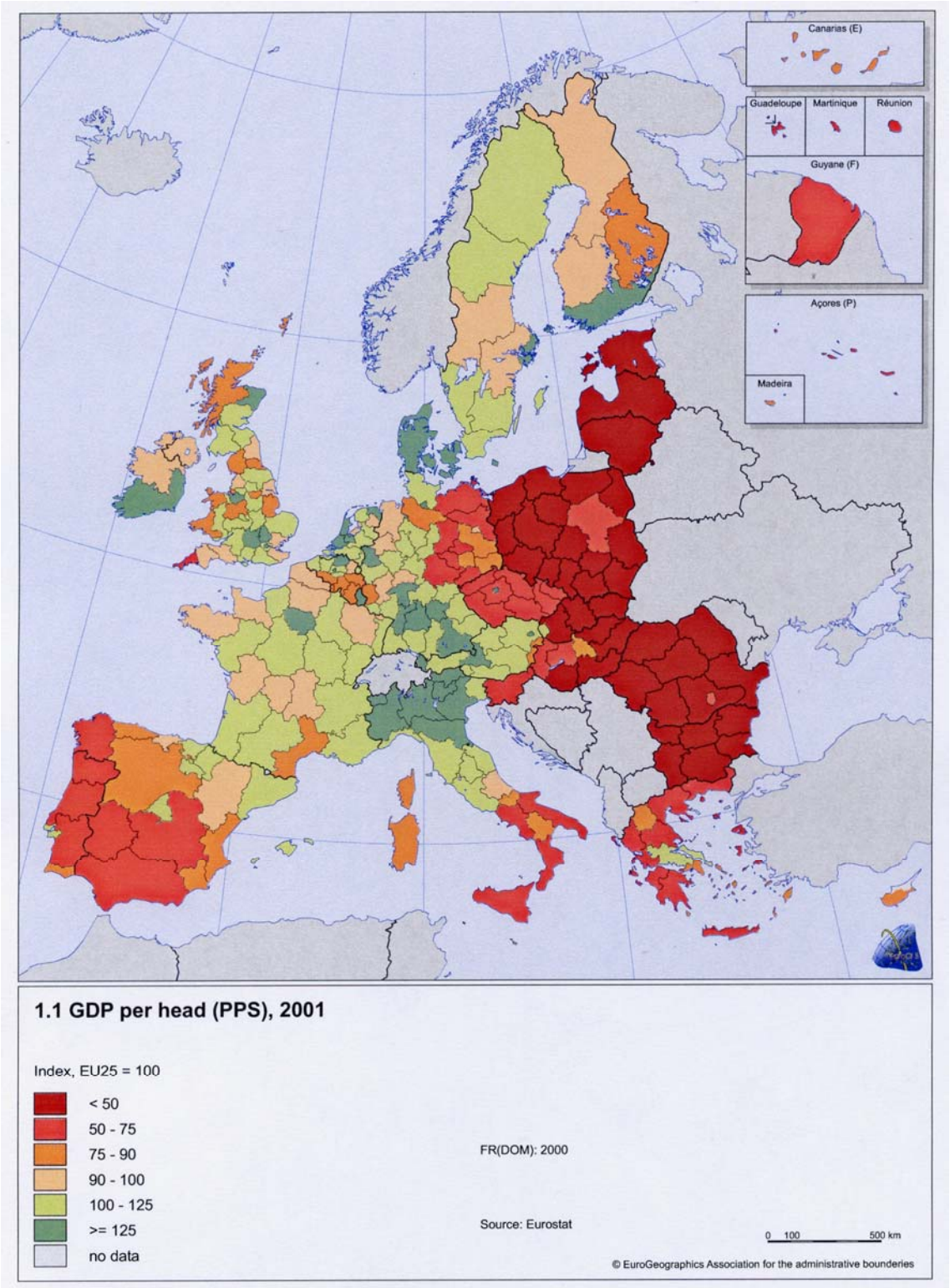


Figure 6.6. GDP per capita for the regions of the EU27 (2001)[348]

[348] CEC (2004b)

6.3.4. 'Cohesion Policy and cities: the urban contribution to growth and jobs in the regions' (2006)

While the Community Strategic Guidelines on Cohesion 2007-2013 (CEC, 2006c) (see Section 6.3.6) address the areas of intervention where the Commission consider it would be appropriate to give priority to the preparation of operational programmes for cohesion policy for the period 2007-2013, the Commission's Communication on *Cohesion policy and cities* (CEC, 2006a) places emphasis on certain aspects of the urban dimension which it consider might be of relevance in this context. The Communication is complemented by an in-house staff working paper which develops the analyses and provides background to the suggestions for action contained within the Communication itself (CEC, 2006b).

What is of principal interest in the Communication and the working paper is the description provided of the importance of cities and urban areas. The Communication suggests cities can be viewed as *motors for growth and jobs*, but cannot be seen in isolation from the surrounding territories. Rather cities are 'key players in regional development, including the development of neighbouring rural areas. Cities and regions, and their social and economic trajectories, are mutually dependent.

The Communication goes on to state that 60% of the EU's population live in urban areas with populations exceeding 50,000 persons. London and Paris are referred to as the 'two mega-poles', while the remainder of the urban system is described as being 'a unique polycentric structure of large, midsize and small cities'. The section concerning the achievement of a better territorial balance across the EU (Section 3.3) again refers to the urban system:

> "Europe is characterised by a polycentric structure of large, medium-sized and small cities. Many of these cities cluster together to form metropolitan areas, but many exist as the single urban centre of a region" (CEC, 2006a, p.6).

What is clearly conspicuous by virtue of its very absence is the lack of reference to the 'core and periphery' of the European territory. Rather the Communication sees the spatial territory of Europe simply as a polycentric structure, without any further qualification.

6.3.5. The Community Strategic Guidelines on Cohesion 2007-2013 (2006)

The Community Strategic Guidelines on Cohesion were adopted by the Commission on 6 October 2006 (CEC, 2006c). These contain the principles and priorities of cohesion policy and suggest ways the European regions can take account of the financial resources made available for national and regional aid programmes over the funding period 2007-2013.

The Introduction to the Guidelines states that:

> "In accordance with the integrated guidelines for growth and jobs in the renewed Lisbon agenda, the programmes supported by cohesion policy should seek to target resources on the following three priorities:
>
> - improving the attractiveness of Member States, regions and cities by improving accessibility, ensuring adequate quality and level of services, and preserving the environment;
> - encouraging innovation, entrepreneurship and the growth of the knowledge economy by research and innovation capacities, including new information and communication technologies; and
> - creating more and better jobs by attracting more people into employment or entrepreneurial activity, improving adaptability of workers and enterprises and increasing investment in human capital" (CEC, 2006c, p. L 291/14).

What is evident from the outset is that the term 'cohesion' appears to serve as an acronym or abbreviation of sorts for the trinity of 'economic, social and territorial cohesion'.

The Guidelines themselves are directed towards the following aspects in detail:

1.1. Making Europe and its regions more attractive places in which to work and invest; which addresses the expansion and improvement of infrastructures; the strengthening of the synergies between environmental protection and growth; and Europe's intensive use of traditional energy sources.

1.2. Improving knowledge and innovation for growth; paying attention to an increase and better targeting of investment in RTD; facilitating innovation and promoting entrepreneurship; promoting the information society for all; and improving access to finance.

1.3. More and better jobs; addressing the attraction and retention of more people in employment and modernising social protection systems; improving adaptability of workers and enterprises and the flexibility of the labour market; increasing investment in human capital through better education and skills; administrative capacity; and helping to maintain a healthy labour force.

The second part of the Guidelines addresses *the territorial dimension of cohesion policy* in detail. Here it is stated that one of the characteristics of cohesion policy is its capacity to adapt to the needs and characteristics of specific geographical challenges. The key phrase is that "under cohesion policy, geography matters" (CEC, 2006c, p. L 291/28). It is suggested that taking into consideration the territorial dimension will contribute to the development of sustainable communities and the prevention of uneven regional development from reducing overall growth potential. An approach of this nature requires the addressing of the specific problems and opportunities of urban and rural areas in general, as web as those of cross-border and broader transnational territories, or regions limited through their insularity, remoteness, sparse population or mountainous character. Coastal areas in general may be subject to environmental and demographic constraints that require addressing. The Guidelines state that the successful implementation of actions to promote territorial cohesion requires implementing mechanisms that can contribute to guarantee fair treatment for all territories based on their individual capacities as a factor of competitiveness. As a consequence good governance is a pre-requisite to successfully addressing the 'territorial dimension'.

What then follows is an examination of the territorial dimension in the context of the contribution of cities to growth and jobs (2.1); the economic diversification of rural areas, fisheries areas and areas with natural handicaps (2.2); cooperation (2.3); cross-border cooperation (2.4); transnational cooperation (2.5); and interregional cooperation (2.6).

The most relevant of these to the development of the thesis is the contribution of cities to growth and jobs. The Guidelines refer to the Commission's Communication on cohesion policy and cities (CEC, 2006a) and the fact that more than 60% of the EU population lives in urban areas of over 50,000 persons. Emphasis is given to cities and urban areas being the home of most jobs, businesses and higher education institutions and have a fundamental role in the road towards social cohesion. Furthermore European cities and metropolitan urban regions have the capacity to attract highly

skilled workers, contributing to a synergy through the stimulation of innovation and business adding to their attractiveness to new talent.

However cities and urban areas concentrate both opportunities and challenges, particularly in the specific problems facing urban areas, such as unemployment and social exclusion, high and rising crime rates, increased congestion and the existence of areas of deprivation within city limits.

Programmes focusing on urban areas need to take several different forms. Firstly, actions to promote cities as motors of regional development, in the form of targeting improvements in competitiveness, for example, through clustering and supporting measures to promote entrepreneurship, innovation and the development of services, including producer services.

Secondly, actions to promote internal cohesion within the urban areas that seek to improve the situation of crisis districts. This not only benefits the districts themselves, but can contribute to reduce pressure towards excessive suburban sprawl in pursuit of a better quality of life.

Measures that seek the rehabilitation of the physical environment, the redevelopment of brownfield sites especially in old industrial cities, and the preservation and development of the historical and cultural heritage with potential spin-offs for tourism development, leading to the creation of more attractive cities in which people want to live are particularly important. Furthermore such regeneration can play an important role in avoiding suburbanisation and urban sprawl, helping to create the conditions necessary for sustainable economic development. In urban areas, the environmental, economic and social dimensions are strongly interlinked and a high quality urban environment contributes to the priority of the renewed Lisbon Strategy to make Europe a more attractive place to work, live and invest.

Thirdly, actions to promote a more balanced, polycentric development by developing the urban network at national and Community level including links between the economically strongest cities and other urban areas including small and medium-sized cities. This requires making strategic choices in identifying and strengthening growth poles and putting in place the networks that link them in both physical (infrastructure, information technologies, etc.) and human (actions to promote cooperation, etc.) terms. Since these poles serve wider territories, they contribute to a sustainable and balanced

development of the Member State and the Community as a whole. Similarly, rural areas provide services to the wider society, and focus should be placed on the urban rural interface.

Based on previous experience, the Guidelines suggest that there are a number of key principles in urban actions. First, the key partners in the cities and local authorities have an important role to play in achieving these objectives. Second, the preparation of a medium- to long-term development plan for sustainable urban development is generally a precondition for success as it ensures the coherence of investments and of their environmental quality. In general, integrated support services and programmes should have a focus on those groups which are most in need, such as immigrants, young people and women. All citizens should be encouraged to participate in both the planning and delivery of services.

It is considered that this section of the Guidelines (2.1 *The contribution of cities to growth and jobs*) is particularly useful and important, in that here one finds the Commission's current position on cities and urban development stated explicitly. The key elements include the emphasis of the re-launched Lisbon Agenda (the importance of growth and jobs in the context of Europe becoming one of the most competitive economic regions in global terms prior to 2010) as well as the spatial planning guidance contained within the ESDP (in terms of the encouragement given to a more balanced and polycentric pattern of urban development and the encouragement afforded to brownfield, rather than greenfield, development).

6.3.6. Fourth report on economic and social cohesion (2007)

In May 2007 the European Commission adopted the *Fourth report on economic and social cohesion, Growing regions, growing Europe*, (CEC, 2007d). One again the implicit reference to the message of the re-vitalised Lisbon Agenda (growth and jobs) is patently clear. The Report follows the same format as the previous three, structured around four principal chapters: the economic, social and territorial situation and trends in member States and regions of the EU-27 (Chapter 1); the impact of cohesion policy (Chapter 2); National Policies and Cohesion (Chapter 3); and finally Community policies and Cohesion (Chapter 4).

Chapter one is divided in two principal sections dealing with 'Economic, social and territorial cohesion', thereby apportioning equal importance to the three aspects, and the 'Factors determining regional competitiveness, growth and employment' (CEC, 2007d).

The overall message of this Fourth report is one of the added value of cohesion policy, suggesting that convergence is occurring at national and at regional level (as illustrated in Figure 6.7, showing the GDP per capita as at 2004); current estimates foreseeing the continuation of these trends; cohesion policy supporting growth and job creation also outside the convergence zones; cohesion policy supporting the innovative capacity of Member States and regions; cohesion policy investment in people proportioning high returns; cohesion policy levering public and private capital in support of productive investment; cohesion policy fostering integrated approaches to development; cohesion policy contributing to improve the quality of public investment; and cohesion policy promoting partnership as a key element of good governance (CEC, 2007d).

In reviewing the situation and trends in economic, social and territorial disparities, the Fourth report suggests that with regard to *economic cohesion* while convergence is occurring both at national and at regional level, disparities still remain important, and increases in employment and productivity are raising growth in the regions (CEC, 2007d).

In terms of *social cohesion* employment rates converged at the EU level and the national level, and the disparities in unemployment have decreased. The question of poverty still remains a challenge; and while education levels are increasing, in lagging regions these remain low (CEC, 2007d).

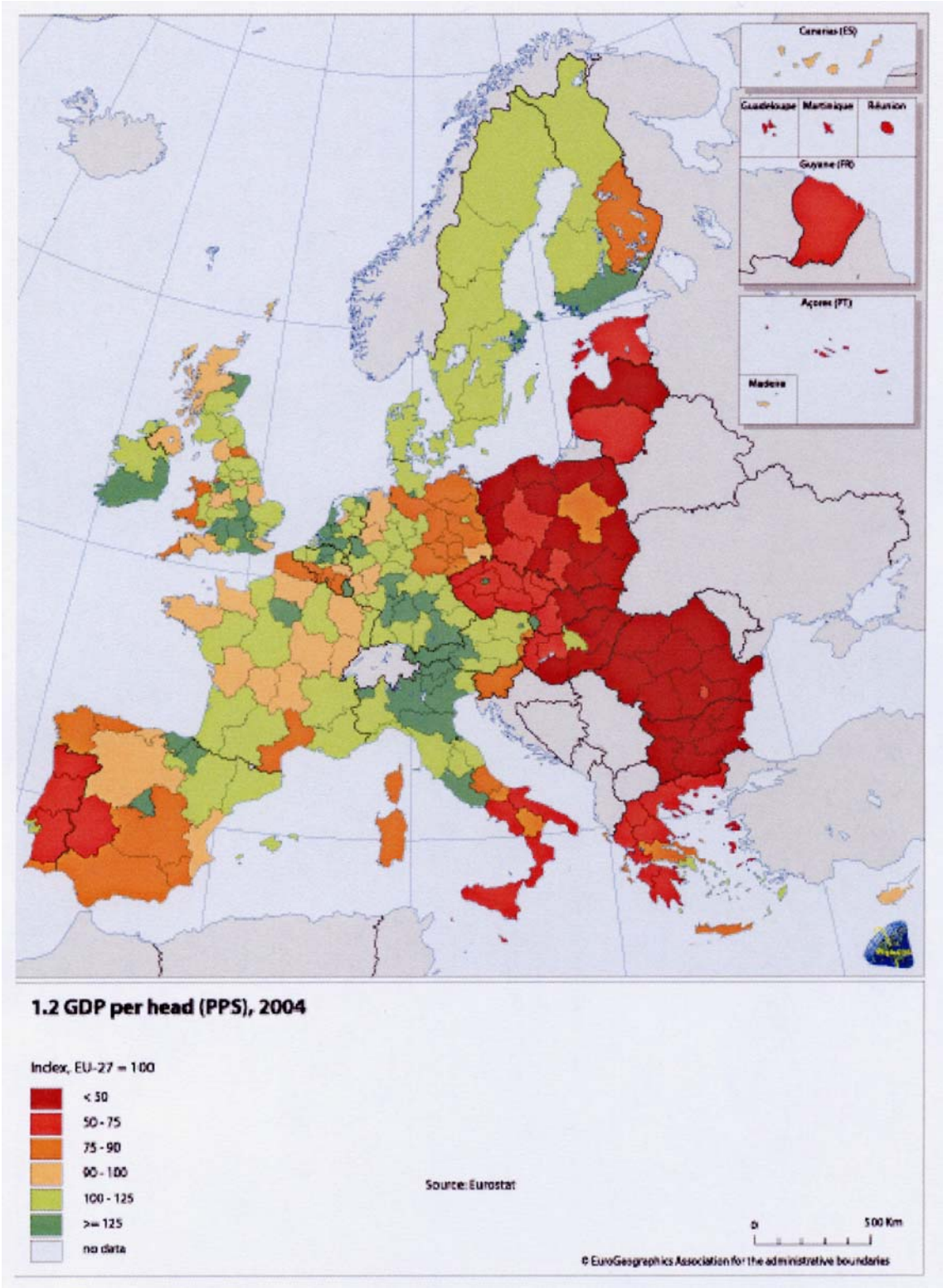


Figure 6.7. GDP per capita for the regions of the EU27 (2004)[349]

With special reference to *territorial cohesion* the Fourth report suggests there being evidence to indicate less territorial concentration of the EU27 GDP in the traditional core of Europe. While the core's share of the population remained relatively stable

[349] CEC (2007d)

during the period 1995-2004, the area's contribution to the EU27 GDP was substantially smaller, in the light of the emergence of new growth centres, amongst which Madrid is mentioned. The other growth centres cited are Dublin, Helsinki and Stockholm, as well as Warsaw, Prague, Bratislava and Budapest. However what is visible is a greater concentration of EU27 GDP at the national level within the capital city regions. Having said that the regional differences highlight the fact that in the case of Spain, the Barcelona region (defined at NUTS 3 level) was responsible for generating 14% of Spanish GDP over the period 1995-2004, while Madrid generated 18% with a similar population. The Fourth report goes on to suggest there is a trend towards suburbanisation throughout the EU territories, with some rural areas continuing to lose population and that there is potential for more cross-border exchanges (CEC, 2007d).

Concluding remarks

The policy context of European spatial development has been far from static over the past twenty years. Indeed it has evolved in step with - at times anticipating and at other times responding to - external factors impinging upon the socio-economic and physical reality of Europe. Comparing the 1983 *European Charter for Regional/Spatial Planning* (CEMAT, 1983) with the 2007 *Territorial Agenda of the European Union* (CEC, 2007b) one finds the same broad underlying policy discourse. The *European Charter* identified the fundamental objectives of regional/spatial planning as being the balanced socio-economic development of the regions; the improvement of the quality of life; the responsible management of natural resources and protection of the environment; and the rational use of land (CEMAT, 1983). These same objectives are reflected in the *Territorial Agenda*, albeit expressed in different terms, as the priorities for EU territorial development: the strengthening polycentric development and innovation through the networking of city regions and cities; the need for new forms of partnership and territorial governance between rural and urban areas; actions for close cooperation between the European Commission and EU member States; actions for strengthening territorial cohesion in the EU member states; the promotion of trans-European risk management including the impacts of climate change; the strengthening of ecological structures and cultural resources as the added value for development (CEC, 2007b).

It is considered that one of the most significant changes in this spatial policy discourse has been the conceptual change in the understanding of cohesion, from being understood in economic and social terms to being understood, as now is the case, in territorial terms as well. Indeed as stated in the *Territorial Agenda*:

> "(…) EU Cohesion Policy should be able to respond more effectively than it has done so far to the territorial needs and characteristics, specific geographical challenges and opportunities of the regions and cities. That is why we advocate the need for the territorial dimension to play a stronger role in future Cohesion Policy in order to promote economic and social well being" (CEC, 2007b, (4)).

The importance of the territorial dimension is implicit from the very title - 'Future Task: Strengthening Territorial Cohesion' – of the opening section of the *Territorial Agenda* (CEC, 2007b). This first section closes with reference to the legislative requirements concerning cohesion, and more specifically to territorial cohesion being considered as the third dimension of Cohesion Policy, through Articles 2, 6, 16 and 158 of the EC Treaty. Reference is also made to the attention apportioned to territorial cohesion in the

Third and Fourth Cohesion Reports (CEC, 2004b and 2007d) and the Community Strategic Guidelines on Cohesion (CEC, 2006c).

By necessity the legislative and policy overview carried out in this chapter has been of an abstract and conceptual nature. However the comprehension of these aspects, past and present, is considered essential for being able to fully appreciate the nature of the European urban system, and in particular the metropolitan urban region component of that system in the following chapter, against which the positioning of the Spanish metropolitan urban regions will then be measured. In order to ease this comprehension, Table 6.1 provides a chronological account of the key legislation and policy documents which are of relevance in this context of the evolving spatial policy of the EU, over the past 50 years, starting out from the Treaty of Rome in 1957[350] up until the adoption of the Fourth Cohesion Report (CEC, 2007d) in May 2007.

[350] Treaty signed 25 March 1957, entering into force on 1 January 1958, not published in the Official Journal

Year	Key events
1957	Signing of the *Treaty establishing the European Economic Community* (Treaty of Rome, 1957) between France, Germany, Italy, Belgium, Luxembourg and the Netherlands[351]
1965	European "Merger Treaty" (Treaty of Brussels, 1965)[352]
1972	*First enlargement* of the EEC incorporating United Kingdom, Ireland and Denmark[353]
1979	*Second enlargement* of the EEC incorporating Greece[354]
1983	Adoption of the *European Charter for Regional/Spatial Planning* in Torremolinos, Spain (20 May 1983) (CEMAT, 1983)
1985	*Third enlargement* of the EEC incorporating Spain and Portugal[355]
1986	Single European Act (1986)[356] Introduction of actions to strengthen economic and social cohesion
1990	*Fourth enlargement* of the EEC to incorporate the former German Democratic Republic[357]
1991	Publication of *Europe 2000 Outlook for the development of the Community's territory* (CEC, 1991)
1992	Treaty on European Union (Maastricht Treaty, 1992)[358] Creation of the 'European Union'
1994	Publication of *Europe 2000+ Cooperation for European territorial development* (CEC, 1994)
1995	*Fifth enlargement* of the European Union, incorporating Austria, Finland and Sweden[359]
1996	Publication of the *First report from the Commission on economic and social cohesion* (CEC, 1996)
1997	Treaty of Amsterdam (1997)[360]
1999	Publication of the *European Spatial Development Perspective* (CEC, 1999)
2000	Adoption of the *Guiding Principles for Sustainable Spatial Development of the European Continent* at the European Conference of Ministers responsible for Regional Planning (CEMAT) held on 7-8 September, 2000, in Hanover (CEMAT, 2000). Lisbon Agreement Strategy (CEC, 2001a)

[351] Treaty signed 25 March 1957, entering into force on 1 January 1958, not published in the Official Journal.
[352] OJ 152 dated 13 July 1967.
[353] OJ L 73 dated 27 March 1972.
[354] OJ L 291 dated 19 November 1979.
[355] OJ L 302 dated 15 November 1985.
[356] OJ L 169 dated 29 June 1987.
[357] The Länder of the former East Germany automatically became part of the EU on 3 October 1990 as a result of the reunification with the former West Germany.
[358] OJ C 191 dated 29 July 1992.
[359] OJ C 241 dated 29 August 1994.
[360] OJ C 340 dated 10 November 1997.

2001	Treaty of Nice (2001)[361] European Commission publishes *Second cohesion report on economic and social cohesion (Unity solidarity, diversity for Europe, its people and its territory)* (CEC, 2001c) Gothenburg Agreement Strategy (CEC, 2001b)
2004	*Sixth enlargement* of the European Union, incorporating the Czech Republic, Estonia, Cyprus, Latvia, Lithuania, Hungary, Malta, Poland, Slovenia and Slovakia[362] European Commission publishes *Interim Territorial Cohesion Report* (CEC, 2004a) Treaty establishing a Constitution for Europe[363] Introduction of aspects of *territorial* cohesion European Commission publishes *Third cohesion report on economic and social cohesion (A new partnership for cohesion: convergence, competitiveness, cooperation)* (CEC, 2004b)
2005	Re-vitalisation of the Lisbon Agenda (CEC, 2005)
2006	Publication of the Communication form the Commission on *Cohesion Policy and cities: the urban contribution to growth and jobs in the regions* (CEC, 2006a) Publication of the Council Decision on *Community strategic guidelines on cohesion 2007-2013* (CEC, 2006c)
2007	*Seventh enlargement* of the European Union, incorporating Bulgaria and Rumania[364] Adoption of the *Leipzig Charter on Sustainable European Cities* (CEC, 2007a) containing common principles and strategies for European urban development policy Adoption of the *Territorial Agenda of the European Union* (CEC, 2007b) as an expression of a new European policy on spatial cohesion Publication of the background document to the *Territorial Agenda* (*The territorial state and perspectives of the European Union, Towards a stronger European territorial cohesion in light of the Lisbon and Gothenburg Ambitions* (CEC, 2007c) Adoption of the *Fourth Report on Economic and Social Cohesion Growing Regions, growing Europe* (CEC, 2007d)

Table 6.1. Chronology of key legislation and policy documents published in the development of European spatial policy (1957-2007)

[361] OJ C 80 dated 10 March 2001
[362] OJ L 236 dated 23 September 2003.
[363] OJ C 310 dated 16 December 2004
[364] OJ L 157 dated 21 June 2005

CHAPTER 7. – EUROPEAN URBAN SYSTEM

Introduction

As will be recalled from Chapter 1 and as is clearly evident from Figures 7.1 and 7.2 the European continent is one of the most urbanised areas of the world. More than 80% of Europe's citizens reside in the metropolitan urban regions, cities and other urban areas which together comprise the European urban system. Furthermore, more than 60% of the population of the EU27 lives in urban areas of more than 50,000 inhabitants (CEC, 2006a).

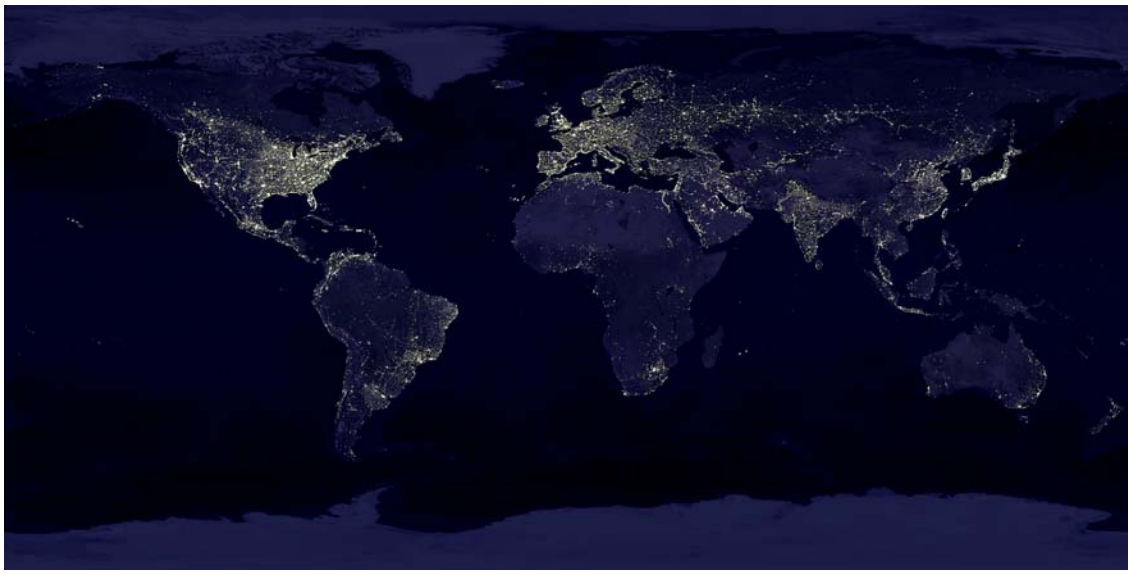


Figure 7.1. The world at night indicating areas of highest urbanisation[365]

However this urban population, in the order of some 390 million inhabitants, is far from spread homogenously throughout the European territory. Indeed as discussed in the previous chapter, approximately one third of the European Union's entire population, some 164 million inhabitants, reside within the central (pentagon) area lying in the territory between London, Hamburg, Munich, Milan and Paris. This core area comprises just 14% of the EU territory but is responsible for around 46.5% of the EU27 GDP. The concentration of development in this core area of Europe is clearly identifiable from Figure 7.2.

[365] http://svs.gsfc.nasa.gov/vis/a000000/a002200/a002276/index.html (consulted accessed 03.01.2007)

Figure 7.2. Urbanisation of the European continent[366]
Source:

This chapter seeks to present an overview of the European urban system, placing emphasis on the metropolitan component of that system, with a view to focusing upon an analytical framework or sample of European metropolitan urban regions against which the positioning of the Spanish metropolitan system can be quantitatively tested in Chapter 8.

Taylor and Hoyler (2000) refer to the different approaches to map the evolving economic space of Europe in terms of cities since the late 1980s, in the context of the development of the Single European Market (SEM) and the ostensibly increased competition between European cities deriving there from. They indicate on the one hand, the concern for the definition of new urban hierarchies, through the combination of different functional indicators (Brunet, 1989; and Rozenblat and Cicille, 2003) and on the other hand highlighting specific topical variables. As the authors point out "the geographical representation of new economic spaces in Europe has perhaps shaped

[366] http://www.europa.usenet.eu.org/btn/europe_night.jpg (consulted 03.01.2007)

the perception of policy-makers deeper than the various league-tables produced" (Taylor and Hoyler, 2000, p. 179).

These earlier studies sought to characterise Europe in terms of the ranking of important urban regions on the basis of their urban performance and developed the concept of 'functional urban regions' (FUR) (Cheshire et. al., 1986; Cheshire and Hay, 1989; and Cheshire, 1990). This line of research allowed for comparison with work previously undertaken by Hall and Hay (1980) seeking to apply the notion of Berry's (1973) 'daily urban systems' (DUS) to the European urban system. In the main, the applicability of these studies and the reliability of the ensuing results of some of the countries studied, including Spain, were severely limited by the lack of comparable data. In this sense, the increasing incorporation of the European countries within the expanding European Union (EU) and the concomitant efforts of the part of EUROSTAT to establish 'user friendly' data bases have contributed enormously to the possibilities of transnational comparative urban and regional research, despite the inherent basic methodological problems relating to the 'units' of territorial analysis (Pumain, D. et. al. 1992). Although not related to the 'structure' of the European urban system, the on-going development of the Urban Audit initiative[367], which started in 1997, is testimony to the sorts of projects which are now possible through the gradual harmonisation of data across Europe, allowing for comparisons between the 258 large and medium sized cities on the basis of demography, social and economic aspects, civic involvement, training and education, environment, travel and transport, information society, and culture and recreation.

In the same way as the analysis of the European spatial policy in Chapter 6 sought to highlight a series of significant advances, this chapter seeks to identify the evolving changes in the ranking and positioning of the Spanish metropolitan urban regions within the European urban system, as perceived through a umber of key and influential studies. It is the analysis of these changes which in part gave rise to the development of the hypothesis in terms of the (re)positioning of the Spanish metropolitan cities within the wider European urban system, as outlined in the Introduction. With this objective in mind, the chapter examines the content of these key research exercises of the European urban system, starting with the DATAR/RECLUS study carried out by Brunet (1989) in the mid-1980s. This is followed by analyses of the Globalisation and World City (GaWC) group's inventory of world cities (Beaverstock et. al., 1999), the revision of the DATAR/RECLUS study in 2003 (Rozenblat and Cicille, 2003), a discussion of the

[367] http://www.urbanaudit.org/

hierarchy of the European urban system in terms of Metropolitan European Growth Areas (MEGA) developed through European Spatial Planning Observation Network (ESPON) (ESPON, 2004) and finally parallel research carried out by Peter Hall in the context of ESPON as well (Hall, 2005).

7.1. *Les Villes Européennes*

The RECLUS/DATAR study (Brunet, 1989) was one of the first to take a transnational approach to the study of European cities. It drew upon a typology of some 165 European urban agglomerations (see Figure 7.3), based upon a number of different variables.

Figure 7.3. Spatial distribution of the 165 urban agglomerations of the sample[368]

These variables included population; population growth; the presence of multinational firms; infrastructures and technological activities; engineers and technicians; research; university functions; financial services; airport traffic; ports; cultural projection; trade fairs; conferences; publishing and printing; telecommunications; and specialised functions. Other sectoral classifications were taken into consideration, covering aspects related to international relations, communications, economic potential, research and technology and cultural functions. The agglomerations were all ranked in terms of their performance on these variables with the identification of some 8 classes (see Table - these were led by London (83) and Paris (81) in the first class; Milan (70) in the second class; and Madrid (66), Munich (65), Frankfurt (65), Rome (64), Brussels (64) Barcelona (64) and Amsterdam (63) in the third class[369].

[368] Brunet (1989)
[369] Curiously Schacar (1996) suggests that "apart from the inclusion of the Spanish cities (Madrid and Barcelona) and Rome, the rest of the list fits quite well with other studies undertaken in terms of the upper echelon of the European urban hierarchy". (p. 157)

Classes and cities	Score
Class 1	
London	83
Paris	81
Class 2	
Milan	70
Class 3	
Madrid	66
Munich, Frankfurt	65
Rome, Brussels, **Barcelona**	64
Amsterdam	63
Class 4	
Manchester	58
Berlin, Hamburg	57
Stuttgart, Copenhagen, Athens	56
Rotterdam and Zurich	55
Turin	54
Lyon	53
Geneva	52
Class 5	
Birmingham, Cologne, Lisbon	51
Glasgow	50
Vienna, Edinburgh	49
Marseille	48
Naples	47
Seville, Strasburg	46
Basel, Venice, Utrecht	45
Düsseldorf, Florence, Bologna, The Hague, Ambers, Toulouse	44
Valencia, Genoa	43
Class 6	
Bonn	42
Lyle, Nice	41
Bristol, Bordeaux, Hanover, Grenoble	40
Montpellier, Nantes, Dublin, Porto	39
Nuremburg, Eindhoven, **Bilbao**	38
Palermo, Bari, Mannheim	37
Liege, Leeds, Rennes	36
Trieste, Essen	35
Class 7	
Saragossa, Maguncia-Wiesbaden	34
Liverpool, Southampton, Newcastle, Thessalonica, Tarentom Berne, Nancy, Lausanne	33
Karlseruhe, Bremen, Gant, Rouen	32
Málaga, Padua, Cagliari, Arnhem	31
Cardiff, Munster, Brunswick, Metz, Palma	30
Augsberg	29
Angers, Verona, Dortmund, Aix en Provence, Nijmegen, Orleans, Clermont	28
Cadiz, Catania, Parma, Groninga, Reims	27
Las Palmas, Valladolid, Granada, Bochum, Tours	26
Class 8	
Sarrebruck, Belfast, Vigo, Tarragona, Saint-Etienne	25
Cordoba, Murcia, Coventry, Alicante, Messina, Odense, Modena, Kiel, Aarhus, Kassel, Duisburg, Haarlem, Havre, Santa Cruz	24
Plymouth, Nottingham, Linz, Graz, Freiburg-Br., Wupperthal, Tiburg	23
Aberdeen, San Sebastian, Caen, Reggio, Brescia, Bielfield, Enschede, Dijon, Sheffield	22
Brest, Santander, Teesdie, Hull, Pamplona, Livorno, Cannes, Amiens, Dordrecht	21
La Coruña, Oviedo, Leicester, Lubeck, Valenciennes	20
Le Mans, Lens, Gijon	19
Stoke-on-Trent, Charleroi, Mönchen Gladbach	18

Table 7.1. Values obtained for the 165 agglomerations of the study[370]

[370] Brunet (1989)

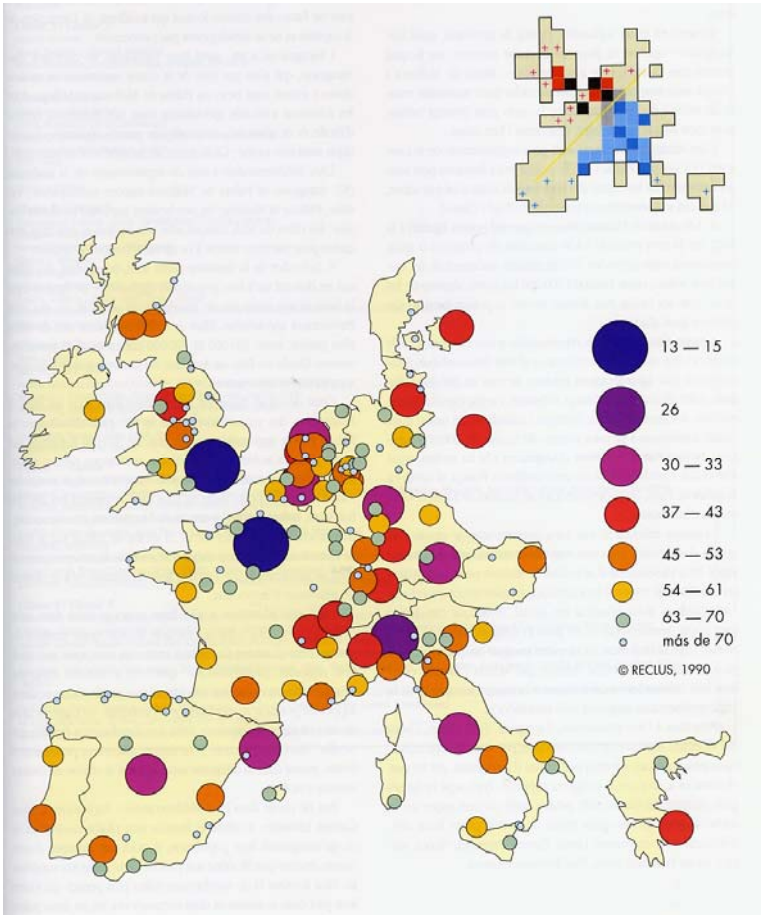


Figure 7.4. Overall scoring of the 165 agglomerations of the sample[371]

However apart from the interest in the ordering or hierarchy of the urban agglomerations, the RECLUS/DATAR study was influential in identifying transnational regional spaces of importance within the European urban system. The everlasting image from Brunet's study was the identification of the dorsal extending from London and extending over the BENELUX countries, Germany and Northern Italy. The spatial metaphor of the dorsal or megalopolis was affectionately encapsulated as a *blue banana* (see Figure 7.5), characterising the highest concentration of urban and economic development within Europe. This interpretation of the European territory was subsequently countered by researchers from the University of Dortmund through the alternative spatial metaphor of Europe characterised as a "bunch of grapes" (see Figure 7.6) (Kunzman and Wegener, 1991) denoting the more evenly spread concentrations and potentials for development.

[371] Brunet (1989)

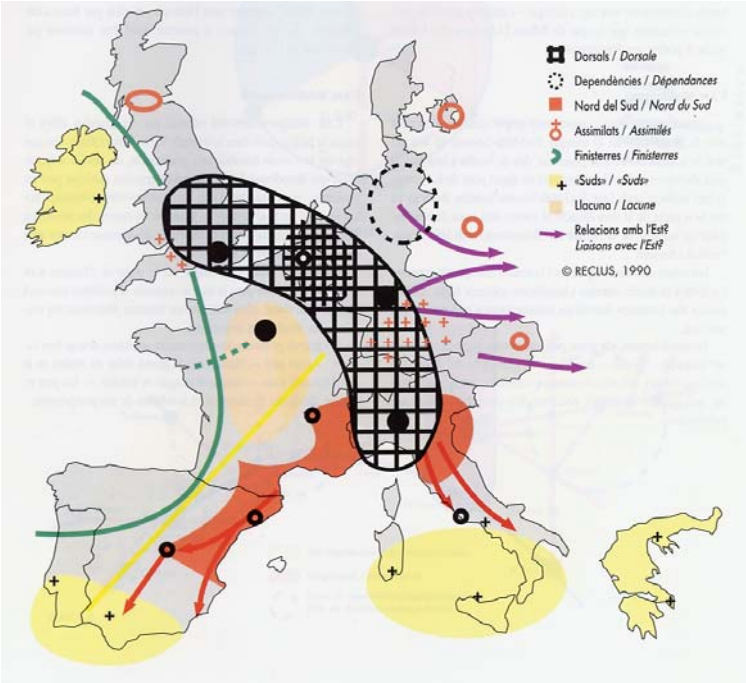


Figure 7.5. Transnational territorial divisions deriving from the analysis of the 165 agglomerations[372]

Figure 7.6. The bunch of grapes spatial metaphor of European territory[373]

[372] Brunet (1989)
[373] Kunzman and Wegener (1991)

Another important transnational regional space identified within the RECLUS/DATAR study was the Mediterranean Arc. This contains large cities and intersects with the dorsal or Megalopolis in the triangle formed between Turin – Genoa – Milan. The large poles of existing and potential development were Valencia and Barcelona in Spain; the Rhone delta around Marseille in France; and the north-east of Italy in Emilio Romany and Venetia. Indeed the identification of this transnational geographical area can be seen as a precursor of the INTERREG IIIB regional space of 'transnational cooperation' (Western Mediterranean)[374].

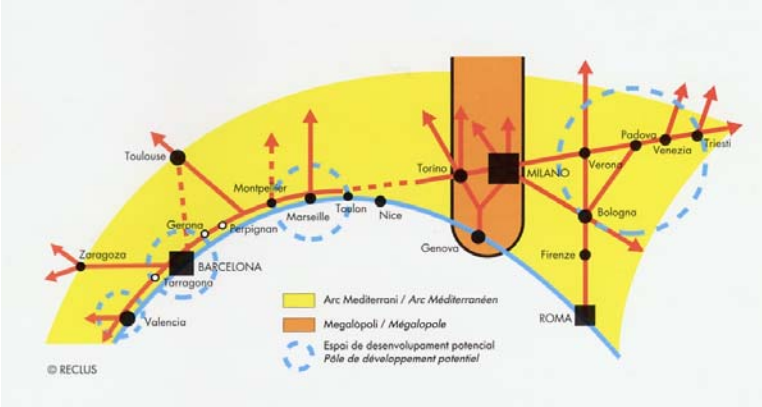


Figure 7.7. Schematic representation of the Mediterranean Arc extending from Spain to Italy[375]

The interpretation of the spatial configuration of the Iberian Peninsula (Figure 7.8) placed Madrid at the centre, connected to the six large urban agglomerations spaced regularly around the periphery: Barcelona, Valencia, Lisbon, Porto and Bilbao. It also identified the connectability between the Iberian Peninsula with the European Megalopolis through Barcelona, and with Africa through Sevilla. It merits mentioning in passing that the connectability with Africa was one of the future challenges identified for Sevilla and Málaga, as "gateway cities", within the UPC's INTERREG IIC report (UPC, 2001), reflecting the importance attached to these within the *Plan de Ordenación Territorial de Andalucía*[376] (Junta de Andalucía, 1999).

[374] Prior to this the European Commssion attributed special attention to the 'Western Mediterranean' section of this Mediterranean Arc in *Europe 2000+* (CEC, 1994); as well as in the *Estudios Prospectivos de la regions del Mediterráneo oeste* (CEC, 1995).
[375] Brunet (1989)
[376] "(…) esta tiene como vocación incrementar relaciones de interdependencia entre el norte y el sur, por su carácter de puente, por las ventajas comparativas con que cuenta para participar directamente en estrategias de cooperación para el desarrollo común: existencia de rasgos territoriales, económicos y ambientales afines, disponibilidad de desarrollos tecnológicos adaptables a las economías en vías de desarrollo entre otras." (Junta de Andalucía, 1999, p. 46).

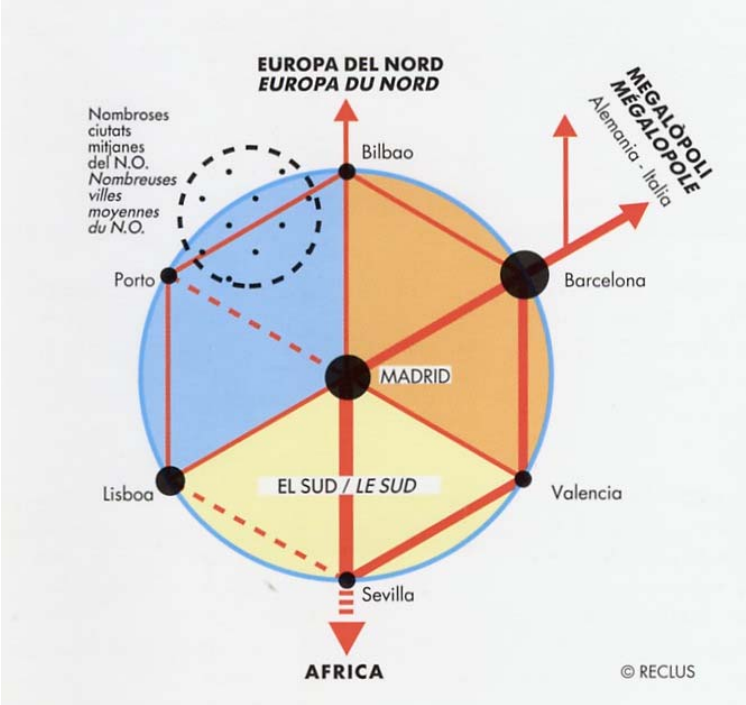


Figure 7.8. Schematic representation of the connectivity of the Iberian Peninsula, deriving from the analysis of the 165 agglomerations[377]

[377] Brunet (1989)

7.2. The GaWC Inventory of World Cities

Research carried out in the later 1990s under the auspices of the Globalisation and World Cities (GaWC) Study Group and Network[378], based at the University of Loughborough (UK), sought to elaborate a roster of second order world cities, based upon their level of advanced producer services. The corporate service criteria used in this study were related to global services in the fields of accountancy, advertising, banking and finance, and legal services (Beaverstock et. al., 1999).

An initial survey of literature by leading experts on global cities and globalisation, to ascertain the frequency of references to cities, led to the identification of some 79 cities[379], just 26 of which were European – Amsterdam, Basel, Barcelona, Berlin, Bonn, Brussels, Cologne, Copenhagen, Düsseldorf, Frankfurt, Geneva, Hamburg, Lisbon, London, Luxembourg, Lyon, Madrid, Milan, Munich, Paris, Rome, Stockholm, Stuttgart, The Hague, Vienna and Zurich - with Barcelona and Madrid being the only Spanish cities. However this was considered limiting and the researchers decided to make a search for a wider sample of cities for each of the advanced producer services under consideration.

Cities' scores on these services led to their being classified as 'prime', 'major' and 'minor' service centres.

Starting with *global accountancy service centres*, a sample of 78 cities was created, based upon the presence of a set of major accounting firms. The multiple presence of the firms led to the identification of 13 'prime' cities, including Atlanta, Chicago, Düsseldorf, Frankfurt, London, Los Angeles, Milan, New York, Paris, Sydney, Tokyo, Toronto and Washington D.C. As can be seen from Table 7.2 Madrid was categorised as a 'major' service centre for global accountancy, along with 38 other cities. A total of 27 cities were identified as 'minor' global accountancy service centres.

[378] http://www.lboro.ac.uk/gawc/index.html

[379] Amsterdam, Atlanta, Bahrain, Bangkok, Basel, Barcelona, Berlin, Beijing, Boston, Bonn, Brussels, Buenos Aires, Cairo, Cape Town, Caracas, Charlotte, Chicago, Cologne, Copenhagen, Dallas, Detroit, Düsseldorf, Frankfurt, Geneva, Hamburg, Hartford, Hong Kong, Honolulu, Houston, Istanbul, Jakarta, Johannesburg, Kobe, Kuala Lumpur, Lisbon, London, Los Angeles, Luxembourg, Lyon, Madrid, Manila, Melbourne, Mexico City, Miami, Milan, Minneapolis, Montreal, Moscow, Mumbai, Munich, New York, Nagoya, Osaka, Panama City, Paris, Philadelphia, Portland, Rio de Janeiro, Rome, Rotterdam, San Francisco, Santiago, Sao Paulo, Seattle, Seoul, Shanghai, Singapore, Stockholm, Stuttgart, Sydney, Taipei, Tel Aviv, The Hague, Tokyo, Toronto, Vancouver, Vienna, Washington DC and Zurich.

Prime	Major	Minor
Atlanta	Amsterdam	Adelaide
Chicago	Auckland	Antwerp
Dusseldorf	Berlin	Arhus
Frankfurt	Birmingham	Baltimore
London	Boston	Bologna
Los Angeles	Brisbane	Calgary
Milan	Brussels	Caracas
New York	Cologne	Columbus
Paris	Copenhagen	Detroit
Sydney	Dallas	Dresden
Tokyo	Hamburg	Dublin
Toronto	Hong Kong	Geneva
Washington DC	Houston	Genoa
	Jakarta	Gothenburg
	Johannesburg	Helsinki
	Lyon	Kuala Lumpur
	Madrid	Leeds
	Manchester	Lille
	Melbourne	Luxembourg
	Mexico City	Marseille
	Montreal	Miami
	Moscow	Minneapolis
	Munich	New Delhi
	Osaka	Oslo
	Philadelphia	Santiago
	Rome	Turin
	Rotterdam	Utrecht
		San Francisco
		Sao Paulo
		Seoul
		Singapore
		Stockholm
		Stuttgart
		Taipei
		Tel Aviv
		The Hague
		Vancouver
		Zurich

Table 7.2. Global accountancy service centres[380]

Turning to the *global advertising service centres*, the sample comprised 67 cities based upon the presence of top advertising firms. The analysis of the multiple presence of these firms led to the identification of 8 'prime' cities - Chicago, London, Minneapolis, New York, Osaka, Paris, Seoul and Tokyo – with 28 'major' global advertising service centres (including both Madrid and Barcelona) and 31 minor global advertising service centres (see Table 7.3).

Concerning the *global banking service centres*, a sample of 68 cities was drawn up, based upon data for 10 of the world's top 25 banks according to assets. The presence of these banks led to the identification of 10 prime global banking service centres, including Frankfurt, Hong Kong, London, Milan, New York, Paris, San Francisco, Singapore, Tokyo and Zurich, 30 'major' banking centres (including Madrid) and 28 'minor' baking service centres (including Barcelona). (See Table 7.4)

[380] Beaverstock, et. al. (1999)

Prime	Major	Minor
Chicago	Amsterdam	Auckland
London	Athens	Bangalore
Minneapolis	**Barcelona**	Bangkok
New York	Boston	Beijing
Osaka	Brussels	Bogota
Paris	Caracas	Bucharest
Seoul	Copenhagen	Budapest
Tokyo	Dusseldorf	Buenos Aires
	Frankfurt	Cape Town
	Helsinki	Dallas
	Hong Kong	Detroit
	Istanbul	Dublin
	Lisbon	Geneva
	Los Angeles	Hamburg
	Madrid	Jakarta
	Melbourne	Johannesburg
	Mexico City	Kuala Lumpur
	Milan	Lima
	Prague	Manila
	San Francisco	Miami
	Santiago	Montevideo
	Sao Paulo	Montreal
	Singapore	Moscow
	Stockholm	Mumbai
	Sydney	New Delhi
	Toronto	Oslo
	Vienna	Rio de Janeiro
	Zurich	Taipei
		Tel Aviv
		Warsaw
		Wellington

Table 7.3. Global advertising service centres[381]

Prime	Major	Minor
Frankfurt	Bangkok	Abu Dhabi
Hong Kong	Beijing	Amsterdam
London	Bogota	**Barcelona**
Milan	Buenos Aires	Boston
New York	Caracas	Bratislava
Paris	Geneva	Brussels
San Fancisco	Houston	Budapest
Singapore	Jakarta	Cairo
Tokyo	Johannesburg	Chicago
Zurich	Kuala Lumpur	Colombo
	Labuan	Dallas
	Los Angeles	Dubai
	Luxembourg	Dublin
	Madrid	Edinburgh
	Manama	Glasgow
	Manila	Istanbul
	Mexico City	Lima
	Miami	Lisbon
	Montreal	Lyon
	Moscow	Melbourne
	Mumbai	Montevideo
	Prague	Munich
	Sao Paulo	New Delhi
	Santiago	Osaka
	Seoul	Rio de Janeiro
	Shanghai	Rome
	Sydney	Tehran
	Taipei	Vienna
	Toronto	
	Warsaw	

Table 7.4. Global banking service centres[382]

[381] Beaverstock, et. al. (1999)

Lastly with regard to the *global legal services centres*, a sample of 72 cities was identified, based upon the foreign branches of top London and US law firms. This resulted in 11 prime global legal service centres being identified - Brussels, Chicago, Hong Kong, London, Los Angeles, Moscow, New York, Paris, Singapore, Tokyo, and Washington D.C. Again Madrid and Barcelona appeared amongst the 27 'major' and 34 'minor' global service centres respectively. (See Table 7.5)

Prime	Major	Minor
Brussels	Almaty	Abu Dhabi
Chicago	Bangkok	Amsterdam
Hong Kong	Beijing	Athens
London	Berlin	Atlanta
Los Angeles	Budapest	**Barcelona**
Moscow	Cleveland	Boston
New York	Dallas	Bogota
Paris	Frankfurt	Bratislava
Singapore	Geneva	Brazilia
Tokyo	Ho Chi Minh City	Buenos Aires
Washington	Houston	Bucharest
	Kiev	Cairo
	Madrid	Caracas
	Mexico City	Dubai
	Milan	Dusseldorf
	Minneapolis	Guangzhou
	Prague	Hamburg
	Riyadh	Hanoi
	Rome	Istanbul
	San Francisco	Jakarta
	Sao Paulo	Kansas City
	Seattle	**Madrid**
	Shanghai	Manila
	Sydney	Melbourne
	Toronto	Munich
	Warsaw	Philadelphia
	Zurich	Richmond
		Rio de Janeiro
		St Petersburg
		Santiago
		Stockholm
		Taipei
		Tashkent
		Tijiana

Table 7.5. Global legal service centres[383]

An inventory was subsequently created from the aggregation of the information relating to the aforementioned four sector listings of centres, as a means of establishing a basic research platform for the future research needs of the GaWC. This inventory initially comprised the 122 cities considered under each of the four services – scores of 3, 2 and 1 were given to the cities on the basis of their lying within the prime, major and minor service centre categories. The sums of these scores led to the placing of some 55 of the cities into one of three categories – ALPHA, BETA or GAMMA world cities – or a residual division comprising cities considered to be showing tendency of world city formation. This inventory is indicated in Table 7.6 and expressed graphically in Figure

[382] Beaverstock, et. al. (1999)
[383] Beaverstock, et. al. (1999)

7.9. Here it can be seen that Madrid appears as a BETA world city alongside Brussels, as well as Mexico City and Sao Paolo; and Barcelona as a GAMMA world city, alongside Berlin, Budapest, Copenhagen, Hamburg, and München, as well as Atlanta, Buenos Aires, Istanbul, Kuala Lumpur, Manila, Miami, Minneapolis, Montreal and Shanghai.

Category	Metropolitan urban regions and cities
A. ALPHA world cities	12: London, Paris, New York, Tokyo 10: Chicago, Frankfurt, Hong Kong, Los Angeles, Milan, Singapore
B. BETA world cities	9: San Francisco, Sydney, Toronto, Zürich 8: Brussels, **Madrid**, Mexico City, São Paulo 7: Moscow, Seoul
C. GAMMA world cities	6: Amsterdam, Boston, Caracas, Dallas, Düsseldorf, Geneva, Houston, Jakarta, Johannesburg, Melbourne, Osaka, Prague, Santiago, Taipei, Washington 5: Bangkok, Beijing, Rome, Stockholm, Warsaw 4: Atlanta, **Barcelona**, Berlin, Buenos Aires, Budapest, Copenhagen, Hamburg, Istanbul, Kuala Lumpur, Manila, Miami, Minneapolis, Montreal, München, Shanghai
D. Evidence of world city formation	*Di Relatively strong evidence* 3: Auckland, Dublin, Helsinki, Luxembourg, Lyon, Mumbai, New Delhi, Philadelphia, Rio de Janeiro, Tel Aviv, Wien *Dii Some evidence* 2: Abu Dhabi, Almaty, Athens, Birmingham, Bogota, Bratislava, Brisbane, Bucharest, Cairo, Cleveland, Köln, Detroit, Dubai, Ho Chi Minh City, Kiev, Lima, Lisbon, Manchester, Montevideo, Oslo, Rotterdam, Riyadh, Seattle, Stuttgart, Den Haag, Vancouver *Diii Minimal evidence* 1: Adelaide, Antwerp, Århus, Athens, Baltimore, Bangalore, Bologna, Brasilia, Calgary, Cape Town, Colombo, Columbus, Dresden, Edinburgh, Genoa, Glasgow, Göteborg, Guangzhou, Hanoi, Kansas City, Leeds, Lille, Marseille, Richmond, St Petersburg, Tashkent, Tehran, Tijuana, Torino, Utrecht, Wellington

Table 7.6. Categorisation of world cities corresponding to the GaWC methodology[384]

[384] Beaverstock, et. al. (1999)

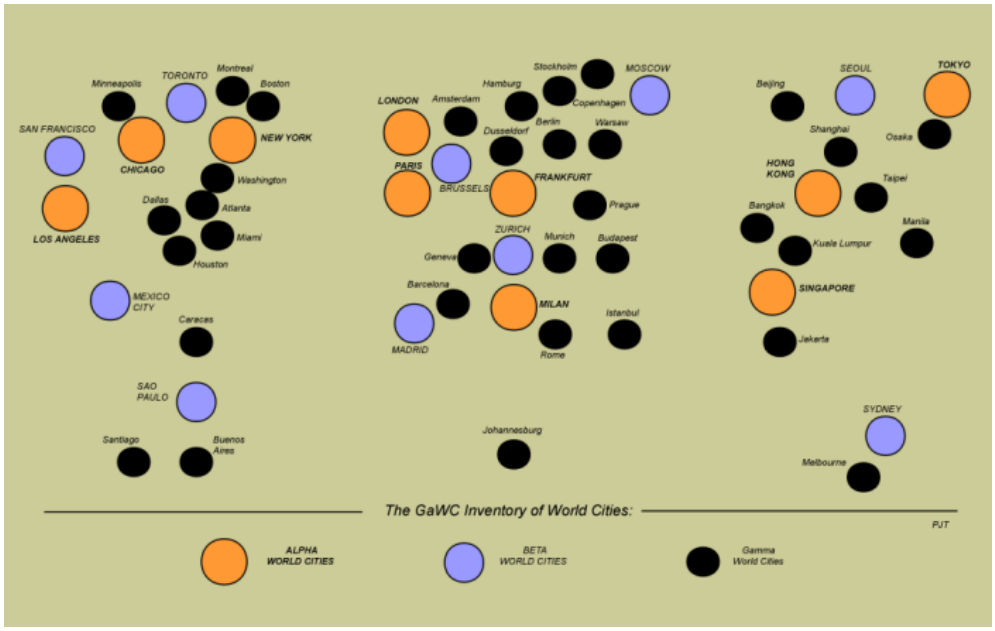


Figure 7.9. The GaWC Inventory of World Cities[385]

[385] Beaverstock, et. al. (1999)

7.3. *Les villes européennes*, 'revisited'

A revision of the DATAR/RECLUS study was published in 2003, but this time covering some 180 agglomerations throughout an expanded Europe (Rozenblat and Cicille, 2003). (See Figure 7.10)

The variables chosen for the ordering of the agglomerations this time included population (2000); population growth (1950-1990); maritime port traffic (1999); passenger airport traffic (2001); accessibility; headquarters of large European firms; financial services; tourism (overnight accommodation); trade fairs; conferences; museums; cultural facilities and heritage; students; scientific publications; and research.

This led to the scoring and subsequent ordering of the cities as indicated by Figure 7.11 and Table 7.11. The classification of the cities resulted in the identification of some seven classes of cities:

Class 1: Metropolises of world ranking
Class 2: Major European metropolises
Class 3: European metropolises
Class 4: Large cities of European importance
Class 5: Large potentially European cities
Class 6: Cities of asserted national importance
Class 7: Other cities of national importance

According to this assessment, Madrid was classified as a major European metropolis, lying in 3rd position after Paris and London, and ahead of Amsterdam and Milan in the same category. Barcelona appeared as a European metropolis, lying in the same position as Berlin and Rome, and in the same category as Brussels and Vienna, Munich and Stockholm, and Lisbon. The 'large cities of European importance' category did not contain any one of the Spanish cities. Valencia Bilbao, Sevilla and Málaga all appeared in the category of 'large potentially European cities', while Zaragoza lay within the category of cities of a greater national importance.

The overall study reaffirmed the dominance of the European urban system by Paris and London, in that order, as well as the concentration of development along the route of the dorsal, or blue banana, as demonstrated by the DATAR/RECLUS study in 1989 (Brunet, 1989).

Figure 7.10. Spatial distribution of the 180 urban agglomerations of the sample[386]

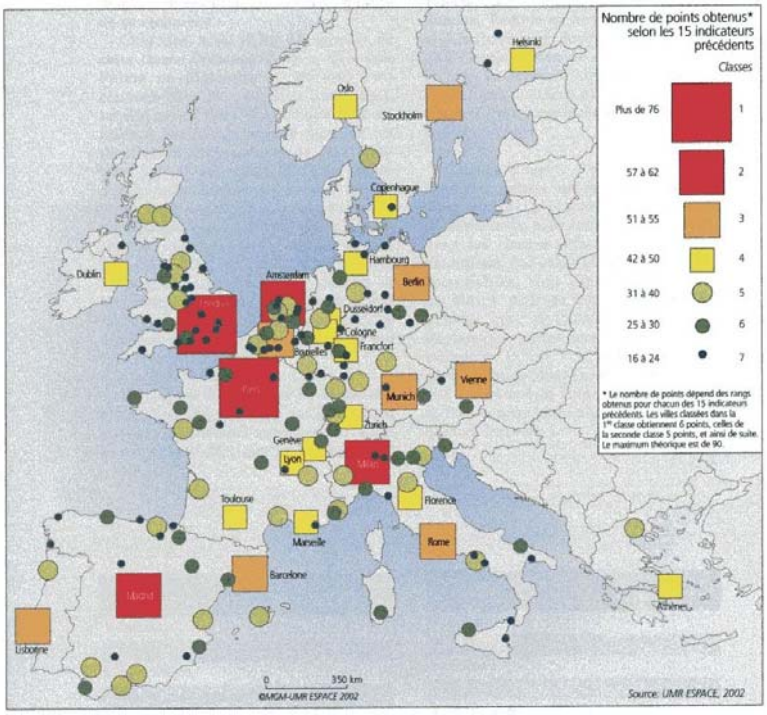


Figure 7.11. Overall scoring of the 180 agglomerations of the sample[387]

[386] Rozenblat and Cicille (2003)
[387] Rozenblat and Cicille (2003)

Class and cities	Score
Class 1: Metropolises of world ranking	
Paris	81
London	76
Class 2: Major European metropolises	
Madrid	62
Amsterdam	59
Milan	57
Class 3: European metropolises	
Barcelona Berlin, Rome	55
Brussels, Vienna	53
Munich, Stockholm	52
Lisbon	51
Class 4: Large cities of European importance	
Athens, Cologne	50
Copenhagen	49
Dublin, Lyon	47
Frankfurt	46
Düsseldorf, Helsinki, Zurich	45
Florence, Hamburg, Marseille	44
Geneva, Oslo	43
Toulouse	42
Class 5: Large potentially European cities	
Naples, Rotterdam, Stuttgart	40
Bologna	39
Edinburgh, Turin	38
Birmingham, Manchester, Strasburg, **Valencia**	37
Ambers, **Bilbao**, Bordeaux, Essen, Lille, Nice, **Seville**	36
Basel, Glasgow, Gothenburg, Montpellier, Nuremburg	35
Hanover, Luxembourg, Venice	34
Leeds, Nantes, Porto, Salonique	33
Grenade, **Palma de Mallorca**, Utrecht	32
Grenoble, **Málaga**	31
Class 6: Cities of asserted national importance	
Cannes, Rennes, Salzburg, Verona	30
Alicante, Bari, Genes, Trieste	29
Dresden, The Hague, Munster, Nancy, **Saragossa**	28
Breme, Bristol, Dijon, Grand, Gijon, Leipzig, Padua, Pamplona, Rouen	27
Aix-la-Chapelle, Angers, Cadiz, Clermont-Ferrand, Eindhoven, Lausanne, Mulhouse, Palermo, Southampton, Tarragona, Wiesbaden	26
Bern, Brest, Cagliari, Fribourg, Graz, Liverpool	25
Class 7: Other cities of national importance	
Belfast, Cardiff, Catane, Cordue, Karlsruhe, Leiden, Luton, Malmo, Mannheim, Rostock, San Sebastian, Santander, Tampere, Tours, Valladolod, Vigo	24
Brunswick, Coventrty, Darmstadt, Liege, Metz, Newcastle-upon Tyne, Nottingham, Reims, Touloun, Turku, Vitoria-Gasteiz	23
Brescia, La Coruña, Murcia	22
Augsburg, Bergame, Bielfield, Bournemouth, Brighton, Halle, La Havre, Leicester, Lübeck, Messine, Orleans, Portsmouth, Salerne, Tarente	21
Aldershot, Arnhem, Carrare, Charleroi, Enschede, Kassel, Kiel, Linz, Nijmegen, Osnabruck	20
Blackpool, Breda, Coblence, Haarlem, Heerlen, Saint-Etienne, Sarrebruck, Sheffield, Swansea	19
Casert, Kingston, Middlesborough, Preston, Southend-on -Sea	18
Chatham, Chemnitz, Derby, Erfurt, Magdebourg, Plymouth, Stock-on Trent, Valenciennes, Bethune, Lens, Mons	17
	16

Table 7.7. Values obtained for the 180 urban agglomerations of the study[388]

[388] Rozenblat and Cicille (2003)

However the study also recognised the growing importance of cities such as Berlin, Munich and Vienna, which seemed to have benefited from the new European geography and the relations with the former Central and Eastern European countries. In a similar way, there was clear evidence of the emergence of a more multi-polar European urban system, to the south (Rome, Milan, Barcelona, Madrid and Lisbon) and to the north in Scandinavia. What was also clearly evident was a better positioning of metropolitan cities lying within the peripheral regions, such as Dublin, Oslo and Athens (Rozenblat and Cicille, 2003).

7.4. Metropolitan European Growth Areas (MEGAs)

It is suggested that the most up to date analysis proportioning a robust and comprehensive understanding of the European urban system at all spatial levels i.e. the level of the metropolitan urban regions, and the level of the medium-sized cities and smaller towns, is that which has been carried out within the context of the *European Spatial Planning Observation Network* (ESPON) aimed at examining the 'Potentials for polycentric development in Europe' (EPSON, 2004). As will be recalled from Chapter 6 (*European spatial policy*) the existing spatial policy of the EU is aimed at countering the hitherto monocentrical concentration of economic development within the regions of the Pentagon, by stimulating the economic development of the regions lying outside the Pentagon in order to contribute to their becoming global integration zones. The argument from Brussels is that a more polycentric development structure, aligned to the 'bunch of grapes' (Kunzman and Wegener, 1991) spatial metaphor, reflecting a number of strong urban regions of European and global significance will contribute to the achievement of Europe's economic competitiveness (c.f. Lisbon and Gothenburg Strategies) as well as territorial cohesion throughout Europe.

In order to systematically explore the specific location of the regional potential for encouraging such polycentrism on a wide European scale, the ESPON study first developed the concept of the *Functional Urban Area* (FUA) (ESPON, 2004). A Functional Urban Area comprises a central urban core and a surrounding area of influence through commuting[389]. The central urban core requires a population of at least 15,000 persons. In the larger countries of the EU27+2 grouping[390], the commuting catchment area required a population of 50,000 persons, while in smaller countries this threshold was lower, standing at 20,000 persons. (See Figure 7.12) A total of 1,595 FUAs were identified across the EU27+2 set of countries, which were examined on the basis of *population* (population exceeding 50,000 inhabitants), *transport* (an airport with more than 50,000 passengers in 2000 or a port with more than 20,000 TEU container traffic in 2001), *knowledge* (main location of universities and number of students), *decision making* (number of headquarters of top European firms), *manufacturing* (gross value added in industry in 2000), *tourism* (number of hotel beds or similar establishments in 2001) and *administration* (based upon the national administrative systems, cities that are the administrative seat of the different levels of public

[389] This catchment area was taken to be the spatial extension which could be reached within a travelling time of 45 minutes by car. See Annex D (Morphological analysis of urban areas based on 45-minutes isochrones) of the Final Report (ESPON, 2004) for a full explanation of the methodology followed to reach the corresponding catchment areas.

administration – national capitals, provincial or regional centres, etc.). Those FUAs with the highest score on the first of these seven indicators were classified as *Metropolitan European Growth Areas* (MEGAs). The remaining FUAs were categorised as *Transnational/national FUAs* or *Regional FUAs*. (See Figure 7.13) In the case of Spain 6 MEGAs were identified (Barcelona, Bilbao, Madrid, Sevilla, Palma de Mallorca and Valencia).

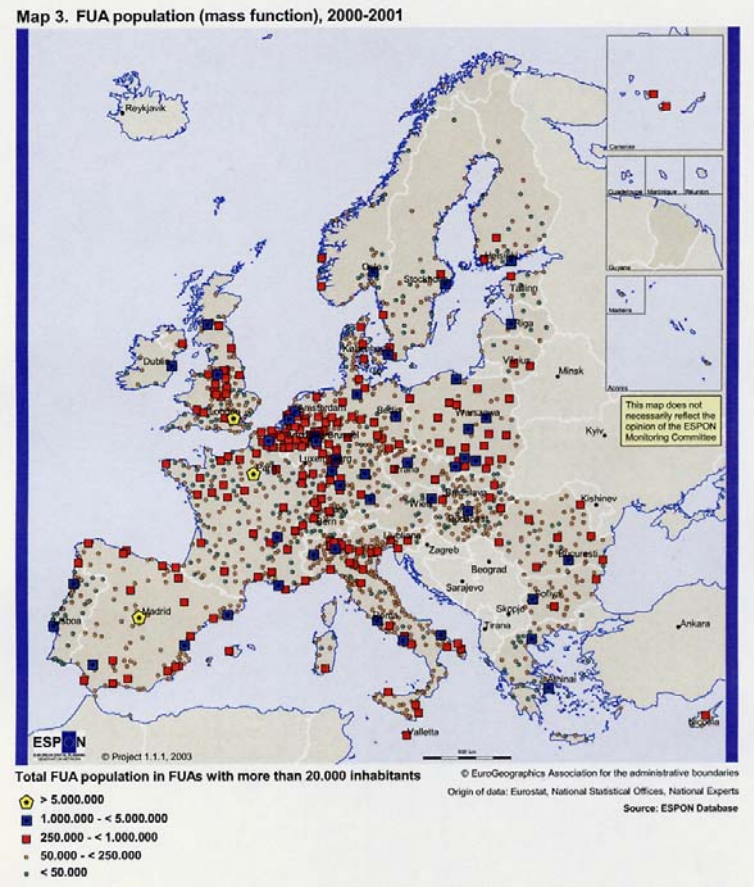


Figure 7.12. Population intervals of the Functional Urban Areas[391]

A further analysis of the MEGAs was then carried out with their being allocated a score on four factors: i) *mass criterion* (population and GDP); ii) *competitiveness* (GDP per capita and headquarters of 500 top European companies); iii) *connectivity* (air transport and accessibility); and iv) *knowledge base* (education level and proportion of total employ in R+D).

[390] Belgium, France, Germany, Italy, Luxembourg, The Netherlands, the United Kingdom, Denmark, Ireland, Greece, Spain, Portugal, Austria, Finland, Sweden, the Czech Republic, Estonia, Cyprus, Latvia, Lithuania, Hungary, Malta, Poland, Slovenia, Slovakia, Bulgaria and Rumania (EU27) and Norway and Switzerland.
[391] *Interim Territorial Cohesion Report* (CEC, 2004a)

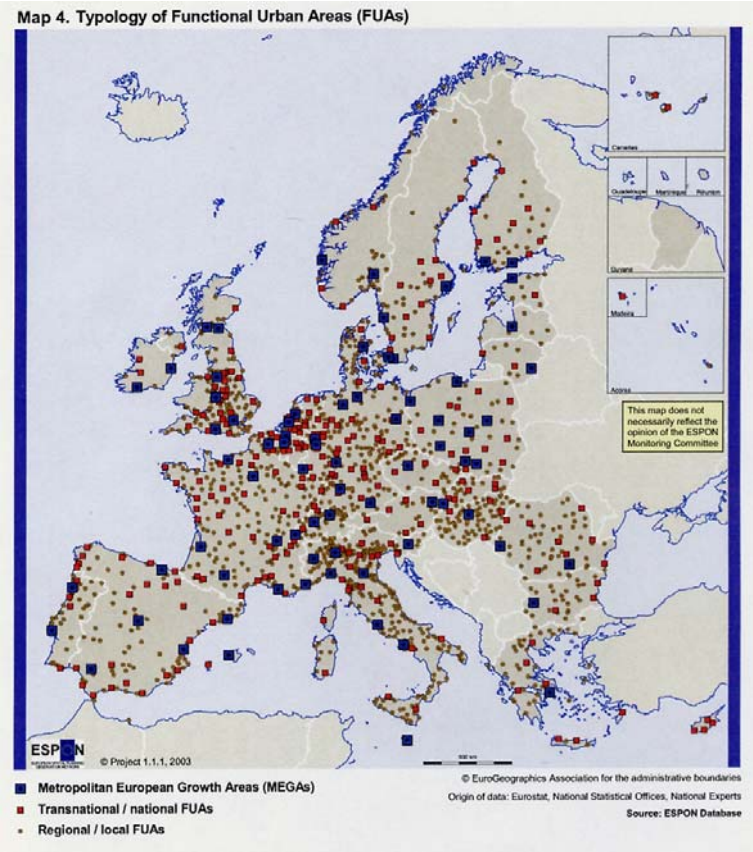


Figure 7.13. Typology of the Functional Urban Areas[392]

The overall performance of the MEGAs on these four criteria resulted in their being ordered into five groupings: i) *global nodes*[393], which are the largest and most competitive urban systems with high connectivity; ii) *European engines*[394], so named for their being large and highly competitive, possessing strong human capital with good accessibility; iii) *strong MEGAs*[395], representing relatively large and competitive cities, often with strong human capital; iv) *potential MEGAs*[396] representing smaller cities, with lower competitiveness, being more peripheral and often with weaker human capital than the strong MEGAs; and finally v) the *weak MEGAs*[397], smaller, less competitive, more peripheral and having lower human capital figures than the potential MEGAs. The ordering of the MEGAs with their respective scores is indicated in Table 7.8 with their spatial distribution illustrated in Figure 7.14.

[392] *Interim Territorial Cohesion Report* (CEC, 2004a)
[393] Paris and London
[394] Munich, Frankfurt, Madrid, Buuxelles, Milano, Roma, Hamburg, Kobenhavn, Zurich, Amsterdam, Berlin, Stockholm, Stuttgart, Barcelona, Düsseldorf, Wien and Köln.
[395] Helsinki, Oslo, Athens, Greater Manchester, Dublín, Goteborg, Torino and Geneve,
[396] Lyon, Antwerp, Lisboa, Rótterdam, Malmo, Marseille, Lille, Nice, Napoli, Bern, Praha, Glasgow, Bremen, Toulouse, Warsawa, Budapest, Aarhus, Edinburgh, Bergen, Birmingham, Bilbao, Valencia, Luxembourg, Bologna and Palma de Mallorca.
[397] Bratislava, Turku, Cork, Bordeaux, Le Havre, Genova, Bucuresti, Tallinn, Sofia, Southampton, Sevilla, Porto, Krakow, Vilnius, Ljublijana, Riga, Katowice, Gdansk-Gdynia-Sopo, Poznan, Wroclaw, Lodz, Valletta, Szczecin and Timosoara.

Category	Metropolitan urban regions and cities
Global nodes (2)	Paris (16) (*) and London (15)(*)
European engines (17)	Munich (15) (*), Frankfurt (13) (*), **Madrid** (13), Brussels (12) (*), Milan (12) (*), Rome (12), Hamburg (12) (*), Copenhagen (12), Zurich (12) (*), Amsterdam (11) (*), Berlin (11), Stockholm (11), Stuttgart (11) (*), **Barcelona** (10), Düsseldorf (10) (*), Vienna(10) and Cologne (10) (*)
Strong MEGAs (8)	Helsinki (9), Oslo (9), Athens(9), Manchester (8), Dublin (7), Gothenburg (7), Torino (7) and Geneva (7)
Potential MEGAs (25)	Lyon (6), Antwerp (6), Lisbon (6), Rotterdam (6), Malmö (6), Marseille (6), Lille (6), Nice (6), Naples (6), Bern (6), Prague (5), Glasgow (5), Bremen (5), Toulouse (5), Warsaw (5), Budapest (5), Aarhus (5), Edinburgh (5), Bergen (5), Birmingham (5), **Bilbao** (5), **Valencia** (5), Luxembourg (5), Bologna (5) and **Palma de Mallorca** (5)
Weak MEGAs (24)	Bratislava (5), Turku (4), Cork (4), Bordeaux (4), Le Havre (4), Genoa (4), Bucharest (4),Tallinn (3), Sofia (3), Southampton (3), **Seville** (3), Porto (3), Krakow (3), Vilnius (3), Ljubljana (3), Riga (3), Katowice (2), Gdansk-Gdynia-Sopo (2), Poznan (2), Wroklaw (2), Lodz (2), Valetta (2), Szczecin (1) and Timisoara (1)

Table 7.8. Classification of the 76 MEGAs. Number in parenthesis indicates the composite score on the four factors of mass, competitiveness, connectivity and knowledge. Cities marked with (*) lie within the spatial limits of the central 'pentagon'.[398]

The highest ranking MEGAs (*global nodes* and *European engines*) tend to be located within the pentagon area - Paris, London, Munchen, Frankfurt, Milano, Hamburg, Bruxelles, Stuttgart, Zurich, Amsterdam, Düsseldorf and Köln, with just Madrid, Roma, Kobenhavn, Berlin, Barcelona, Stockholm and Wien all lying outside this area. (See Figure 7.14)

Notwithstanding this, one of the results of this study was the recommendation that the spatial extent of the European 'pentagon' is in fact larger than that traditionally referred to as lying between London, Paris, Milan, Munich and Hamburg. Rather the study suggests that the territorial area lying between Manchester, Paris, Genoa, Venice and Berlin provides a more accurate representation of this European central area.

Taking into consideration the MEGAs with their corresponding adjoining FUAs, a number of possible polycentric counterweights to the urban systems of the pentagon area were identified. In Spain these included Madrid, Barcelona (with Tarragona), Valencia (with Castellon de la Plana), Alicante (with Murcia) and Sevilla (with Cadiz).

[398] EPSON (2004)

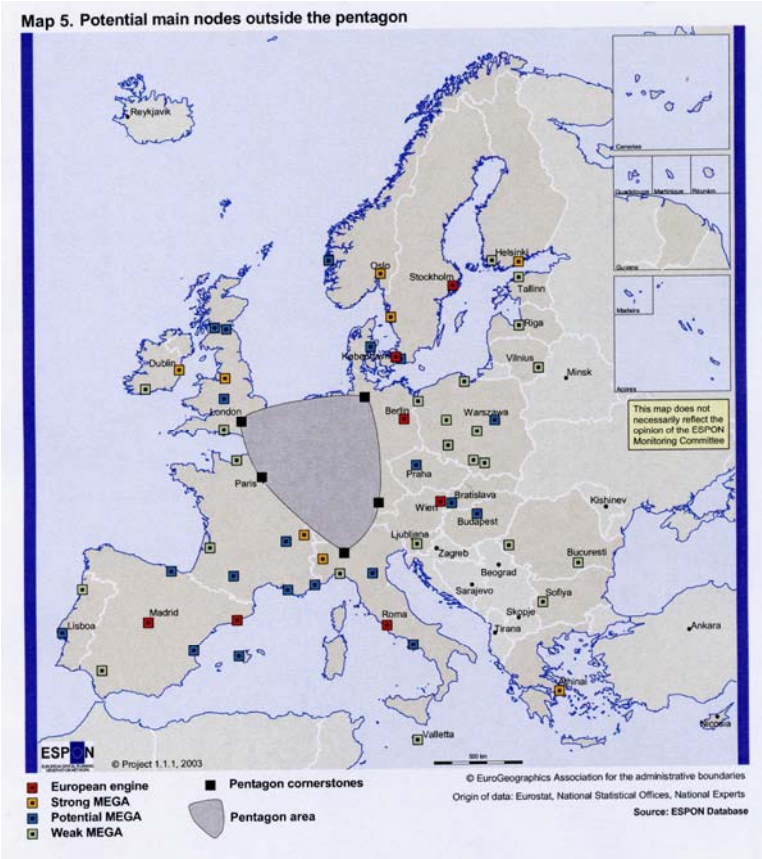


Figure 7.14. Spatial distribution of the MEGAs indicating the potential main nodes outside the pentagon[399]

[399] CEC (2004a) p.22

7.5. A geographical-functional categorisation of European cities

In 2005, the Global Urban Development organisation published a paper written by Peter Hall, one of the most erudite and experienced researchers on European urban and regional research, offering a European perspective on the world's urban system. This paper was of interest as it put forward a qualitative assessment of a European urban system based partly on the content of the ESDP (CEC, 1999) and partly on Hall's own views (Hall, 2005).

Hall suggested that there was an emerging contrast between the region of the European central capitals on the one hand , characterised by the dense cluster of cities closely networked and connected by means of air, high-speed-train and telecommunications links (London, Paris, Frankfurt, Luxembourg, Brussels, Amsterdam), and the "gateway" or "regional capital" cities in the Europe's more peripheral regions, where each of these was dominating a large but less-densely-populated territory (Dublin, Edinburgh, Copenhagen, Stockholm, Helsinki, Berlin, Vienna, Rome, Madrid, and Lisbon, together with the central and eastern European capitals of Ljubljana, Budapest, Prague, Warsaw, and Tallinn). All of these cities enjoy air connectivity into the central region, despite the fact that at the same time they are becoming the cores of local high-speed-train systems. In these cases Hall suggests that there an interesting degree of competition between a higher-order city that appears to control such a wide sector of European space, and neighbouring cities which exert control over parts of that space, as takes place with Copenhagen versus Stockholm and Helsinki; Berlin versus Vienna; Madrid versus Lisbon. Furthermore in a number of cases this critical Euro-regional role is divided between a "political" and a "commercial" capital and the example Hall offers include Rome and Milan; and Madrid and Barcelona.

Hall goes on to offer a system broken down into some four categories:

1. Central high-level service cities
2. Gateway cities (sub-continental capitals)
3. Smaller capitals and provincial capitals, and
4. County towns

The first of these categories (c*entral high-level service cities*:) includes major cities (national capitals) and major commercial cities lying within the pentagon area, i.e.

London, Paris, Milan, Munich, Frankfurt, Hamburg, Amsterdam, Brussels and Luxembourg. These cities all benefit from the highest multi-modal transport accessibility within the EU and are inter-connected through dense air corridors and are in the process of being supplemented by new high-speed rail services.

The second such category (*gateway cities sub-continental capitals*) refers to national capitals and major commercial cities lying beyond the central pentagon area, with a high-level service centre role for major parts of Europe. This includes Madrid-Barcelona, Rome, Athens, Vienna, Berlin, Copenhagen, Prague, Warsaw and Budapest. They are characterised as normally being major air hubs for flag carriers and increasingly the cores of regional high-speed train systems, waiting being connected to the more advanced system of the central pentagon area. In some cases the location may be too distant for rail to compete effectively. This category also includes a number of larger commercial cities, such as Manchester, Lyon, Stuttgart and Leipzig.

Category	Cities
Central High-Level Service Cities	London, Paris, Milan, Munich, Frankfurt, Hamburg, Amsterdam, Brussels, and Luxembourg
Gateway Cities (Sub-Continental Capitals)	Madrid-Barcelona, Rome, Athens, Vienna, Berlin, Copenhagen, Prague, Warsaw, and Budapest; as well as Manchester, Lyon, Stuttgart, and Leipzig.
Smaller Capitals and Provincial Capital	Dublin, Edinburgh, Lisbon, Helsinki, Stockholm, Bratislava, Ljubljana, and Sofia; as well as Bristol, Bordeaux, Grenoble, Strasbourg, Hanover, Bologna, Poznan and Krakow.
"County towns":	

Table 7.9. Ordering of cities according to the geographical-functional categorisation[400]

The third category, (smaller capitals and provincial capitals) refers to the smaller equivalents of the previous category, commanding less extensive space in terms of population and economic production. Often these cities lie in wholly peripheral European locations, such as Edinburgh, Lisbon, Helsinki, Stockholm, Bratislava, Ljubljana and Sofia. The category also embraces smaller commercial centres controlling "provincial" territories, such as Bristol, Bordeaux, Grenoble, Strasbourg, Hannover, Bologna, Poznan and Krakow.

Hall's final category (county towns) recognises the typical rural administrative and service centre for a surrounding area 40-60 km. in radius, of which hundreds exist in Europe. Some, in "accessible rural" areas, are growing very rapidly through dispersal from major cities, thus tending to form highly networked "mega-city regions" such as south-eastern England, the Delta Metropolis around Amsterdam, and Lombardy in

[400] Hall (2005)

northern Italy. Other examples, less accessible, are experiencing more varied fortunes. Some are growing through tourism and migration for retirement, while others are stagnant or even declining. Hall suggests the last represents a particular problem of deindustrialisation that is highly localised in certain parts of Europe, especially the coalfield belt from northern and midland England through Wallonia, Lorraine, the Ruhr valley, and upper Silesia.

Concluding remarks

This chapter has sought to provide an overview of the development of some of the principal studies directed towards examining the nature and hierarchies of the European urban system over the last twenty year period, placing emphasis on the hierarchies accorded to Europe's metropolitan urban regions. Each of these studies has been carried out with the growing benefits accruing from the increasing harmonisation of statistical data, enabling more rigorous comparative urban and territorial analysis.

From this overview and the summary of the findings of each of these studies contained in Table 7.14, it is apparent that both Madrid and Barcelona occupy key positions within the European metropolitan spatial hierarchy. In the context of the French studies of the European urban agglomerations, both Madrid and Barcelona improved their positioning over the period between the two studies. With regard to the GaWC study, of the 48 European metropolitan urban regions and cities finally included in the 'inventory' Madrid (in the BETA world city category) and Barcelona (in the GAMMA category) stand out as the only two Spanish cases. The more recent EPSON study accords equal status to both Madrid and Barcelona as 'European engines', in the category lying directly below that of the 'Global nodes' used to describe Paris and London. The other Spanish MEGAs are accorded lesser importance as Potentail MEGAs (Bilbao, Valencia and Palma de Mallorca) and Weak MEGAs (Sevilla). Finally in Peter Hall's assessment, both Madrid and Barcelona can be categorised as Gateway Cities or Sub-Continental Capitals).

Accordingly it is reasonable to conclude, albeit tentatively, that while not all, at least some of the metropolitan urban regions comprising the Spanish metropolitan system have achieved a strong 'positioning' within the European urban system. Without doubt the two pre-eminent Spanish cases are those of Madrid and Barcelona. However this tentative conclusion is for the moment severely constrained by one of the limitations of each of the studies cited here. That limitation rests on the fact that each of the studies is carried out on the application of a series of pre-determined attributes to the metropolitan urban regions and cities of the respective samples. None of the studies adopts a methodological approach which broaches the question of the 'relations' between the different metropolitan urban regions and cities, treating them as a system in themselves. It is considered that such an approach would contribute to a greater and more robust appreciation of the nature of the European urban system, and could lead

to a more definitive empirical understanding of the resultant hierarchy or ordering of the individual components. It is precisely this challenge which forms the basis of the empirical research outlined in Chapter 8. A quantitative 'network analysis' of the relations between some 28 European metropolitan urban regions is carried out through a detailed examination of air passenger flows. The network analysis approach enables the quantitative determination of the 'positioning' of the 28 sample cities in relation to one another and as a consequence will permit ascertaining the positioning of the Spanish metropolitan urban regions within this wider European spatial configuration.

Source	Positioning
Les Villes Européennes (Brunet, 1989)	Madrid and Barcelona = Class 3 Sevilla and Valencia = Class 5 Bilbao = Class 6 Zaragoza and Málaga = Class 7
GaWC Inventory of World Cities (Beaverstock, Taylor and Smith, 1999)	Madrid = BETA world city Barcelona = GAMMA world city
Les Villes Européennes 'revisited (Rozenblat and Cicille, 2003)	Madrid = Class 2 (major European metropolis) Barcelona = Class 3 (European metropolis) Valencia, Bilbao, Sevilla and Málaga = Class 5 (large potentially European cities) Zaragoza = Class 6 (city of certain national importance)
ESPON (2004)	Madrid and Barcelona = '*European engines*' Bilbao and Valencia = *potential* Metropolitan European Growth Areas Sevilla = *weak* Metropolitan European Growth Areas
Hall (2005)	Madrid-Barcelona= Gateway Cities (sub-continental capitals)

Table 7.10. Summary of the positioning accorded to the Spanish metropolitan urban regions within the named studies

At this stage it is necessary to advise that for questions of data (non-)availability, the spatial extent and composition of the European urban system used in Chapter 8 for testing these air passenger relations has had to be reduced. On the one hand this reduction impinges upon the countries forming part of the system, which through

necessity has to comprise the EU15+2 grouping[401]; and on the other hand the reduction impinges upon the individual metropolitan urban regions drawn upon. The final sample of metropolitan urban regions derives from the upper echelons (*Global nodes*, *European engines* and *Strong MEGAs*) of the aforementioned EPSON study, on the basis of it being the most contemporary and comprehensive research, in terms of its depth, its spatial coverage and the criteria used to determine the classification of the metropolitan urban regions of the EU27+2 grouping to date. As a consequence the Spanish share of the system of European metropolitan urban regions by necessity has had to be limited to include just Madrid and Barcelona – on the basis of their being the only two Spanish metropolitan urban regions lying within these upper categories of the EPSON classification. In spite of the consequential 'loss' of the other components of the Spanish metropolitan system, the inclusion of just Madrid and Barcelona is consistent with the magnitude of the spatial scale to be examined within Chapter 8. Furthermore it is considered wholly in keeping with the bicephalia of the Spanish metropolitan system, as indicated by Chapters 4 and 5, which examined the social and economic structures of the metropolitan system, as well as the long-standing metropolitan characterisation of both cities (c.f. Mumford, 1961) and the overall maturity of the two leading metropolitan urban regions which came out in Chapter 2 (Metropolisation in Spain).

[401] EU15+2 = Belgium, France, Germany, Italy, Luxembourg, The Netherlands, United Kingdom, Denmark, Ireland, Greece, Spain, Portugal, Austria, Finland, Sweden; and Norway and Switzerland.

CHAPTER 8. - EUROPEAN SPACE OF AIR PASSENGER FLOWS[402]

Introduction

Following the evolution of European spatial policy and the analysis of the cities constituting the European metropolitan hierarchy in the two previous chapters, this current chapter sets out to proportion quantitative evidence to support the hypothesis of a gradual (re)positioning of the Spanish metropolitan urban regions within this urban system. Therefore the focus of the chapter is on the dynamics between these metropolitan centres, rather than searching for the elaboration of some form of hierarchy of these centres based upon (a) single or multiple attribute(s), as was the approach adopted in the majority of the hierarchies referred to in Chapter 7.

The quantitative analysis adopted for this purpose takes inspiration from the concept of 'space of flows' and 'network society', proposed by Manuel Castells, in the context of the changes resulting from the informational and technological revolution, and the new industrial space and the new service economy (Castells, 1989, 1996). According to Castells, contemporary society is 'constructed around flows: flows of capital, flows of information, flows of technology, flows of organisational interaction, flows of images, sounds and symbols.' Furthermore such flows are 'the expression of processes dominating our economic, political and symbolic life' (Castells, 1996, p.412).

If such an approach is to be adopted to ascertain the nature of the relations between the European metropolitan urban regions, the considerations that need to be addressed relate to a) the choice of the flows that can realistically be examined, and b) the selection of the said metropolitan urban regions, in order to proportion results capable of reflecting these relations.

In dealing with this first issue, there is an extensive literature relating to the use of air passenger flows in order to evaluate the concept of World (and European) City Networks (Cattan, 1995; Derudder and Witlox, 2005; Guimerà, et. al. 2005; Keeling, 1995; Smith and Timberlake, 1995a, 1995b, 2001 and 2002, and Timberlake and Ma,

[402] A first version of the results outlined in this Chapter (Burns, Roca and Moix, 2007) were presented at the 2007 Meeting of the *Association of American Geographers*, which took place in San Francisco, 17-21 April 2007, while a second version (Burns, Roca and Moix, 2008) appears in a special issue of *GeoJournal*, on 'Airline networks and urban systems'.

2007). Other writers have used air passenger flows as a means of determining different aspects of urban economic development and labour markets (Alkaabi and Debbage, 2007; Breuckner, 2003, Debbage, 1999; Debbage and Dalk, 2001; and Liu et. al., 2007).

Keeling (1995) suggests the connections between world cities and other principal cities of similar, superior or in inferior importance , as well as connections with different urban and rural centres at different territorial scales are facilitated principally through air transport, telecommunications circuits and non-voice data transfer systems. The most appropriate indication of the role of transport within the world city system derives from the following key considerations:
(1) Global airline flows represent one of the few indices available of transactional flows or inter-urban connectivity;
(2) Air networks together with their associated infrastructure are the most visible manifestation of world city interaction;
(3) Considerable demand still exists for face-to-face relationships, despite the global telecommunications revolution;
(4) Air transport is the preferred mode of intercity movement for the transnational capitalist class, migrants, tourists and high-value goods; and finally
(5) Airline links form an important component of a city's aspirations to world city status.

It is considered that the interpretation of the air passenger flows, between the different European metropolitan urban regions fits appropriately within the notion of a 'space of flows'. It is suggested that the evaluation of these flows to determine the degree of interaction between the metropolitan centres and the resulting relations can contribute to another understanding of the European spatial territory, which goes beyond that deriving from a straightforward analysis of the urban system in terms of the geographical position of the cities.

Turning attention to the selection of the metropolitan urban regions for the sample, it will be recalled from Chapter 7 (European urban system) that the ESPON studies, carried out in the context of the INTERREG III Community Initiative, have produced the most up to date results through taking a transnational comparative approach to determining the nature and characteristics of the contemporary European urban system. For this reason it is considered wholly appropriate that the selection should derive in the main from the classification of the upper echelons of the Metropolitan European Growth Areas (MEGA). Therefore the sample comprises some 28 cities,

belonging principally to the global nodes and European engine classes of the MEGAs of the EU15+2[403] urban system[404]. All the countries of the EU15+2 countries are represented. The spatial extent and geographical positioning of the cities in the sample is illustrated in Figure 8.1. It is important to bear this geographical positioning in mind, in its most abstract sense, as this will be built upon progressively throughout the development of this chapter, in the absence of the more familiar and traditional cartographic base.

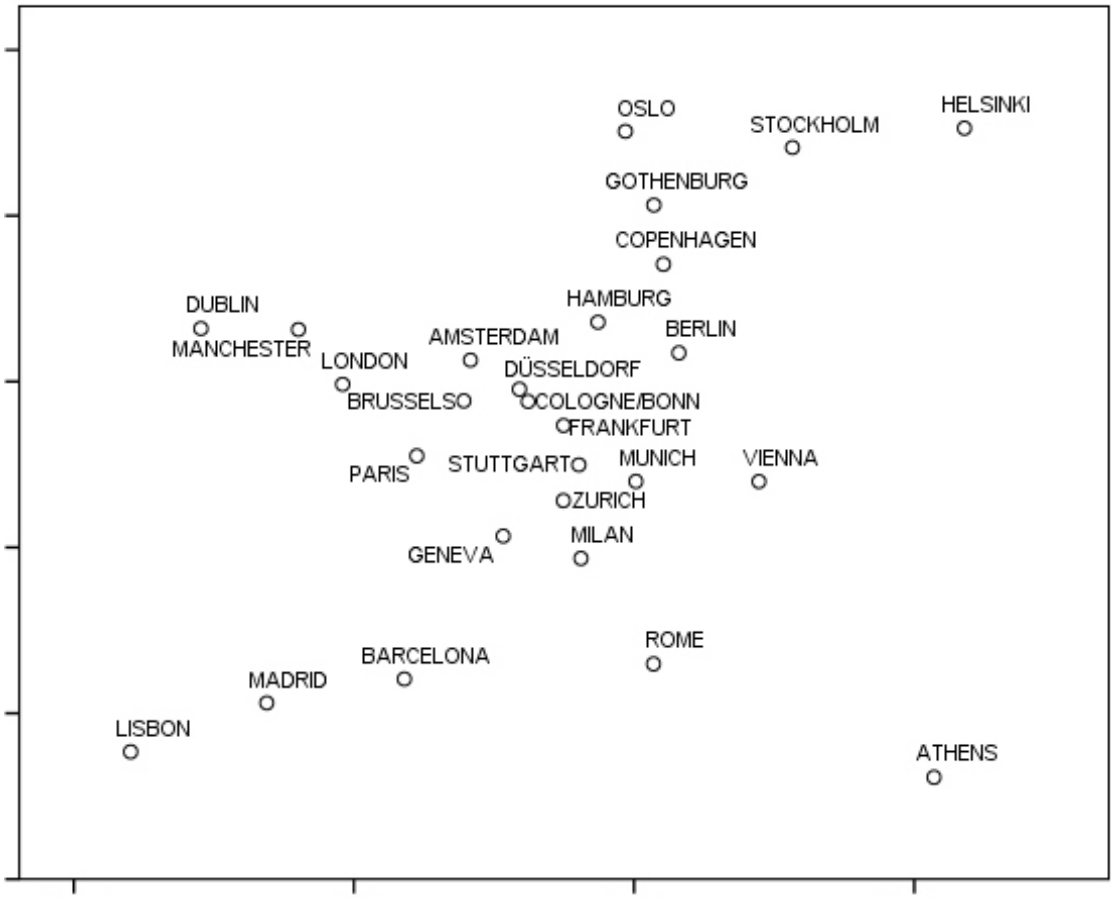


Figure 8.1. Spatial (geographical) distribution of the 28 European metropolitan urban regions

A 'network analysis' methodology is adopted in order to come to a clear and succinct understanding of the nature of the air passenger flows. Several indicators are used, deriving from gravitational modelling techniques, to analyse the complexity of the flows between these cities within the European metropolitan system. Finally a mathematical technique of multidimensional scaling is drawn upon, in order to interpret and visualise

[403] EU15+2 = Belgium, France, Germany, Italy, Luxembourg, The Netherlands, United Kingdom, Denmark, Ireland, Greece, Spain, Portugal, Austria, Finland, Sweden; and Norway and Switzerland.
[404] Paris, London, Munich, Frankfurt, Madrid, Brussels, Milan, Rome, Hamburg, Copenhagen, Zurich, Amsterdam, Berlin, Stockholm, Stuttgart, Barcelona, Düsseldorf, Vienna, and Cologne/Bonn, Helsinki, Oslo, Athens, Greater Manchester, Dublin, Gothenburg and Geneva, as well as Lisbon and Luxembourg, given there capital city status within the EU15 grouping.

the resulting spatial configuration and the positioning of the different cities within the conceptual European 'space of air passenger flows'. Such a vision contrasts with the more traditional map-based geographical image of Europe, based upon Cartesian coordinates, permitting the comparison between the functional and physical proximity of the cities of the sample to the respective centres of gravity.

8.1. Network analysis

In proposing a spatial order of European cities in the context of globalisation, Taylor and Hoyler (2000) acknowledge that such cities form part of the wider World City Network, drawing upon Castells (1993) and the notion of their forming 'nodal centres of the new global economy' (Castells, 1993, p.250).

For Smith and Timberlake (2002) as well, world cities represent nodes in 'multiple networks of economic, social, demographic and informational flows' (p. 118). An approach of this nature enables them to conceptualise these world cities in relational terms, which leads on to consider 'mapping cities in terms of their structural relationships to one another' (Smith and Timberlake, 2002, p. 118).

For these authors:

> "Quantitative network analysis is particularly well suited to the network-theoretical imagery on which both world-system analysis and the literature on global cities rely. In principle, network methodology allows us to simultaneously analyse multiple patterns of flows, exchanges, or linkages between cities (or other nodes) for the purpose of illuminating the patterning of connections between them as well as the structure of the entire network. It is a powerful tool uncovering the structure of the global flows of people, commodities, capital, information, and more. It is a rigorous way to operationalise theoretical conceptions about the world economy and the global city system." Cities area linked through economic, political, cultural and social reproductive exchanges, and these take many forms. Broadly, "the stuff" that flows among cities must be human, other material, or communication. Everything we can think of that moves from city to city can be classified in the matrix defined by these two typologies" (Smith and Timberlake, 2002, p.119).

One of the limitations in carrying out a network analysis technique to understand an urban system rests in the complex data requirement. Since network analysis concerns relations, the data must itself be a measure of relations. The availability of appropriate data is therefore a crucial consideration. Another such limitation is that data must be available for every city or location in the system. Smith and Timberlake (2002) suggest that 'the data requirements can best be understood as an in-flow/out-flow matrix' with 'a measure of the relationship between each city pair in the network', and that 'formal network analysis on the international city system must be based on a thorough compilation of relational data among all possible pairs of cities to be included in the analysis' (p. 121).

Derudder and Witlox (2005) are critical of analyses of airline data of *area subsets* in the context of World City Networks. They argue that while 'the notion that there is a European or an Asian 'system of cities' or 'urban hierarchy' may initially seem an attractive idea because it appears to provide a coherent subset of cities to study within a regional context' (p. 2,379) in the end 'depicting the patterns of intercity relations within the Asia-pacific region and Europe is only the first step in understanding how these cities operate as world cities. Simply invoking the concept of the world city means that we must extend our vision beyond these area subsets' (p. 2,380).

While Cattan's (1995) research drew upon gravity modelling techniques to examine the attractivity and international hierarchy of European airports, the content of this present chapter is more concerned with the relations between the principal airports of the previously described European subsystem comprising 28 metropolitan urban regions.

As seen in Chapter 7, through the Lisbon (2000) and Gothenburg (2001) Strategies (CEC, 2000 and 2001b), as well as the revitalisation of the Lisbon Agenda (2005) (CEC, 2005), European policy is directed towards fulfilling the challenge of strong European competitiveness at the international level. As a consequence the analogy to the network-analytical framework used in World City Network Analysis, and applied to this European space comprising the EU15+2 grouping of countries, is considered justified.

8.2. Air passenger data sources

The first objective of the network analysis application comprised the construction of a (*28 × 28*) in-flow/out-flow or origin-destination matrix of passenger flows, providing data for the 784 city pairs of the European metropolitan urban region space.

	DESTINATION						
	1,	2,	3,	.	.	.	28
ORIGIN							
1,							
2,							
3,							
.							
.							
.							
28							

Table 8.1. Outline of the origin-destination matrix for the 28 sample cities

These flows were taken from publicly available EUROSTAT transportation data[405] for 2004, on the basis of being the most recent year for which such data was available for all of the 28 cities in the sample[406]. In the cases of Berlin, Paris, Milan, Rome and London, multiple airport combinations were used, given that these cities are served by more than one principal airport. The full list of the airports drawn upon for the 28 cities is contained in Table 8.2.

The EUROSTAT database contains data for *detailed* air passenger flows between airport pairs[407]. The exploitation of this data source proportioned detailed passenger flows for some 572 of the possible 756 combinations[408]. The values of the flows were arrived at by taking the median value of a) the departure flow from one airport to another and b) the arrival flow at the destination airport from the airport of origin. In a number of cases only one such value - the departure flow from one airport to another or the arrival flow at the destination airport from the airport of origin - was available. The matrix of these real flows is contained in Technical Annex 1 at the end of this chapter.

[405] http://epp.eurostat.ec.europa.eu
[406] Other data sources such as the ICAO were considered but were rejected on the basis of not being complete for the sample of 28 cities and appearing to be restricted to returns from a limited number of airlines operating from the airports in question.
[407] <<Transport <<Air transport <<Air transport measurement <<Detailed air passenger transport by reporting country and routes <<Air passenger transport between the main airports of reporting country and their main partner airports
[408] While the matrix contains some (n × n) cells, the maximum number of possible combinations[(n × n) – n], on the basis of the values of the diagonal being zero. No passengers depart from and arrive at the same airport. Even in the case of London, with multiple airports, no data was found relating to passenger flows of this nature. Therefore after subtracting the 28 diagonal combinations registering zero, the 784 theoretical combinations was reduced in practical terms to 756 possible origin-destination combinations.

Case	City	Corresponding airport(s)
1	Vienna	at_loww WIEN/SCHWECHAT airport
2	Brussels	be_ebbr BRUXELLES/NATIONAL airport
3	Geneva	ch_lsgg GENEVE/COINTRIN airport
4	Zurich	ch_lszh ZURICH airport
5	Frankfurt	de_eddf FRANKFURT/MAIN airport
6	Hamburg	de_eddh HAMBURG airport
7	Cologne/Bonn	de_eddk KÖLN/BONN airport
8	Düsseldorf	de_eddl DÜSSELDORF airport
9	Munich	de_eddm MUNCHEN airport
10	Stuttgart	de_edds STUTTGART airport
11	Berlin	de_eddt BERLIN-TEGEL airport
		de_eddi BERLIN-TEMPELHOF airport
		de_eddb BERLIN-SCHONEFELD airport
12	Copenhagen	dk_ekch KOBENHAVN/KASTRUP airport
13	Barcelona	es_lebl BARCELONA airport
14	Madrid	es_lemd MADRID/BARAJAS airport
15	Helsinki	fi_efhk HELSINKI-VANTAA airport
16	Paris	fr_lfpg PARIS/CHARLES-DE-GAULLE airport
		fr_lfpo PARIS/ORLY airport
17	Athens	gr_lgav ATHENS airport
18	Dublin	ie_eidw DUBLIN airport
19	Milan	it_liml MILANO/LINATE airport
		it_limc MILANO/MALPENSA airport
20	Rome	it_lirf ROMA/FIUMICINO airport
		it_lira ROMA/CAMPINO
21	Luxembourg	lu_ellx LUXEMBOURG/LUXEMBOURG airport
22	Amsterdam	nl_eham AMSTERDAM/SCHIPHOL airport
23	Oslo	no_engm OSLO/GARDERMOEN airport
24	Lisbon	pt_lppt LISBOA airport
25	Gothenburg	se_esgg GOTEBORG/LANDVETTER airport
26	Stockholm	se_essa STOCKHOLM/ARLANDA airport
27	Manchester	uk_egcc MANCHESTER/INTL airport
28	London	uk_eggw LONDON LUTON airport
		uk_egkk LONDON/GATWICK airport
		uk_eglc - LONDON CITY airport
		uk_egll LONDON/HEATHROW airport
		uk_egss LONDON/STANSTED airport

Table 8.2. International Civil Aviation Organisation (ICAO) airport codes for the 28 cities[409]

Smith and Timberlake (1995) recognise the requirement for all cells of a matrix to be filled in network analysis. The difference between the maximum number of airport combinations and the combinations for which detailed passenger flows were obtained from the EUROSTAT data source, i.e. the 184 pale shaded cells of Technical Annex 1[410], was overcome by making an estimation of the passenger flows between the

[409] http://www.airport-technology.com/icao-codes/M.html (consulted 05.03.2006)

[410] The full list of these city-pair combinations is as follows: Oslo-Vienna; Lisbon-Vienna; Gothenburg-Vienna; Manchester-Vienna; Cologne/Bonn-Brussels; Düsseldorf-Brussels; Stuttgart-Brussels; Berlin-Brussels; Luxembourg-Brussels; Hamburg-Geneva; Cologne/Bonn-Geneva; Düsseldorf-Geneva; Stuttgart-Geneva; Berlin-Geneva; Stuttgart-Zurich; Oslo-Zurich; Gothenburg-Zurich; Geneva-Hamburg; Berlin-Hamburg; Madrid-Hamburg; Athens-Hamburg; Dublin-Hamburg; Milan-Hamburg; Rome-Hamburg; Luxembourg-Hamburg; Oslo-Hamburg; Lisbon-Hamburg; Gothenburg-Hamburg; Stockholm-Hamburg; Manchester-Hamburg; Brussels-Cologne/Bonn; Geneva-Cologne/Bonn; Düsseldorf-Cologne/Bonn; Stuttgart-Cologne/Bonn; Copenhagen-Cologne/Bonn; Helsinki-Cologne/Bonn; Athens-Cologne/Bonn; Dublin-Cologne/Bonn; Luxembourg-Cologne/Bonn; Amsterdam-Cologne/Bonn; Oslo--Cologne/Bonn; Lisbon-Cologne/Bonn; Gothenburg-Cologne/Bonn; Stockholm-Cologne/Bonn; Manchester-Cologne/Bonn; Brussels-Düsseldorf; Geneva-Düsseldorf; Cologne/Bonn-Düsseldorf; Luxembourg-Düsseldorf; Oslo-Düsseldorf; Lisbon-

airport pairs, based upon complementary data contained within the same EUROSTAT database[411]. For example, while Lisbon is not a *principal* airport pair for Berlin, and Berlin is not a *principal* airport pair for Lisbon, clearly there are passenger flows between the two airports within the European air passenger system.

EUROSTAT data provides detailed information of the total number of passengers departing from one EU country to another, broken down to the departures from the individual airports of the country of origin. In the same way it provides detailed information of the total number of passengers arriving in one EU country from another, broken down to the arrivals at the individual airports of the country of arrival. Therefore the absolute and proportional values of passengers leaving any one of the 28 cities of the sample with another country as their destination can be ascertained. Similarly the passengers arriving in one country from another is available and is broken down in terms of the arrival airport, again in absolute and proportional terms.

In the case of Lisbon-Berlin, an estimation was able to be made of the passengers departing from Lisbon and arriving in Berlin was done by firstly ascertaining the passengers (absolute value) arriving in Berlin from Portugal and multiplying that value by the proportion of passengers departing for Germany from Lisbon (proportional value). This estimated value was contrasted with the number of passengers (absolute value) departing from Lisbon for Germany, multiplied by the proportion of passengers arriving in Berlin from Portugal (proportional value). The median value of these two calculations was taken as the value of the attraction of Berlin for Lisbon, in the absence

Düsseldorf; Gothenburg-Düsseldorf; Stockholm-Düsseldorf; Luxembourg-Munich; Brussels-Stuttgart; Geneva-Stuttgart; Zurich-Stuttgart; Cologne/Bonn-Stuttgart; Helsinki-Stuttgart; Dublin-Stuttgart; Luxembourg-Stuttgart; Oslo-Stuttgart; Lisbon-Stuttgart; Gothenburg-Stuttgart; Stockholm-Stuttgart; Manchester-Stuttgart; Brussels-Berlin; Hamburg-Berlin; Athens Dublin-Berlin; Luxembourg-Berlin; Oslo-Berlin; Lisbon-Berlin; Gothenburg-Berlin; Stockholm-Berlin; Manchester-Berlin; Cologne/Bonn-Copenhagen; Athens-Barcelona; Luxembourg-Barcelona; Oslo-Barcelona; Gothenburg-Barcelona; Hamburg-Madrid; Helsinki-Madrid; Oslo-Madrid; Gothenburg-Madrid; Geneva-Helsinki; Cologne/Bonn-Helsinki; Stuttgart-Helsinki; Madrid-Helsinki; Athens-Helsinki; Dublin-Helsinki; Luxembourg-Helsinki; Lisbon-Helsinki; Hamburg-Athens; Cologne/Bonn-Athens; Barcelona-Athens; Helsinki-Athens; Dublin-Athens; Luxembourg-Athens; Oslo-Athens; Lisbon-Athens; Gothenburg-Athens; Stockholm-Athens; Manchester-Athens; Hamburg-Dublin; Cologne/Bonn-Dublin; Berlin-Dublin; Helsinki-Dublin; Athens-Dublin; Luxembourg-Dublin; Amsterdam-Dublin; Oslo-Dublin; Lisbon-Dublin; Gothenburg-Dublin; Stockholm-Dublin; Geneva-Milan; Hamburg-Milan; Luxembourg-Milan; Oslo-Milan; Gothenburg-Milan; Stockholm-Milan; Hamburg-Rome; Oslo-Rome; Gothenburg-Rome; Brussels-Luxembourg; Cologne/Bonn-Luxembourg; Düsseldorf-Luxembourg; Munich-Luxembourg; Stuttgart-Luxembourg; Berlin-Luxembourg; Barcelona-Luxembourg; Helsinki-Luxembourg; Athens-Luxembourg; Dublin-Luxembourg; Milan-Luxembourg; Oslo-Luxembourg; Gothenburg-Luxembourg; Stockholm-Luxembourg; Vienna-Oslo; Geneva-Oslo; Zurich-Oslo; Hamburg-Oslo; Cologne/Bonn-Oslo; Düsseldorf-Oslo; Stuttgart-Oslo; Berlin-Oslo; Barcelona-Oslo; Madrid-Oslo; Athens-Oslo; Dublin-Oslo; Milan-Oslo; Rome-Oslo; Luxembourg-Oslo; Lisbon-Oslo; Manchester-Oslo; Vienna-Lisbon; Hamburg-Lisbon; Cologne/Bonn-Lisbon; Düsseldorf-Lisbon; Stuttgart-Lisbon; Berlin-Lisbon; Helsinki-Lisbon; Athens-Lisbon; Dublin-Lisbon; Oslo-Lisbon; Gothenburg-Lisbon; Stockholm-Lisbon; Manchester-Lisbon; Vienna-Gothenburg; Geneva-Gothenburg; Zurich-Gothenburg; Hamburg-Gothenburg; Cologne/Bonn-Gothenburg; Düsseldorf-Gothenburg; Stuttgart-Gothenburg; Berlin-Gothenburg; Barcelona-Gothenburg; Madrid-Gothenburg; Athens-Gothenburg; Dublin-Gothenburg; Milan-Gothenburg; Rome-Gothenburg; Luxembourg-Gothenburg; Lisbon-Gothenburg; Geneva-Stockholm; Hamburg-Stockholm; Cologne/Bonn-Stockholm; Düsseldorf-Stockholm; Stuttgart-Stockholm; Berlin-Stockholm; Athens-Stockholm; Dublin-Stockholm; Milan-Stockholm; Luxembourg-Stockholm; Lisbon-Stockholm; Manchester-Stockholm; Vienna-Manchester; Hamburg-Manchester; Stuttgart-Manchester; Berlin-Manchester; Athens-Manchester; Oslo-Manchester; Lisbon-Manchester; Gothenburg-Manchester; and Stockholm-Manchester.

[411] <<Transport <<Air transport <<Air transport measurement <<Overview of the air passenger transport by country and airports <<Air passenger transport between main airports in each reporting country and partner reporting countries

of the detailed information concerning the exact flow. This methodology is illustrated in Figure 8.2. In all cases it was assumed, in the absence of information to the contrary, that such flights were direct. Therefore the role of hubs within the European air industry 'space' was not addressed[412].

Figure 8.2. Outline of the methodology adopted for estimating the passenger flows between the 212 combinations for which such data was not available.

However in a number of specific cases, these such estimates are clearly unrealistic, due to the relatively short physical distance separating the cities concerned and the logistical improbability of connectivity between such cities being provided by means of air transportation. These cases include the 20 combinations between Cologne/Bonn-Brussels; Düsseldorf-Brussels; Luxembourg-Brussels; Amsterdam-Brussels; Stuttgart-Zurich; Stuttgart-Frankfurt; Luxembourg-Frankfurt; Luxembourg-Cologne/Bonn; Luxembourg-Düsseldorf; and Stuttgart-Munich, where in each case the physical separation is less than 200 Km. In these cases, the 'estimated' flows really need to be treated as 'virtual' flows[413]. For this reason Technical Annex 2 at the end of this chapter represents a composite picture of the 'real' values for the passenger flows between the city pairs, and the 'realistic' and 'virtual' estimated values for the flows between the other city pairs.

Having achieved values of the air passenger flows for the 756 cells of the (*28 × 28*) origin-destination matrix, the (vertical) totals for each of the airports were calculated as a means of examining the magnitude of the attraction (or weighting) of each of the 28 airports, with respect to the other airports of the European system i.e. in quantitative terms the number of passenger who depart from each of the airports of origin *X* (1, .. 27) to travel to the destination airport *Y*. The magnitude of these weightings or attractions within the overall hierarchy are indicated in the horizontal TOTAL of

[412] Possibilities for estimating indirect flows and as a consequence taking traditional European 'hubs' into consideration, would lie within Markov Chain and complex gravity modelling methodologies.
[413] Rail would undoubtedly be the realistic mode of travel for connecting between these cities.

Technical Annex 2 and are also illustrated in descending order of magnitude in Table 8.3.

Reference	Airport(s)	Magnitude of attraction	% share of total	Rank
28	London	18,549,202	13.40	1
16	Paris	9,915,138	7.16	2
5	Frankfurt	8,287,006	5.99	3
22	Amsterdam	7,527,638	5.44	4
14	Madrid	7,260,846	5.25	5
13	Barcelona	6,806,624	4.92	6
9	Munich	6,757,175	4.88	7
19	Milan	6,118,022	4.42	8
20	Rome	5,741,471	4.15	9
11	Berlin	5,418,468	3.91	10
12	Copenhagen	4,976,836	3.60	11
4	Zurich	4,317,879	3.12	12
18	Dublin	4,201,648	3.04	13
26	Stockholm	3,775,540	2.73	14
2	Brussels	3,772,381	2.73	15
6	Hamburg	3,706,353	2.68	16
8	Düsseldorf	3,622,888	2.62	17
1	Vienna	3,555,518	2.57	18
3	Geneva	3,288,905	2.38	19
27	Manchester	3,165,849	2.29	20
17	Athens	3,023,125	2.18	21
24	Lisbon	2,869,215	2.07	22
7	Cologne/Bonn	2,631,369	1.90	23
15	Helsinki	2,382,484	1.72	24
23	Oslo	2,368,323	1.71	25
10	Stuttgart	2,178,891	1.57	26
25	Gothenburg	1,679,930	1.21	27
21	Luxembourg	513,186	0.37	28
	TOTAL	138,411,909	100	

Table 8.3. Ranking of airports in terms of the magnitude of their share of the overall hierarchy passenger flows (i.e. number of air passengers arriving at each airport from the remaining 27 airports of the sample) (2004)[414]

As can be observed from Table 8.3 and Technical Annex 2, the magnitude of the overall attraction of the 28 airports of the system is in the order of 140 million passenger flows. If this overall attraction were apportioned equally amongst the 28 airports, each airport would be the destination for almost 5 million passengers, representing 3.57% of the total. However in reality London stands out far above the others in absolute terms, by attracting almost 18.550 million passengers from the other 27 airports, representing 13.4% of the attraction of the system. The highest following attraction is that of Paris, with 9.915 million passengers, representing almost 50% of the attraction of London and 7.16% of the total attraction of the system. Frankfurt and Amsterdam follow with 8.3 and 7.5 million passengers (5.99% and 5.44% of the attraction of the system) respectively, slightly ahead of Madrid (7.3 million passengers,

[414] EUROSTAT (own elaboration)

or 5.25% of the overall attraction) and Barcelona (6.8 million passengers, or 4.92% of the total attraction). Munich occupies the 7th position with just fewer than 6.8 million passengers (4.88% of the overall attraction). Milan lies ahead of Rome, ranked 8th and 9th respectively, representing 4.42% and 4.15% of the attraction of the entire system. Of the remaining airports just Berlin (3.91%) and Copenhagen (3.60%) attract sufficient passengers to lie above the hypothetical average of a perfectly balanced system. The other airports of the southern European regional axis all lie well behind – Athens in the 21st position (3.0 million passengers, or 2.18% of the overall attraction) and Lisbon in the 22nd position (2.9 million passengers, or 2.07% of the attraction of the entire system).

Recalling the abstract geographical positioning of the cities of the sample as indicated in Figure 8.1, Figure 8.3 illustrates the clear visual complexity of the 756 air passenger flows between the 28 EU15+2 airports, with priority being given to the magnitude of the flows, in the sense of the greatest flows being proportioned greater visibility.

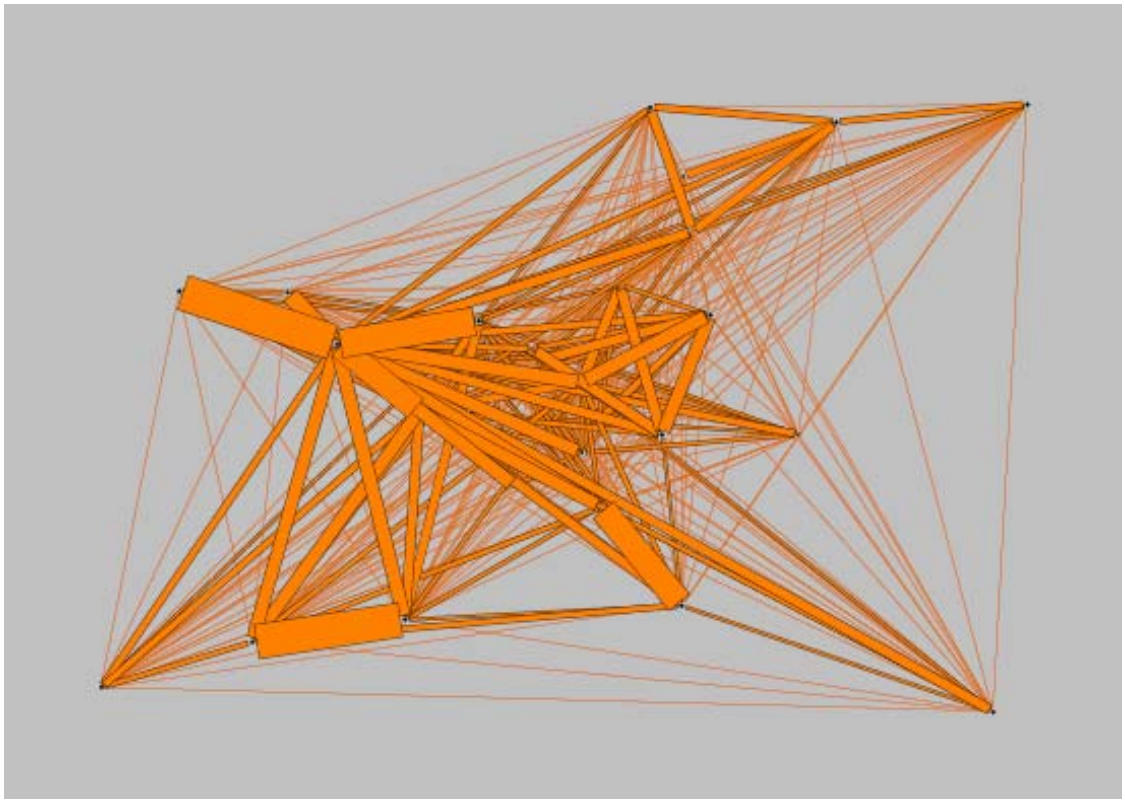


Figure 8.3. Gross passenger flows between the 28 EU15+2 airports[415]

The first impression, apart from the dominance of London, is of the diagonal corridor of flows from Dublin in the north-west, through London, Paris and Amsterdam towards

[415] EUROSTAT (own elaboration with the aid of Flow Mapper)

Milan and Rome in the south-east, and connecting with the network of flows between the German airports.

The strong connectivity between Madrid and Barcelona is also clearly evident, as are their connections with London, Paris and Amsterdam, as well as the strong connectivity between Milan and Rome. In order to examine the roles of Madrid and Barcelona within this system of flows, it is necessary to break down Figure 8.3 into its component parts, and thereby reduce (or deconstruct) the complexity of this visual representation. However prior to looking at the two Spanish cases, it is appropriate to examine the cases of the airports whose rankings, in terms of the overall attraction, lie above that of Madrid and Barcelona.

Commencing with London (Figure 8.4), the largest flows originate, in descending order of importance, from Dublin (2.3 million passengers), Amsterdam (1.7 million pass.), Paris (1.6 million pass.) and Manchester (1.1 million pass.).

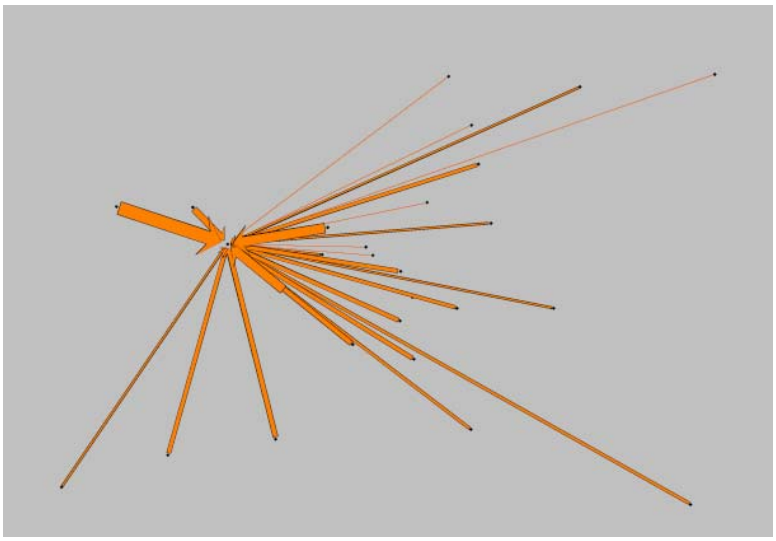


Figure 8.4. Gross passenger flows to London (2004)[416]

In the case of Paris (Figure 8.5), the largest flow of almost 1.46 million passengers comes from London. This is followed by flows of much lesser magnitudes from Madrid (825,000 pass.), Milan (793,000 pass.), Rome (670,000 pass.) and Barcelona (620,000 pass.).

[416] EUROSTAT (own elaboration with the aid of Flow Mapper)

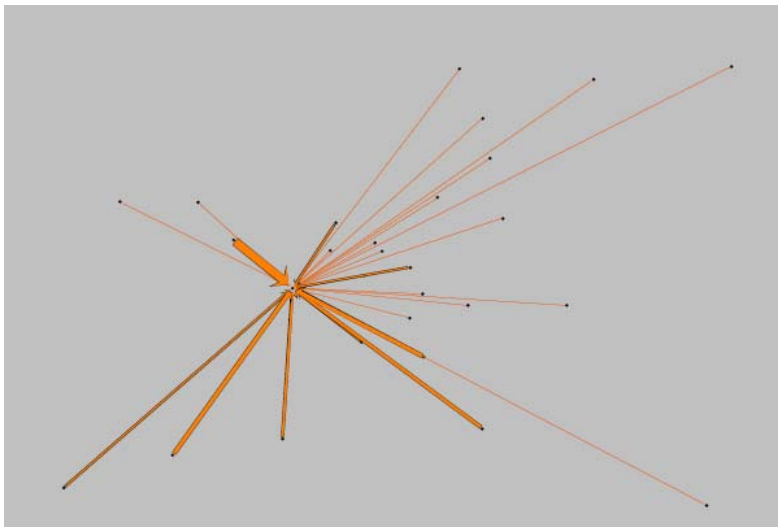


Figure 8.5. Gross passenger flows to Paris (2004)[417]

Turning to Frankfurt (Figure 8.6), while the largest flow of passengers comes from London (837,000 pass.) this is marginally ahead of the flow originating from Berlin (835,000 pass.). The other most important airports of origin for the arrival of passengers are both within Germany - Munich (661,000 pass.) and Hamburg (664,000 pass.). There were just under 500,000 passengers arriving from Paris.

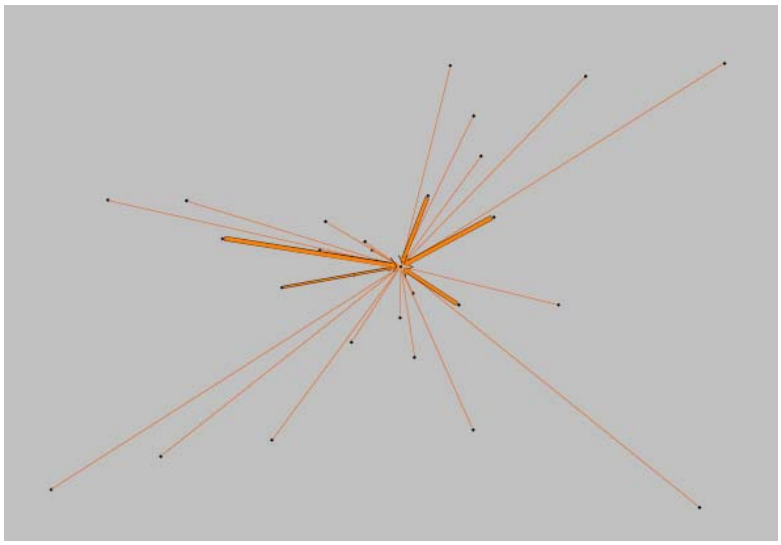


Figure 8.6. Gross passenger flows to Frankfurt (2004)[418]

As with Paris and Frankfurt, the highest passenger flows arriving in Amsterdam (Figure 8.7) originate from London (1.72 million pass). This is followed by passengers from Barcelona (563,000 pass.) and Paris (507,000 pass.).

[417] EUROSTAT (own elaboration with the aid of Flow Mapper)
[418] EUROSTAT (own elaboration with the aid of Flow Mapper)

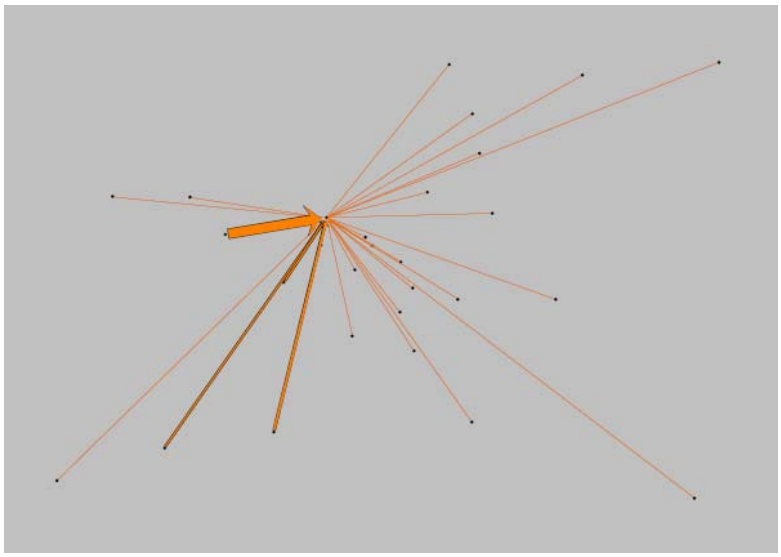


Figure 8.7. Gross passenger flows to AMSTERDAM (2004)[419]

Turning to Madrid and Barcelona, Table 8.4 indicates the attraction of the two airports for the other airports of the sample, and this attraction is illustrated in Figures 8.8 and 8.9. In the case of Madrid (Figure 8.8), the highest passenger flows originate in Barcelona with almost 2 million passengers. This is followed by Paris with 830,000 passengers and London with 822,000 passengers. The flows from the remaining airports all lie below the threshold of 500,000 passengers, with Amsterdam, Rome, Milan, Lisbon, Frankfurt and Brussels in the 250,000-500,000 passenger range. Munich, Zurich, Copenhagen, Geneva, Düsseldorf and Athens all lie within the 100,000-250,000 passengers range.

[419] EUROSTAT (own elaboration with the aid of Flow Mapper)

ATTRACTION OF MADRID AS DESTINATION FOR AIR PASSENGERS		RANKING	ATTRACTION OF BARCELONA AS DESTINATION FOR AIR PASSENGERS	
AIRPORT OF ORIGIN	PASSENGER FLOW		PASSENGER FLOW	AIRPORT OF ORIGIN
Barcelona	1,996,411	1	2,073,196	Madrid
Paris	830,007	2	866,474	London
London	821,892	3	638,409	Paris
Amsterdam	431,777	4	567,000	Amsterdam
Rome	424,297	5	284,859	Frankfurt
Milan	353,072	6	276,161	Milan
Lisbon	339,468	7	263,039	Brussels
Frankfurt	336,417	8	244,060	Rome
Brussels	333,974	9	184,792	Geneva
Munich	194,926	10	172,126	Munich
Zurich	153,908	11	153,403	Lisbon
Copenhagen	119,874	12	138,945	Düsseldorf
Geneva	117,337	13	134,924	Zurich
Düsseldorf	106,271	14	123,068	Copenhagen
Athens	106,114	15	101,573	Manchester
Dublin	96,897	16	93,723	Dublin
Stockholm	79,608	17	92,174	Berlin
Berlin	76,641	18	86,773	Stuttgart
Vienna	72,242	19	67,354	Vienna
Hamburg	56,230	20	49,740	Stockholm
Manchester	47,218	21	45,127	Helsinki
Cologne/Bonn	44,639	22	41,443	Cologne/Bonn
Stuttgart	36,255	23	39,769	Hamburg
Helsinki	36,222	24	32,184	Athens
Luxembourg	24,636	25	16,849	Oslo
Gothenburg	14,516	26	9,799	Gothenburg
Oslo	10,001	27	9,665	Luxembourg

Table 8.4. The attraction of Madrid and Barcelona as destinations for passengers arriving from the other 27 airports[420]

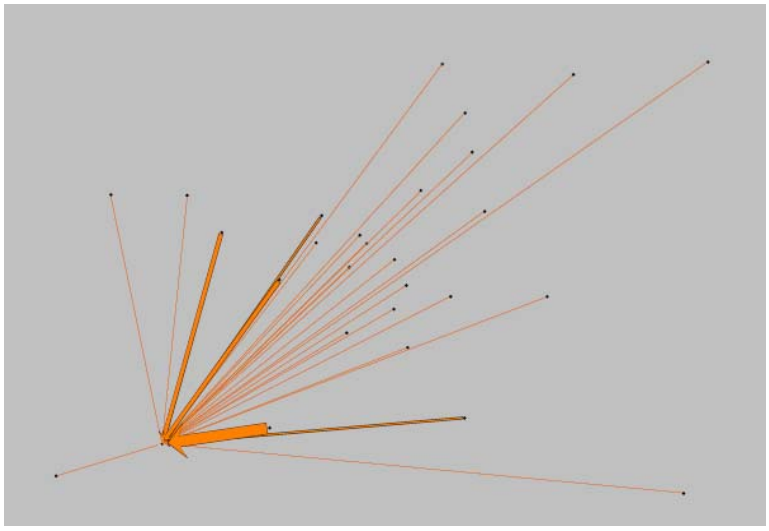


Figure 8.8. Gross passenger flows to MADRID (2004)[421]

[420] EUROSTAT (own elaboration)

In the case of Barcelona (Figure 8.9), its attraction for Madrid lies in 2.07 million passengers. In contrast to Madrid, Barcelona appears significantly more attractive for London (866,500 pass.) than Paris (638,000 pass.) and indeed the magnitude of attraction of passengers from London exceeds that of Madrid (866,500 pass. as compared with 830,000 pass.). However as with Madrid, Amsterdam represented the fourth most important airport for Barcelona (567,000 pass.), though again attracting more passengers from Amsterdam than did Madrid. The flows from the remaining airports all lie well below the threshold of 500,000 passengers, with Frankfurt, Milan and Brussels in the 250,000-500,000 passenger range. Rome, Geneva, Munich, Lisbon, Düsseldorf, Zurich, Copenhagen and Manchester all lie within the 100,000-250,000 passengers range.

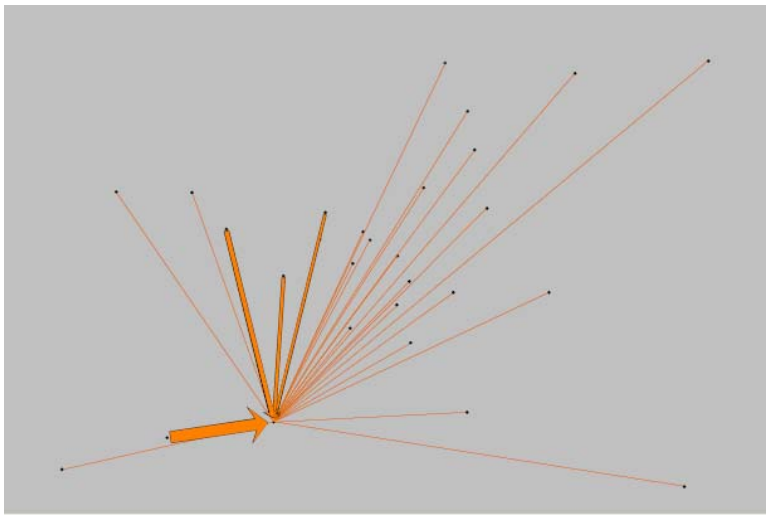


Figure 8.9. Gross passenger flows to BARCELONA (2004)[422]

It is reasonable to question to what extent the exploitation of the EUROSTAT passenger data equates with other specialised passenger data sources. Information obtained from the European Region of the Airports International Council (ACI EUROPE) denoting the passenger numbers of the Top 50 European Airports in 2003 can be observed in Table 8.5.

[421] EUROSTAT (own elaboration with the aid of Flow Mapper)
[422] EUROSTAT (own elaboration with the aid of Flow Mapper)

RANK	CITY (CODE)	PASSENGERS
1	LONDON, GB (LHR)	63,468,620
2	FRANKFURT, DE (FRA)	48,351,664
3	PARIS, FR (CDG)	48,122,038
4	AMSTERDAM, NL (AMS)	39,959,161
5	MADRID, ES (MAD)	35,694,331
6	LONDON, GB (LGW)	30,007,209
7	ROME, IT (FCO)	26,285,036
8	MUNICH, DE (MUC)	24,193,304
9	BARCELONA, ES (BCN)	22,748,758
10	PARIS, FR (ORY)	22,390,236
11	MANCHESTER, GB (MAN)	19,867,912
12	PALMA DE MALLORCA, ES (PMI)	19,179,018
13	LONDON, GB (STN)	18,716,692
14	COPENHAGEN, DK (CPH)	17,643,641
15	MILAN, IT (MXP)	17,630,452
16	ZURICH, CH (ZRH)	16,989,497
17	DUBLIN, IE (DUB)	15,856,265
18	STOCKHOLM, SE (ARN)	15,206,411
19	BRUSSELS, BE (BRU)	15,164,913
20	DUSSELDORF, DE (DUS)	14,273,082
21	ISTANBUL, TR (IST)	14,030,122
22	OSLO, NO (OSL)	13,646,890
23	VIENNA, AT (VIE)	12,784,504
24	ATHENS, GR (ATH)	12,252,216
25	MALAGA, ES (AGP)	11,553,624
26	MOSCOW, RU (SVO)	11,540,990
27	BERLIN, DE (TXL)	11,104,106
28	ANTALYA, TR (AYT)	10,482,036
29	HELSINKI, FI (HEL)	9,698,431
30	LISBON, PT (LIS)	9,636,551
31	HAMBURG, DE (HAM)	9,529,924
32	MOSCOW, RU (DME)	9,379,037
33	GRAN CANARIA, ES (LPA)	9,180,942
34	NICE, FR (NCE)	9,127,268
35	BIRMINGHAM, GB (BHX)	9,080,362
36	TENERIFE SUR, ES (TFS)	8,841,180
37	MILAN, IT (LIN)	8,757,038
38	ALICANTE, ES (ALC)	8,179,372
39	GLASGOW, GB (GLA)	8,131,688
40	GENEVA, CH (GVA)	8,009,308
41	COLOGNE, DE (CGN)	7,758,355
42	STUTTGART, DE (STR)	7,584,502
43	EDINBURGH, GB (EDI)	7,481 978
44	PRAGUE, CZ (PRG)	7 463,120
45	LONDON, GB (LTN)	6,809,534
46	LYON, FR (LYS)	5,939,895
47	LANZAROTE, ES (ACE)	5,383,097
48	MARSEILLE, FR (MRS)	5,364,763
49	TOULOUSE, FR (TLS)	5,304,922
50	VENICE, IT (VCE)	5,304,597

Table 8.5. Top 50 European Airports (2003) in passenger numbers[423]

Here it can be seen that London Heathrow stands out, ahead of Frankfurt and Paris (Charles de Gaulle), but combining the multiple airports of London, Paris and Milan, the ordering turns out as follows: London (120 million passengers), Paris (70.5 million passengers), Frankfurt (48.4 million passengers), Amsterdam (40 million passengers), Madrid (35.7 million passengers), Milan and Rome (26.4 and 26.3 million passengers

[423] ACI EUROPE

respectively), Munich (24.2 million passengers) and Barcelona (22.7 million passengers).

A correlation was carried out between the 2 sets of data - that deriving from EUROSTAT and the ACI 2003 data, resulting in a correlation coefficient of 0.965. (See Figure 8.10) As a consequence it is considered wholly appropriate to make use of the EUROSTAT data for the quantitative analysis of the air passenger flows (relations) between the metropolitan urban regions of the sample.

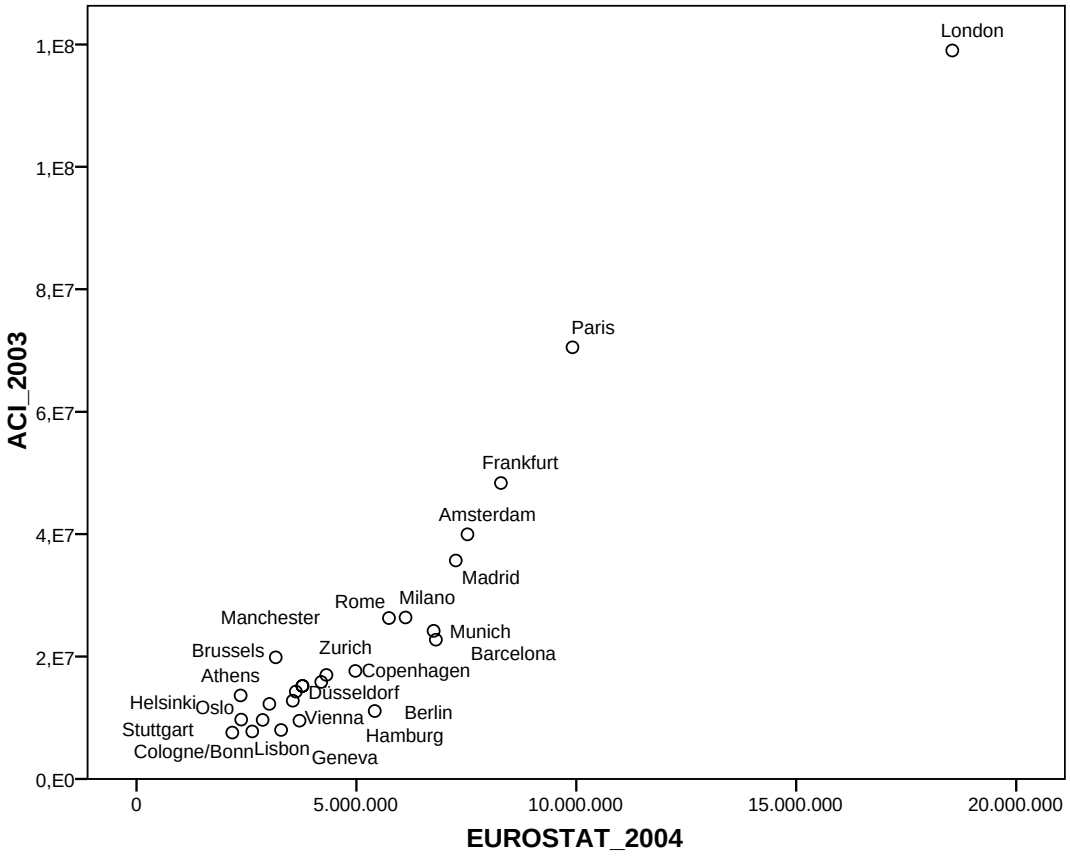


Figure 8.10. Correlation between the EUROSTAT 2004 and ACI 2003 air passenger data

By contrast the correlation between the EUROSTAT data and the population data for each of the corresponding Functional Urban Areas (Table 8.6 and Figure 8.11) within which the airports are located was not considered significant (r = 0.675).

GROSS PASSENGER FLOWS (2004)			POPULATION (2001)	
AIRPORT	ATTRACTION	RANK	POPULATION	MEGA
London	18,549,202	1	11,202,043	London
Paris	9,915,138	2	10,853,764	Paris
Frankfurt	8,287,006	3	8,315,305	Düsseldorf
Amsterdam	7,527,638	4	8,107,195	Manchester
Madrid	7,260,846	5	7,516,698	Milan
Barcelona	6,806,624	6	6,790,617	Amsterdam
Munich	6,757,175	7	6,48,9124	Brussels
Milan	6,118,022	8	5,606,556	Cologne/Bonn
Rome	5,741,471	9	5,456,553	Frankfurt
Berlin	5,418,468	10	5,280,009	Madrid
Copenhagen	4,976,836	11	4,709,288	Berlin
Zurich	4,317,879	12	4,588,211	Stuttgart
Dublin	4,201,648	13	4,443,165	Barcelona
Stockholm	3,775,540	14	3,845,206	Hamburg
Brussels	3,772,381	15	3,645,055	Athens
Hamburg	3,706,353	16	3,636,136	Munich
Düsseldorf	3,622,888	17	3,599,144	Rome
Vienna	3,555,518	18	3,114,942	Zurich
Geneva	3,288,905	19	2,930,963	Vienna
Manchester	3,165,849	20	2,837,095	Lisbon
Athens	3,023,125	21	2,058,002	Copenhagen
Lisbon	2,869,215	22	1,647,363	Luxembourg
Cologne/Bonn	2,631,369	23	1,606,234	Stockholm
Helsinki	2,382,484	24	1,516,049	Geneva
Oslo	2,368,323	25	1,423,512	Dublin
Stuttgart	2,178,891	26	1,306,760	Helsinki
Gothenburg	1,679,930	27	1,030,600	Oslo
Luxembourg	513,186	28	833,326	Gothenburg

Table 8.6. Ranking of a) airports in terms of the magnitude of their attraction (2004), and b) MEGAs in terms of their population (2001)[424]

[424] EUROSTAT (2004) and ESPON (2004)

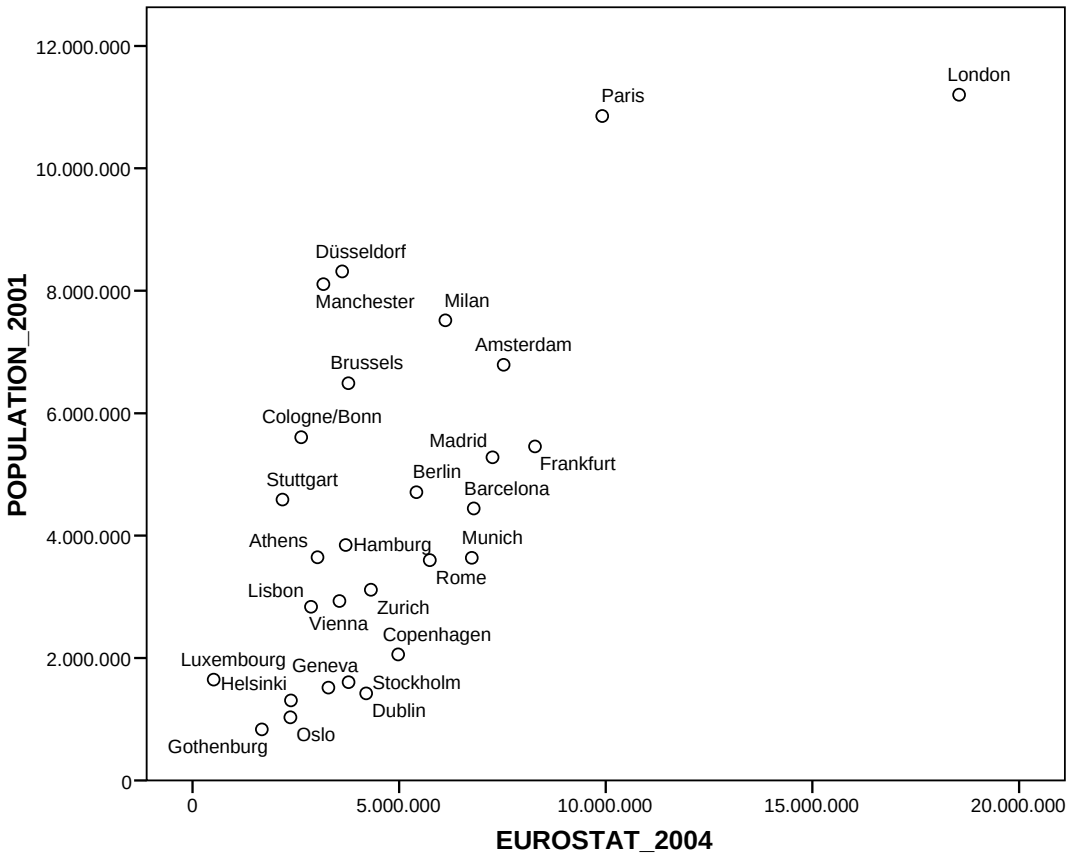


Figure 8.11. Correlation between the EUROSTAT 2004 passenger flows and the MEGA population data for 2001[425]

[425] EUROSTAT (2004) and ESPON (2004)

8.3. Descriptive indicators deriving from the air passenger flows

In the early 1970s the United Kingdom Department of Labour undertook studies to determine the spatial extent of employment areas or Travel to Work Areas (TTWA). The methodology for their definition was first developed by Smart (1974) and then elaborated upon by Coombes et. al. (1986). In turn this was adopted in Italy (Sforzi, 1991) and even led to orienting European policy (EUROSTAT, 1992).

The TTWA methodology was based upon the concepts of self-sufficiency and self-containment[426] of different labour markets; and the *interaction value* between the areas being studied. Roca and Moix (2005) recognise the benefits of the interaction value for representing the mutual interaction between two functional spaces. The interaction value considers the bi-directional nature of flows, as well as the weighting of the flows by the origin and destination masses, making it a quasi-gravitational measure.

According to Lee (1973) of all the different types of mathematical models used in planning and transportation studies, gravity models are probably the most popular. Gravity modelling simply adapts and applies to the social sciences relationships pertaining to the physical sciences. In the physical sciences context, these relationships are derived from the Newtonian concept of gravity, whereby the force of gravitational interaction between two bodies is directly proportional to the product of the masses of the bodies and inversely proportional to the square of the distance existing between these masses:

$$G = [(M_i \times M_j)/d_{ij}^2] \quad (1)$$

where G is the pull or force of gravity; M_i and M_j are the masses of the two bodies; and d_{ij} is the distance lying between the two bodies.

In the social sciences context in general, and more specifically in the context of urban systems, "the gravitational pull exerted by two bodies has been interpreted as the amount of interaction between two areas, and the mass of the bodies has been measured in terms of the size or attractiveness of the areas" (Lee, 1973, p. 58). Traditional applications of gravity modelling have included the determination of the location of retail centres of a certain magnitude, depending upon the pull or attraction

[426] Self-containment refers to the proportion of the workers who reside and work in the same municipality (RWL) with respect to the resident employed population who might work within or outside the municipality (REP). Self-sufficiency is seen as the proportion between the same RWL and total localised workplaces (DEP).

generated by the potential spending power from two or more populations, as well as their use in residential location modelling (Wilson, 1971).

Returning to the context of employment areas, the interaction value is arrived at by weighting the flow (or at least the square of the flow) by the employment 'masses' of both the sending and receiving areas. The interaction value therefore quantifies the mutual interaction force between the two 'masses', which in this employment context are deemed to be the resident employed population (REP) of one sending area and the local workplaces (LWP) of the employment destination.

Following Coombes's approach the first term of the interaction value (IV) equation represents the gravitational attraction of the mass LWP_i upon the mass of REP_j, and the second represents the gravitational attraction exerted on REP_j by LWP_i. The resulting IV equation can therefore be expressed as:

$$IV = f_{ij}^2/(LWP_i \times REP_j) + f_{ji}^2/(LWP_j \times REP_i) \quad (2)$$

where

$$IV = IV_{ij} + IV_{ji} \quad (3)$$

and

$$IV_{ij} \neq IV_{ji}. \quad (4)$$

Applying the same methodological approach to the analogy of air passenger flows between two (i and j) areas (airports), the same equation can be adopted:

$$IV = f_{ij}^2/(DEP_i \times ARR_j) + f_{ji}^2/(DEP_j \times ARR_i) \quad (5)$$

where in this case DEP represents air passenger departures from one location to another and ARR represents air passenger arrivals at that latter location from the former.

The interaction value measures the relationship existing between two areas or spatial entities regardless of the intervening distance. For this reason there is truth in Coombes and Openshaw's (1982) assertion that the interaction value is representative of an index for weighting the strengths of the respective commuting flows. Clearly it is the sum of the products of the ratios existing between the flow '*i,j*' (and the transitive '*j,i*') and the masses of origin and destination (LWP_i and DEP_j) (and the transitive masses). However assuming that f_{ij}^2 is a measure of the force of gravitational attraction of j upon

i, then the interaction value could be rewritten in terms of the concept of *functional* (as opposed to *physical*) *distance* (FD).

In a bi-dimensional space (i,j) and (j,i) from standard Pythagorean geometry it stands that:

$$FD^2 = FD_{ij}^2 + FD_{ji}^2 \quad (6)$$

Since:

$$FD_{ij}^2 = 1/IV_{ij} \quad (7)$$

and

$$FD_{ji}^2 = 1/IV_{ji} \quad (8)$$

then

$$FD_{ij}^2 = (DEP_i \times ARR_j)/f_{ij}^2 \quad (9)$$

and

$$FD_{ji}^2 = (DEP_j \times ARR_i)/f_{ji}^2 \quad (10)$$

The functional distance (FD) is by nature not symmetrical, however in attempting to make it symmetrical the assumption is made that:

$$f_{ij}^2 = (DEP_i \times ARR_j)/FD^2 \quad (11)$$

and

$$f_{ji}^2 = (DEP_j \times ARR_i)/FD^2 \quad (12)$$

so

$$f_{ij}^2 + f_{ji}^2 = [(DEP_i \times ARR_j)/FD^2] + [(DEP_j \times ARR_i)/FD^2] \quad (13a)$$

$$= [(DEP_i \times ARR_j) + (DEP_j \times ARR_i)]/FD^2 \quad (13b)$$

and

$$FD^2 = [(DEP_i \times ARR_j) + (DEP_j \times ARR_i)]/(f_{ij}^2 + f_{ji}^2) \quad (14)$$

meaning that

$$FD = \sqrt{([(DEP_i \times ARR_j) + (DEP_j \times ARR_i)]/(f_{ij}^2 + f_{ji}^2))} \quad (15)$$

The results of the application of the interaction value are contained in Technical Annex 3, at the end of this chapter. These indicate that the strongest interaction was between Barcelona and Madrid (0.16750); followed by Milan and Rome (0.13942); London and Dublin (0.11933); Gothenburg and Stockholm (0.08515); Copenhagen and Oslo (0.06263); and Cologne/Bonn and Berlin (0.06014); and Amsterdam and London (0.04332).

The same order was repeated in the application of the functional distance, with the closest distance being that between Barcelona and Madrid (3.45); Milan and Rome (3.79); London and Dublin (4.09); Gothenburg and Stockholm (4.85); Copenhagen and Oslo (5.65); Cologne/Bonn and Berlin (5.77); and Amsterdam and London (6.80). The full results of the functional distance between each of the 28 airport combinations are contained in Technical Annex 4, at the end of this chapter.

In the same way as Figure 8.3 was used to illustrate the complexity of the gross air passenger flows between each of the 28 EU15+2 airports in the previous section, Figure 8.12 represents the magnitude of the relations between the 28 airports in terms of the interaction value and functional distance.

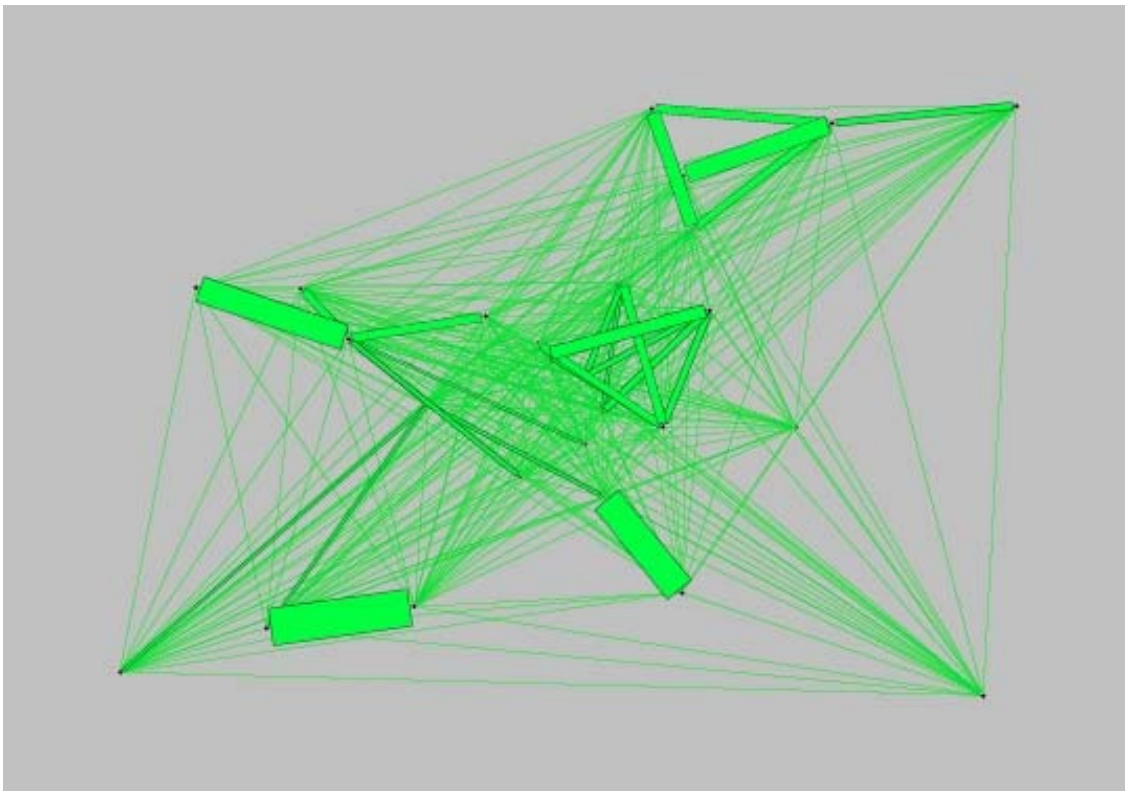


Figure 8.12. Magnitude of the interaction value and functional distance between the 28 EU15+2 airports[427]

In the case of the interaction value, the higher the value then the more important is the relation. By contrast in the case of the functional distance, the more important relations are those with lower values. The ordering of the functional distances between the 28 airports is the complete inverse of that of the interaction value. While Figure 8.12 strictly illustrates the values of the interaction values, at the same time it serves to convey the strength of the functional distances. The broader the band of the 'flow' between two

points is indicative of both the higher interaction value and the shorter functional separation distance.

What are of particular interest at this stage are the functional distances between Madrid and Barcelona, and the other airports of the sample. As can be seen from Table 8.7 following the equidistance of 3.45 between Madrid and Barcelona, in the case of Barcelona, the closest functional separation is with Amsterdam (12.60) while the closest separation between Madrid and another airport is with Paris (10.36). Following these, in the case of Barcelona the closest corresponding separations are with London (12.73), Paris (13.13) and Brussels (19.26). In the case of Madrid, Lisbon (13.21), London (13.89), Rome (15.38), Brussels (15.59), Amsterdam (17.20) and Milan (18.98) are all separated at distances of less than 20. What can be observed is that the separation between Madrid and Rome (15.38) is less than that between Madrid and Milan (18.98); however Barcelona is functionally closer to Milan (23.12) than to Rome (25.71). In terms of the distances between Barcelona and Madrid and the German airports, in both cases Frankfurt is the closest lying city – at a distance of 26.79 to Barcelona and 22.80 to Madrid. As might be expected London is much closer to both the Spanish airports than Manchester, but the differences are significant – 46.03 to Barcelona and 102.58 to Madrid. Figures 8.13 and 8.14 illustrate the magnitude of the interaction values and the functional distances between Madrid and Barcelona, and the other airports of the sample.

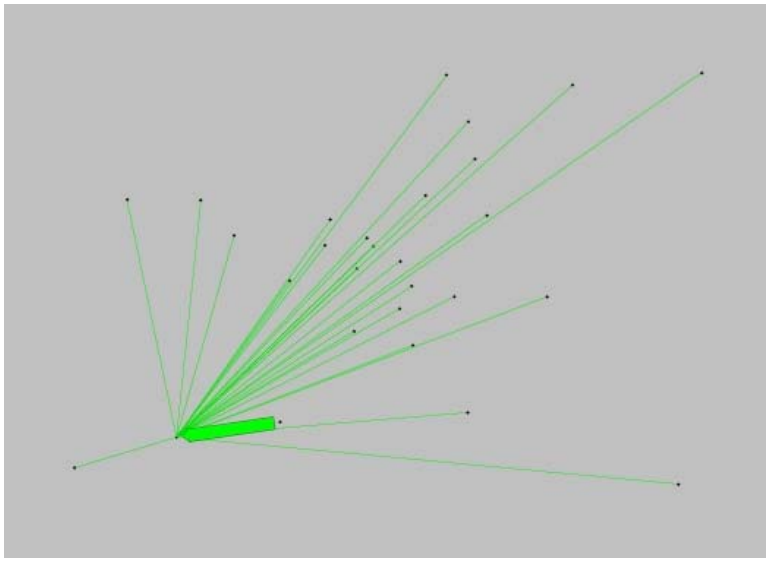


Figure 8.13. Magnitude of the interaction values and functional distances between Madrid and the other airports[428]

[427] EUROSTAT (own elaboration with aid of Flow Mapper)
[428] EUROSTAT (own elaboration with aid of Flow Mapper)

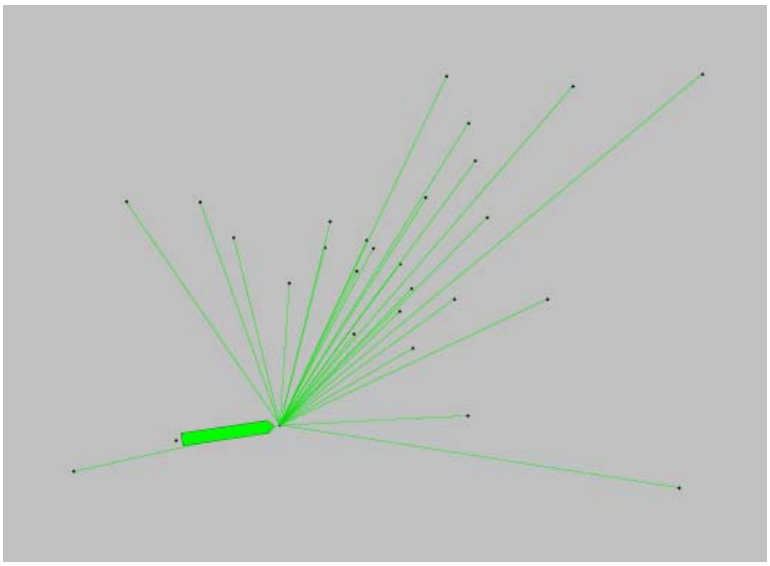


Figure 8.14. Magnitude of the interaction value and functional distance between Barcelona and the other airports[429]

FUNCTIONAL DISTANCES BETWEEN MADRID AND OTHER AIRPORTS		RANK	FUNCTIONAL DISTANCES BETWEEN BARCELONA AND OTHER AIRPORTS	
AIRPORT	FUNCTIONAL DISTANCE		FUNCTIONAL DISTANCE	AIRPORT
Barcelona	3.45	1	3.45	Madrid
Paris	10.36	2	12.60	Amsterdam
Lisbon	13.21	3	12.73	London
London	13.89	4	13.13	Paris
Rome	15.38	5	19.26	Brussels
Brussels	15.59	6	23.12	Milan
Amsterdam	17.20	7	25.71	Rome
Milan	18.98	8	25.97	Geneva
Frankfurt	22.80	9	26.79	Frankfurt
Munich	35.96	10	28.32	Lisbon
Zurich	37.20	11	35.23	Düsseldorf
Geneva	40.63	12	38.38	Munich
Athens	45.22	13	40.90	Zurich
Düsseldorf	48.23	14	44.85	Stuttgart
Copenhagen	50.96	15	46.03	Manchester
Dublin	56.99	16	47.44	Copenhagen
Stockholm	64.24	17	57.28	Dublin
Vienna	72.90	18	66.57	Berlin
Luxembourg	80.26	19	75.04	Vienna
Berlin	82.87	20	86.49	Helsinki
Hamburg	92.10	21	102.42	Cologne/Bonn
Cologne/Bonn	98.10	22	104.08	Stockholm
Manchester	102.58	23	124.55	Hamburg
Stuttgart	103.55	24	144.55	Athens
Helsinki	129.97	25	194.89	Luxembourg
Gothenburg	225.47	26	235.65	Oslo
Oslo	403.27	27	344.59	Gothenburg

Table 8.7. Functional distances and corresponding ranking, between Barcelona and Madrid, and the other metropolitan urban regions of the sample

[429] EUROSTAT (own elaboration with aid of Flow Mapper)

On the basis of London's extremely high value of attraction within the system of air passenger flows, it is considered relevant to make passing reference to the corresponding illustration of the dynamics between it and the other airports of the sample, in terms of the interaction value and the functional distance (Figure 8.15).

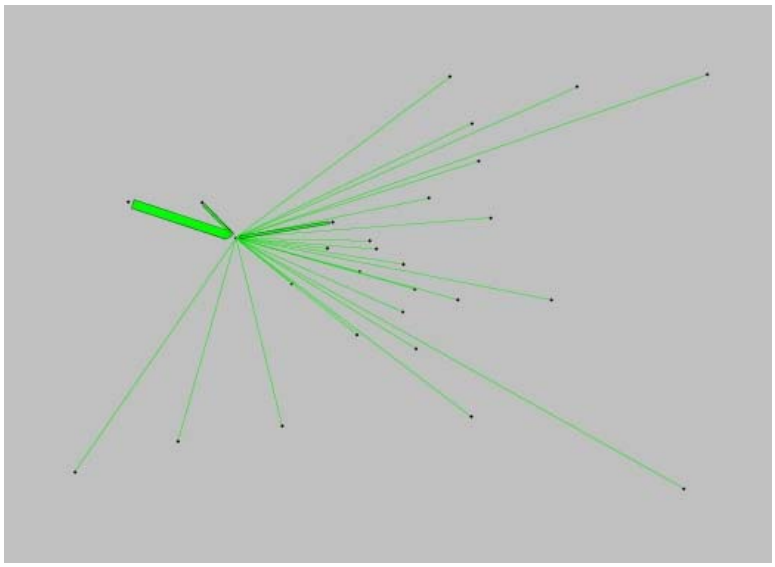


Figure 8.15. Magnitude of the interaction value and functional distance between London and the other airports[430]

[430] EUROSTAT (own elaboration with aid of Flow Mapper)

8.4. Multidimensional scaling

While the results presented in the previous section enable an appreciation of the individual functional distance, as a measure of the individual relations, between each metropolitan urban region and the other 27 such urban regions, what is of interest is to explore the nature of the functional distances or relations between all of the metropolitan urban regions. This means treating the system of 28 metropolitan urban regions as a whole and examining the internal dynamics of that system. With this objective in mind, the mathematical technique of multidimensional scaling was drawn upon, enabling a clear and elegant insight into the spatial dynamics of this system.

Multidimensional scaling (MDS) is an appropriate mathematical technique discovering the dimensional nature of the relationships among objects. MDS analysis leads to a rapid geometric representation, or spatial map, of the proximities between different objects. Such a map contributes to the quantification of the nature of the attributes of the said objects, thereby providing the researcher with a visual expression of relationships (O'Connell, 1999).

The input data requirement for MDS is that it be in a square, symmetric 1-mode matrix indicating the relationships between a set of objects. Applied to the set of metropolitan urban regions, the set of objects was the metropolitan urban regions themselves, or at least the airports, and the relationships were the functional distances between the metropolitan airports i.e. Technical Annex 4, at the end of this chapter. However owing to the missing data for Luxembourg (with Gothenburg and Oslo), it was decided to exclude Luxembourg from the sample. Therefore the sample matrix was *27 × 27*.

Many different statistical computer programmes are capable of carrying out MDS. In this case the PROXSCAL programme from SPSS was used. Quite simply PROXSCAL automatically performs multidimensional scaling of proximity data in order to ascertain a least-squares representation of the objects on a low-dimensional space. The methodology reduced the 27 dimensions of functional distances (i.e. each *i* with every possible *j*) to just two dimensions ((*x, y*) or Dim_1 and Dim_2). The initial results of the PROXSCAL calculation on the proximity data of Technical Annex 4 (with Luxembourg excluded) are illustrated in the scatterplot of the objects, i.e. the metropolitan airports, in the different two-dimensional planes in Figure 8.16.

In the interpretation of an MDS map the axes themselves (Dim 1 and Dim 2) are meaningless and the orientation is completely arbitrary. As can be observed from Figure 8.16 the German cities are situated in the south-western quadrant of the space.

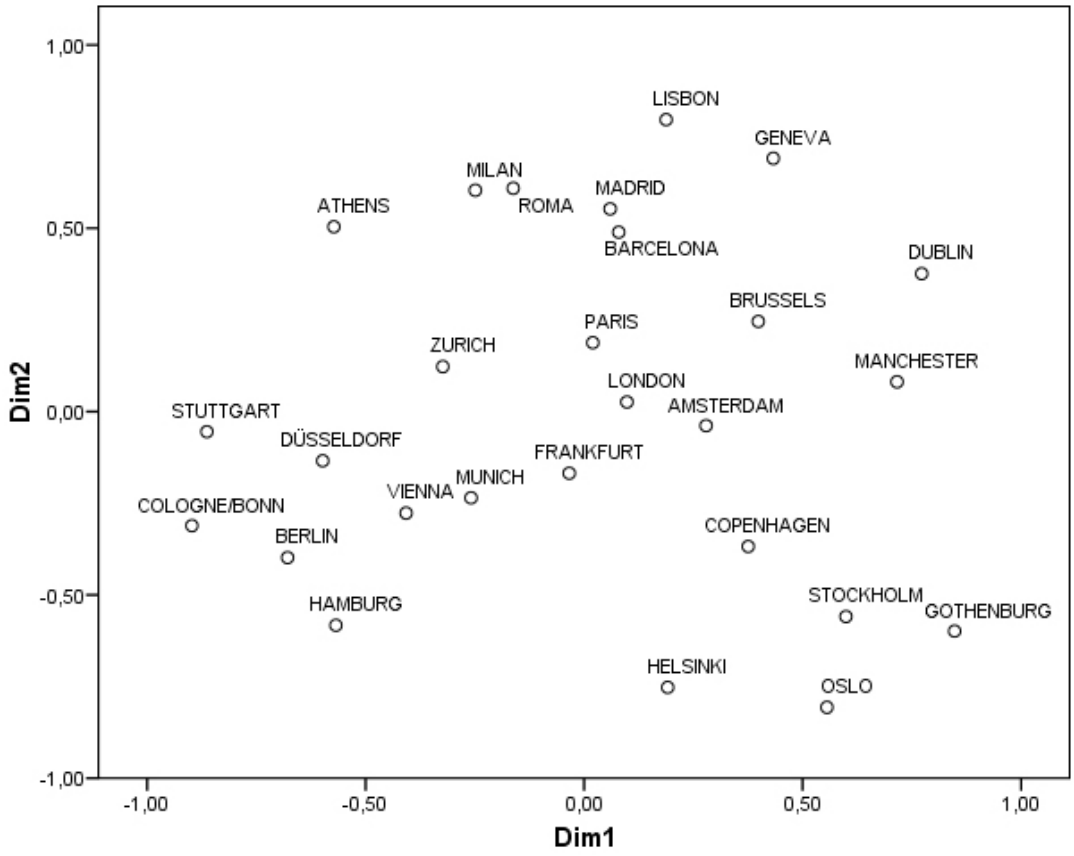


Figure 8.16. Graphical representation (I) of the spatial positioning of the metropolitan cities, following the PROXSCAL multidimensional scaling operation.

However in order to reach a closer approximation or 'fit' of these results to the European spatial territory, the Dim_1 and Dim_2 coordinates were first inverted over the horizontal and vertical axes (Figure 8.17) and then rotated around the central point (0, 0) leading to the final graphical representation in Figure 8.18. This illustrates the broad geographical groupings of the metropolitan urban regions around the centre, for example indicating the location of Lisbon, Madrid, Barcelona, Rome, Milan and Athens in the southern quadrants, and the clustering of the Scandinavian, and German and Austrian metropolitan urban regions.

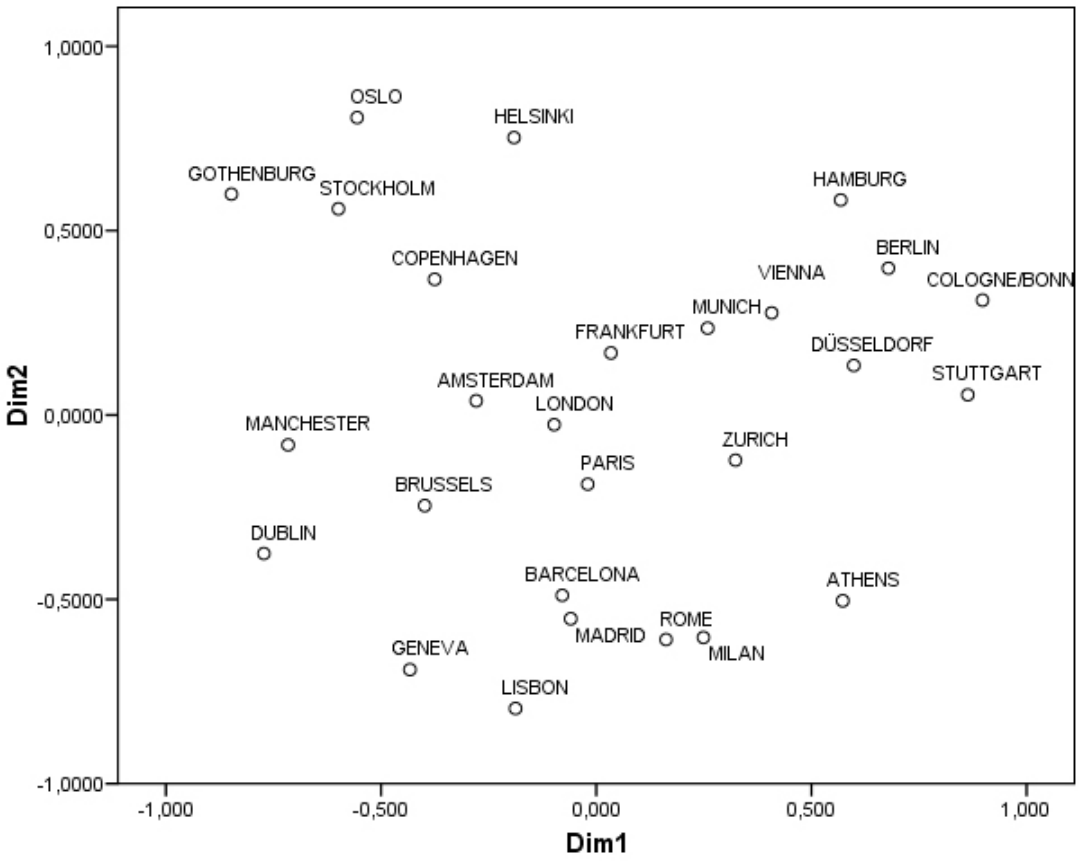


Figure 8.17. Graphical representation (II) of the spatial positioning of the cities with the respective coordinates inverted to correspond more closely with the European territory.

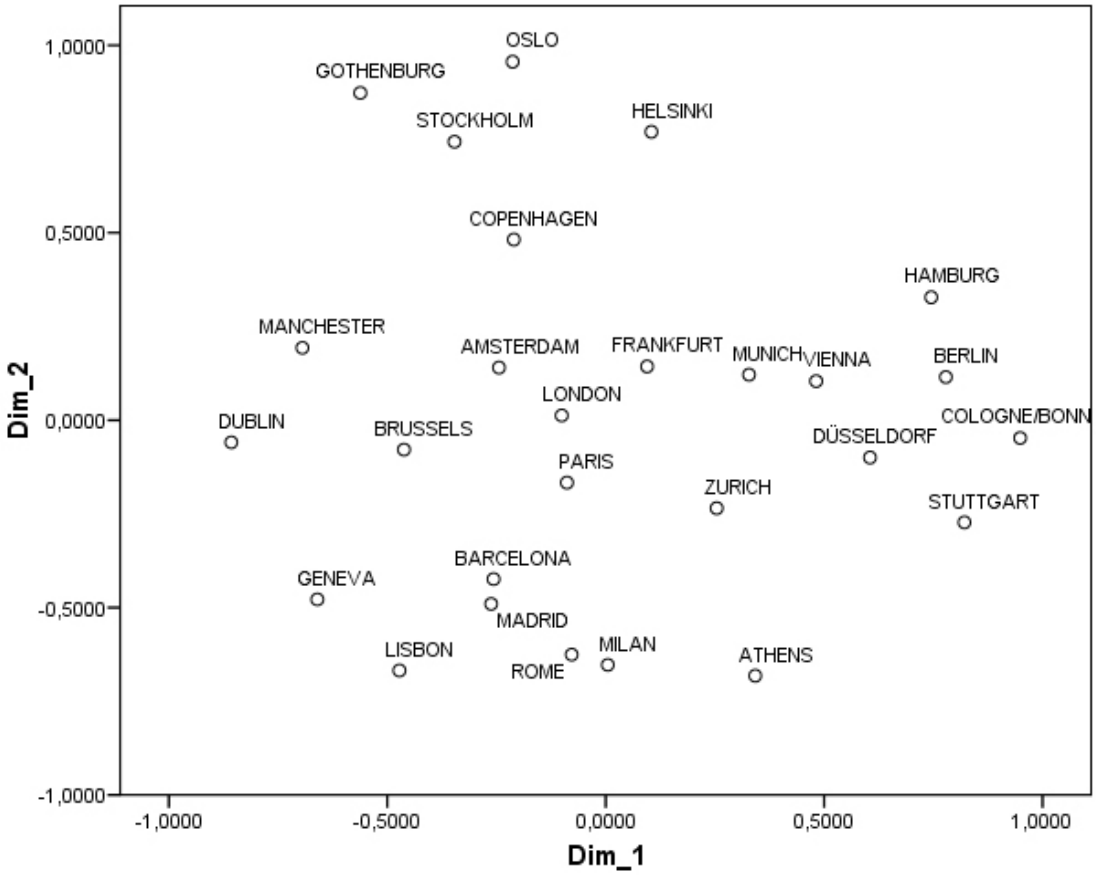


Figure 8.18. Graphical representation (III) of the spatial positioning of the cities, with all the coordinate points rotated about the centre to obtain a best fit to the European territory.

While the orientation of the objects resulting from an MDS application is wholly arbitrary, what is of crucial interest is the proximity of the objects (in this case the metropolitan cities) within the two-dimensional plane. The Euclidean distance from each point to the central point (0, 0) was calculated and the results are contained in Table 8.9. London (0.10) is the city lying closest to the centre of the European space of air passenger flows between these principal metropolitan urban regions, followed by Frankfurt (0.17), Paris (0.19), Amsterdam (0.28), Zurich and Munich (0.35), Brussels (0.47), Vienna (0.49), Barcelona (0.50), Copenhagen (0.53), Madrid (0.56), Düsseldorf (0.61), Rome (0.63), Milan (0.65), Manchester (0.72), Athens (0.76), Helsinki (0.78), Berlin (0.79), Hamburg (0.81), Geneva, Lisbon and Stockholm (0.82), Dublin (0.86), Stuttgart (0.87), Cologne/Bonn (0.95), Oslo (0.98) and Gothenburg (1.04).

Figure 8.19 illustrates the linear rank ordering of the cities from the centre of the 'space of air flows' deriving from the functional distance calculation. From a southern European perspective what is of critical interest is the closer proximity of Barcelona to the centre, than that of Madrid to the centre. On the basis of the functional distance calculation, Barcelona benefits from a higher degree of interaction with the other cities

of the sample than Madrid. Moreover of the five countries with two airports in the sample (Great Britain: London and Manchester; Italy: Milan and Rome; Spain: Barcelona and Madrid; Sweden: Gothenburg and Stockholm; and Switzerland: Geneva and Zurich) Spain is the only one which indicates an ostensibly 'secondary' airport having a superior position over the primary one with respect to the functional proximity to the centre of the space of air passenger flows. It is considered that there is a strong message here needing to be acknowledged by governmental agencies in terms of the financing of airports and facilitating licensing for air operators.

Ref.	City	Dim_1	Dim_2	Dist_centre	Rank_dist_centre
28	London	0,10	0,03	0,10	1
5	Frankfurt	-0,03	-0,17	0,17	2
16	Paris	0,02	0,19	0,19	3
22	Amsterdam	0,28	-0,04	0,28	4
4	Zurich	-0,32	0,12	0,35	5
9	Munich	-0,26	-0,24	0,35	6
2	Brussels	0,40	0,25	0,47	7
1	Vienna	-0,41	-0,28	0,49	8
13	Barcelona	0,08	0,49	0,50	9
12	Copenhagen	0,38	-0,37	0,53	10
14	Madrid	0,06	0,55	0,56	11
8	Düsseldorf	-0,60	-0,13	0,61	12
20	Rome	-0,16	0,61	0,63	13
19	Milan	-0,25	0,60	0,65	14
27	Manchester	0,72	0,08	0,72	15
17	Athens	-0,57	0,50	0,76	16
15	Helsinki	0,19	-0,75	0,78	17
11	Berlin	-0,68	-0,40	0,79	18
6	Hamburg	-0,57	-0,58	0,81	19
3	Geneva	0,43	0,69	0,82	20
24	Lisbon	0,19	0,80	0,82	21
26	Stockholm	0,60	-0,56	0,82	22
18	Dublin	0,77	0,38	0,86	23
10	Stuttgart	-0,86	-0,05	0,87	24
7	Cologne/Bonn	-0,90	-0,31	0,95	25
23	Oslo	0,56	-0,81	0,98	26
25	Gothenburg	0,85	-0,60	1,04	27

Table 8.8. PROXSCAL results for the positioning and distances to the centre of the space of air flows for the cities of the sample

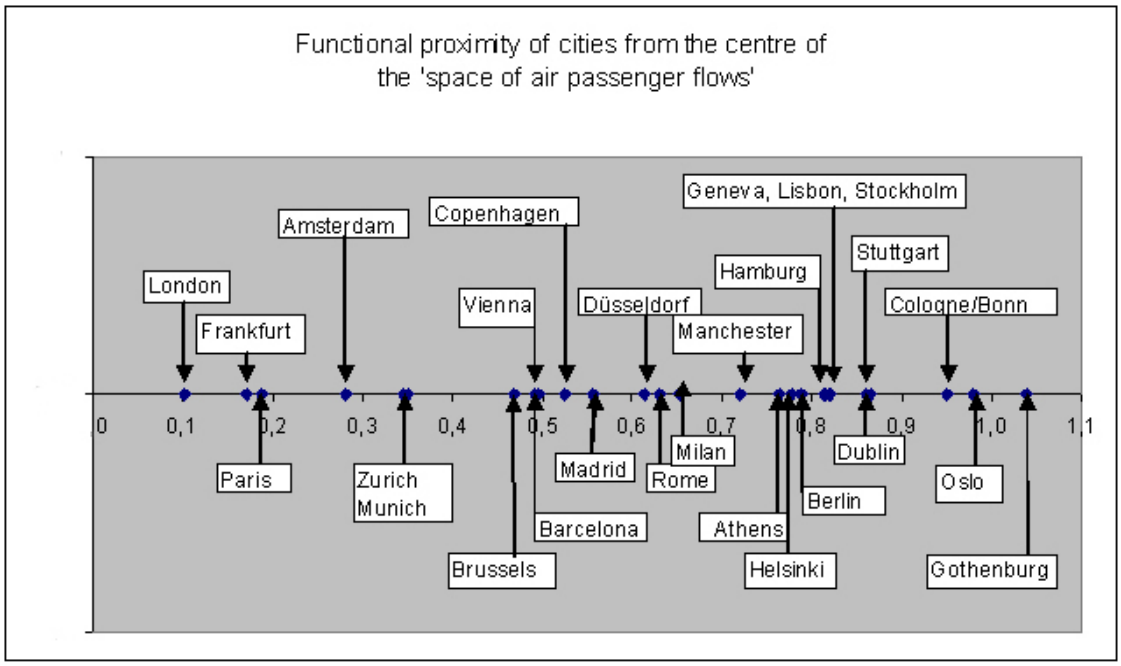


Figure 8.19. Functional proximity of cities from the centre of the space of European air flows.

In order to compare this functional proximity with physical proximity between the cities, the centre of gravity (COG) between the cities was calculated[431]. This resulting centre was found to lie to the west of Frankfurt[432].

The physical distance between each of the cities and the centre of gravity was calculated[433]. The maximum of all these distances, 1,821 Km. corresponding to the distance between Athens and the COG, was proportionally reduced to equate with the maximum value of the functional proximity. The remaining physical distances were all reduced by the same factor and the results of the lineal spatial distribution of the cities are shown in Figure 8.20.

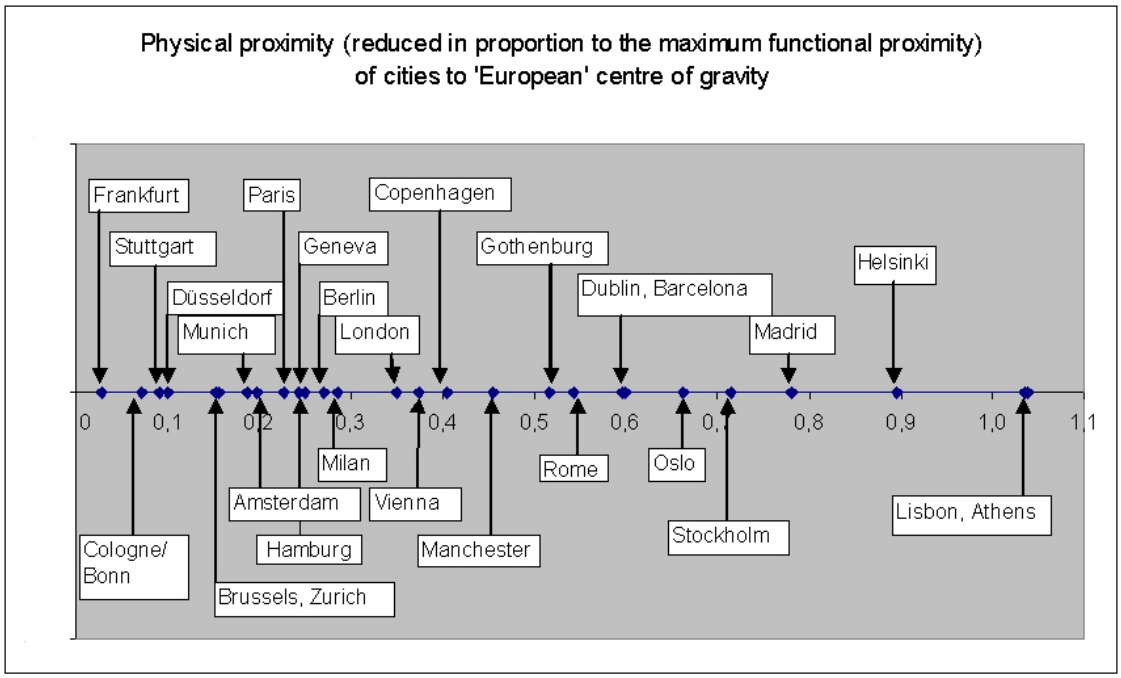


Figure 8.20. Physical proximity of the cities from the centre of gravity of the European space

Figure 8.21 illustrates the corresponding functional and physical proximities of the cities to the centre of the space of European air passenger flows and to the centre of gravity between these cities. Only in seven cases is the functional proximity inferior to the physical proximity – namely Paris, London, Barcelona, Madrid, Helsinki, Lisbon and Athens. In all the other cases the functional proximity is more than the physical proximity. Paris and London - the two global nodes of the MEGA classification – are the

[431] Xcg = (ΣMi ×Xi)/(ΣMi), for i =1 to N; and Ycg = (ΣMi ×Yi)/(ΣMi), for i =1 to N; where Xcg and Ycg are the x and y coordinates of the Centre of Gravity; Xi and Yi are the x and y coordinates of the airports; Mi is the mass of the airport (in this case M = 1); and N is the number of airports.
[432] LONGITUDE 7.86725º East and LATITUDE 49.86725º North
[433] Great Circle Distance Formula (with radians) = 6,378.8 * arcos[sin(lat1) * sin(lat2) + cos(lat1) * cos(lat2) * cos(lon2-lon1)]

only two cases lying within the so-called central pentagon area where the physical proximity to the centre of gravity exceeds that of the functional proximity.

Similarly Figure 8.22 illustrates the scatterplot of the correlation between the functional and physical proximities. The resulting correlation r = 0.139 is clearly indicative of the absence of correlation between the two factors, and Figure 8.22 corroborates the content of Figure 8.21, with the only cases above the line of perfect fit being London, Paris, Barcelona, Madrid, Helsinki, Athens and Lisbon.

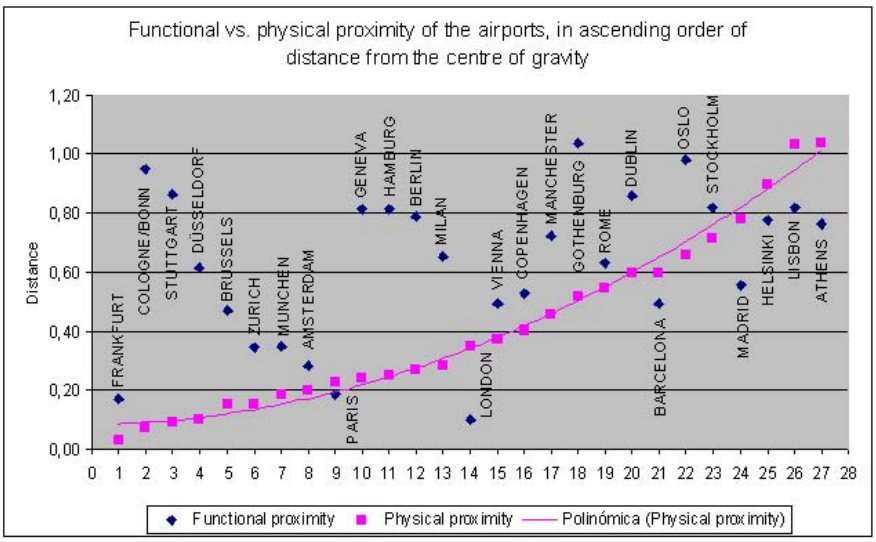


Figure 8.21. Functional and physical proximity of the cities from the centre of the space of European air passenger flows and from the centre of gravity.

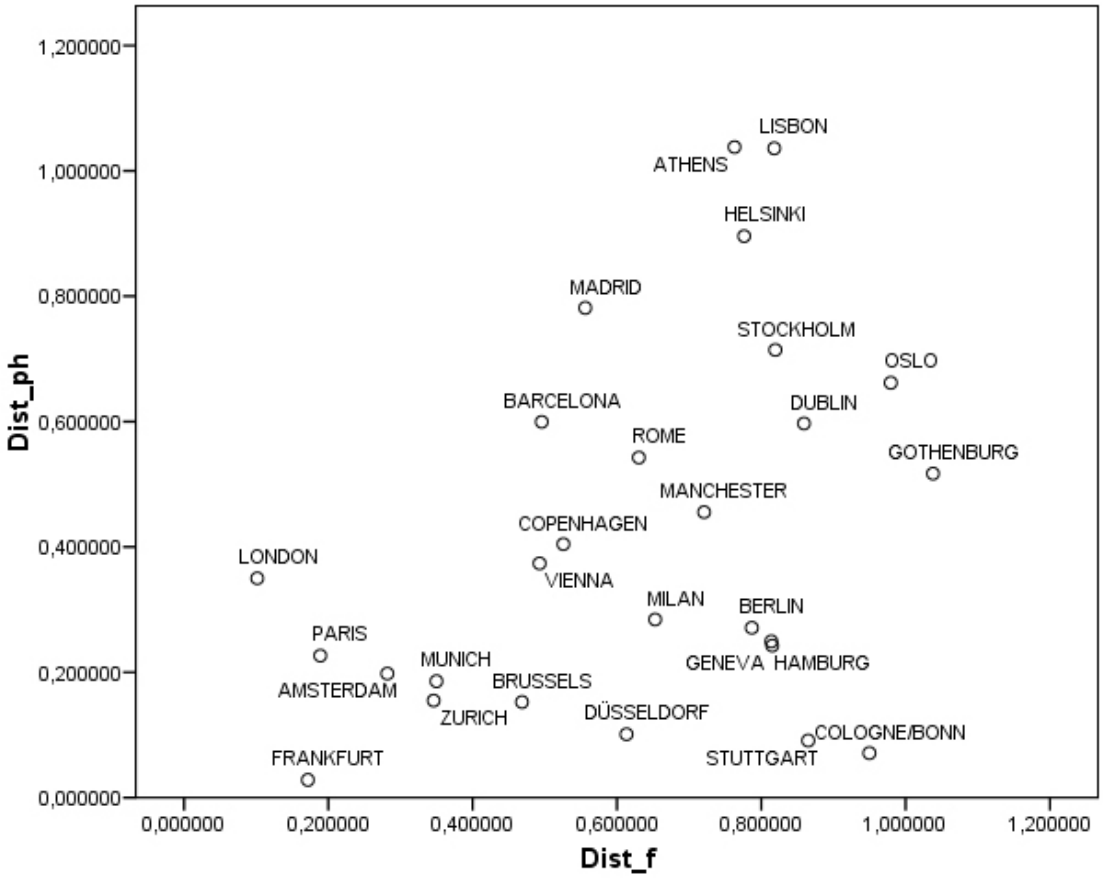


Figure 8.22. Correlation between the functional and physical proximity of the cities to the centre of the space of European air passenger flows and to the centre of gravity.

Focussing on the differences between the physical and functional proximities, Table 8.10 indicates that these tend to be most pronounced in the case of the cities lying within the more central area, for example in the cases of Cologne/Bonn, Stuttgart, Geneva, Hamburg and Düsseldorf. At the opposite end of the scale, one can see that Paris, with a difference of +0.04, is almost as close to the centre of the space of air passenger flows, as it is to the centre of gravity between the airports. By contrast London, with a difference of +0.25, is located further away from the centre of gravity. There is negligible difference between the differences of Barcelona (+0.10) and Helsinki (+0.12), both located at ostensibly opposite extremes of the European territory.

Ref	City	Functional proximity	Physical proximity	Difference
7	Cologne /Bonn	0.95	0.07	-0.88
10	Stuttgart	0.87	0.09	-0.77
3	Geneva	0.82	0.24	-0.57
6	Hamburg	0.81	0.25	-0.56
25	Gothenburg	1.04	0.52	-0.52
11	Berlin	0.79	0.27	-0.52
8	Düsseldorf	0.61	0.10	-0.51
19	Milan	0.65	0.28	-0.37
23	Oslo	0.98	0.66	-0.32
2	Brussels	0.47	0.15	-0.32
27	Manchester	0.72	0.46	-0.27
18	Dublin	0.86	0.60	-0.26
4	Zurich	0.35	0.15	-0.19
9	Munich	0.35	0.19	-0.16
5	Frankfurt	0.17	0.03	-0.14
12	Copenhagen	0.53	0.40	-0.12
1	Vienna	0.49	0.37	-0.12
26	Stockholm	0.82	0.71	-0.11
20	Rome	0.63	0.54	-0.09
22	Amsterdam	0.28	0.20	-0.08
16	Paris	0.19	0.23	+0.04
13	Barcelona	0.50	0.60	+0.10
15	Helsinki	0.78	0.90	+0.12
24	Lisbon	0.82	1.04	+0.22
14	Madrid	0.56	0.78	+0.23
28	London	0.10	0.35	+0.25
17	Athens	0.76	1.04	+0.28

Table 8.9. Differences in values between the functional and physical proximity of the cities, to the centre of the space of European air passenger flows and to the centre of gravity.

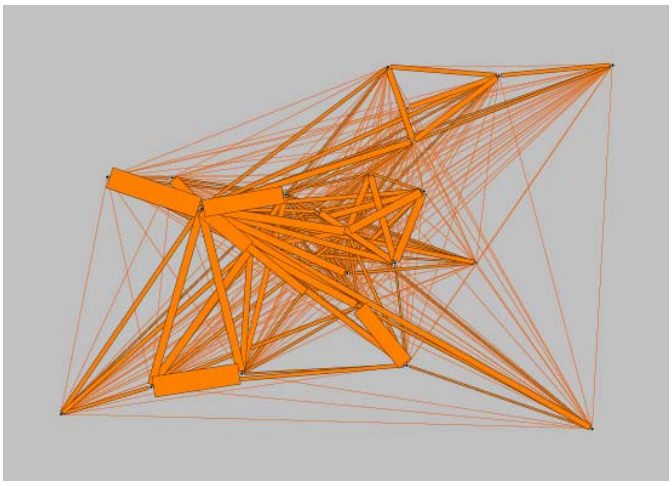
Concluding remarks

This chapter has sought to summon quantitative evidence, through the exploitation and interpretation of the air passenger flows between the 28 European metropolitan urban regions, in order to indicate the dynamics of the relationships lying between these metropolitan centres. The network analysis approach has required the treatment of the air passenger flows between the 28 airport combinations as a closed system.

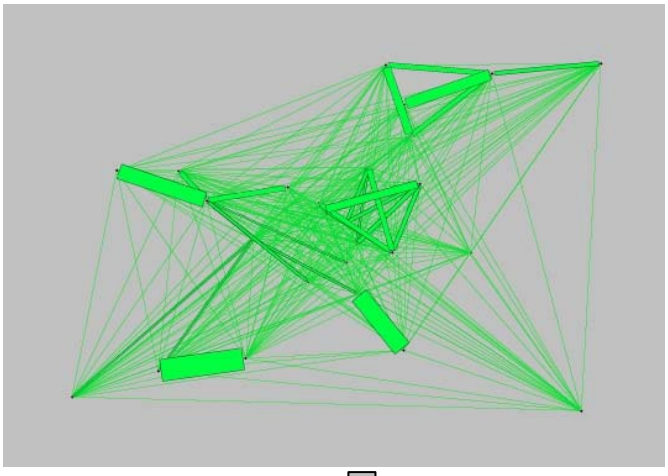
Figure 8.24 summarises the results of the processes carried out in Sections 8.2-8.4. The first step entailed the elaboration of the data for each of the cells of the *28 × 28* origin-destination matrix (Figure 8.24a). Descriptive indicators were produced in the second step, in the form of the 'interaction value' and the 'functional distance' between the different metropolitan urban regions, as a means of making some sense of the overall passenger flows between the different centres (Figure 8.24b). Finally the multidimensional scaling mathematical technique was introduced in order to reduce the complexity of the functional distance indicator and at the same time proportion a functional positioning of the airports within the conceptual European space of air passenger flows (Figure 8.24c).

Within this functional ordering Madrid and Barcelona both appear well positioned in relation to the centre – in the 11th and 9th positions respectively – clearly highlighting the superior positioning of Barcelona over Madrid with respect to the remainder of the European system. Comparing the functional proximity to the centre of the system, with the physical proximity of the metropolitan urban regions to the spatial centre of gravity, Barcelona and Madrid are positioned at a closer functional distance than their physical proximity, following those of Paris and London.

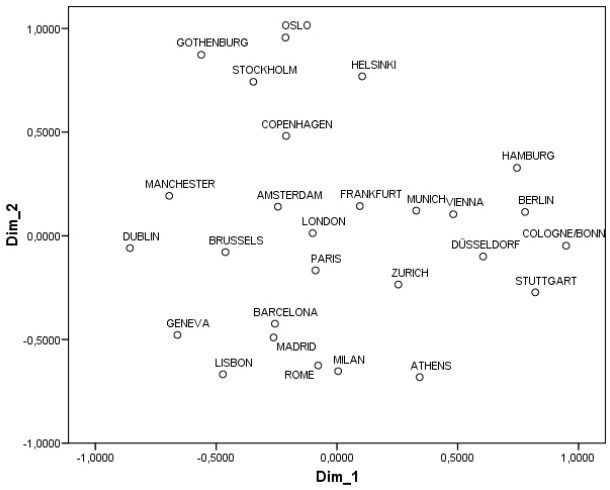
The empirical evidence provided in this chapter appears conclusive in contributing to the possibility of accepting the hypothesis set out in the Introduction, relating to the (re)positioning of at least part of the Spanish metropolitan system within the European urban system, which will be discussed in further detail in Chapter 9.



(a)



(b)



(c)

Figure 8.23(a-c). Summary of the analytical process adopted through Sections 8.2-8.4 to determine the functional positioning of the metropolitan airports within the European space of air passenger flows

A limitation of the research outlined here lies in the fact that it deals with just one single period, thus making it impossible to examine changes over time. The non-availability of earlier data for all of the airports initially chosen meant that taking a time-series approach would by necessity have reduced the size of the sample of the airports. Another limitation lies in the Western European focus of the research. Capitals such as Warsaw, Budapest and Prague would deserve to have been included, especially since the ESPON work recognises them as potential MEGAs, in the same way as Lisbon. However for reasons of the data not being available within the same data source, these cities were excluded. Future research should be directed towards rectifying these two critical limitations.

TECHNICAL ANNEXES

Technical Annex 1: Real air passenger flows

Technical Annex 2: Real and estimated air passenger flows

Technical Annex 3: Interaction values between the 29 airports of the sample

Technical Annex 4: Functional distance between the 29 airports of the sample

DESTINATION		1	2	3	4	5	6	7	8	9	10	11	12	13	14
ORIGEN		VIEN.	BRUS.	GEN.	ZUR.	FRAN.	HAM.	COL/BN.	DÜS.	MUN.	STUT.	BER.	COP.	BAR.	MAD.
1	VIEN.		170657	54620	263975	352060	154342	129835	205300	193636	117084	190659	149366	67354	72242
2	BRUS.	170894		150522	127047	222940	53669			134164			194200	263039	333974
3	GEN.	55318	146198		298188	188728				77974		39732	76831	184792	117337
4	ZUR.	261756	128530	306871		266325	191728	80315	204940	152917		232117	145993	134924	153908
5	FRAN.	343574	215445	190765	269003		658179	53896	267154	665265	162494	799444	256565	284859	336417
6	HAM.	152900	54091		192460	644083		216976	158832	713946	289553		59818	39769	
7	COL/BN.	129232			80675	56646	215129			517698		654871		41443	44639
8	DÜS.	197685			208548	265657	155973			667539	105003	343524	93643	138945	106271
9	MUN.	188577	138537	69703	147664	660990	713854	515085	666581		67401	727927	149098	172126	194926
10	STUT.	117925				159768	290082		104130	74730		376404	53635	86773	36255
11	BER.	187336	54673		232252	791392		655092	340839	735512	453112		104183	92174	60512
12	COP.	144460	189725	80811	148780	258027	63672		93064	147254	56415	65784		123068	119874
13	BAR.	63870	264604	179719	130540	273798	40189	40866	141926	180681	84100	62964	121156		1996411
14	MAD.	68411	344921	125165	150002	347143		44860	107419	197343	40707	58890	116912	2073196	
15	HEL.	63125	111857		73600	196763	53579		61354	115627		49177	287806	45127	
16	PAR.	257989	162821	505386	288664	497672	167574	92034	208559	327395	140696	217061	311503	638409	830007
17	ATH.	65113	147772	45610	76749	258817			65883	192088	54881		66486		106114
18	DUB.	41212	71267		41139	153169			59129	49962			83805	93723	96897
19	MIL.	104779	211836		126832	289175		62736	99236	119128	50391	60663	129315	276161	353072
20	ROME	124788	256368	92349	130749	345078		53821	38868	202072	40600	70722	106233	244060	424297
21	LUX.	20569		14084	19980	73258							19015		24636
22	AMST.	201463	105855	246492	265812	287831	121977		64244	212347	85617	142144	268345	567000	431777
23	OSLO		57581			159083				67424			617628		
24	LIS.		185429	87968	114851	146818				107813			48275	153403	339468
25	GOTH.		75084			105621				44389			191895		
26	STOCK.	58013	90894		92266	234048				110515			583943	49740	79608
27	MAN.		92600	51830	45923	171334		37748	71374	69327			107024	101573	47218
28	LON.	348205	420995	854231	611637	836773	237867	256396	375545	636573	141554	372068	631576	866474	821892
TOTAL		3367187	3697733	3056122	4137329	8242992	3117811	2239658	3334374	6713314	1889606	4464149	4974246	6738127	7127748

Technical Annex 1: Real air passenger flows between the airports of the sample. Shaded cells denote missing data. Dark shaded cells denote no value between the airport and itself[434].

[434] EUROSTAT (own elaboration)

DESTINATION		15	16	17	18	19	20	21	22	23	34	35	26	27	28
ORIGEN		HEL.	PARIS	ATH.	DUB.	MIL.	ROME	LUX.	AMST.	OSLO	LIS.	GOTH.	STOCK.	MAN.	LON.
1	VIEN.	VIEN.	254790	63575	52979	110333	119965	25894	205213				60930		360791
2	BRUS.	BRUS.	156875	147757	111313	222670	257175		108766	73444	186106	74554	89755	94213	461731
3	GEN.	GEN.	508949	44588	44603		89237	14120	242420		87754			50249	909722
4	ZUR.	ZUR.	281856	76705	59235	134767	124990	20077	263200		113919		93704	48592	693952
5	FRAN.	FRAN.	485663	255151	207324	297269	314044	70179	277539	163799	140061	108443	243474	175717	828057
6	HAM.	HAM.	162545						123015						235718
7	COL/BN.	COL/BN.	86781			63730	52835							38271	255479
8	DÜS.	DÜS.	196953	76851	75678	100433	38512		66291					70591	378619
9	MUN.	MUN.	330673	199590	130359	123685	200114		215394	69576	110240	42580	105986	66332	639929
10	STUT.	STUT.	136134	44150	30207	48933	39189		84138						140083
11	BER.	BER.	264193	83613		60466	70010		138177						452729
12	COP..	COP..	307176	67131	77418	125641	104879	20271	266317	598048	49917	192668	588710	107389	636900
13	BAR.	BAR.	614748		91442	279722	245668		563287		157135		47156	102750	871639
14	MAD.	MAD.	825002	102290	96983	352049	428021	24864	430648		353670		83888	48238	837199
15	HEL.	HEL.	138086			46821	36090		181547	93991		59087	387247	42715	218077
16	PAR.	PAR.		332760	297987	798729	639396	61484	506928	128150	461878	59259	194826	264329	1564110
17	ATH.	ATH.	337067			311129	234577		162662						605088
18	DUB.	DUB.	257220			90595	96473		218038					313746	2291765
19	MIL.	MIL.	792985	301803	181149		1560764		295994		112879			65218	645731
20	ROME	ROME	666631	228829	168556	1602946		14273	313750		131259		42449	39531	552372
21	LUX.	LUX.	62413				14970		36617		14168			10545	223197
22	AMST.	AMST.	485103	159196	188484	311032	293731	37136		234756	216470	140141	245868	254580	1718905
23	OSLO	OSLO	128308						232042			39940	429578		343963
24	LIS.	LIS.	459339			109954	124455	36877	208895						429262
25	GOTH.	GOTH.	59483						137761	35294			495354		184910
26	STOCK.	STOCK.	195605				43212		243192	434617		509976			428464
27	MAN.	MAN.	261541		312832	66233	39475	10472	255776			178642			1003923
28	LON.	LON.	1459025	601439	1943990	649748	527160	131618	1715975	339611	419135	186460	427849	951526	
TOTAL		2260692	9915138	2785425	4070537	5906881	5694938	467265	7493578	2171285	2554587	1591748	3536770	2744528	17912308

Technical Annex 1: (cont.) Real air passenger flows between the airports of the sample. Shaded cells denote missing data. Dark shaded cells denote no value between the airport and itself.

DESTINATION		1	2	3	4	5	6	7	8	9	10	11	12	13	14
ORIGEN		VIEN.	BRUS.	GEN.	ZUR.	FRAN.	HAM.	COL/BN.	DÜS.	MUN.	STUT.	BER.	COP.	BAR.	MAD.
1	VIEN.		170657	54620	263975	352060	154342	129835	205300	193636	117084	190659	149366	67354	72242
2	BRUS.	170894		150522	127047	222940	53669	359	125	134164	25292	78426	194200	263039	333974
3	GEN.	55318	146198		298188	188728	35289	16036	40020	77974	6120	9706	76831	184792	117337
4	ZUR.	261756	128530	306871		266325	191728	80315	204940	152917	25377	232117	145993	134924	153908
5	FRAN.	343574	215445	190765	269003		658179	53896	267154	665265	162494	843762	256565	284859	336417
6	HAM.	152900	54091	34010	192460	644083		216976	158832	713946	289553	293467	59818	39769	56230
7	COL/BN.	129232	215	15569	80675	56646	215129		131369	517698	98073	654871	2554	41443	44639
8	DÜS.	197685	430	39133	208548	265657	155973	131470		667539	105003	364784	93643	138945	106271
9	MUN.	188577	138537	69703	147664	660990	713854	515085	666581		67401	780475	149098	172126	194926
10	STUT.	117925	24995	6090	26345	159768	290082	98626	104130	74730		453637	53635	86773	36255
11	BER.	187336	77688	9381	232252	835406	330706	655092	362065	777729	453112		104220	92174	76641
12	COP..	144460	189725	80811	148780	258027	63672	2030	93064	147254	56415	105829		123068	119874
13	BAR.	63870	264604	179719	130540	273798	40189	40866	141926	180681	84100	89575	121156		1996411
14	MAD.	68411	344921	125165	150002	347143	56392	44860	107419	197343	40707	75415	116912	2073196	
15	HEL.	63125	111857	5026	73600	196763	53579	16719	61354	115627	12463	49177	287806	45127	36222
16	PAR.	257989	162821	505386	288664	497672	167574	92034	208559	327395	140696	270606	311503	638409	830007
17	ATH.	65113	147772	45610	76749	258817	26753	25723	65883	192088	54881	55747	66486	32184	106114
18	DUB.	41212	71267	25321	41139	153169	17078	16863	59129	49962	16977	14359	83805	93723	96897
19	MIL.	104779	211836	50443	126832	289175	12682	62736	99236	119128	50391	78699	129315	276161	353072
20	ROME	124788	256368	92349	130749	345078	15821	53821	38868	202072	40600	70722	106233	244060	424297
21	LUX.	20569	54	14084	19980	73258	37	31	14	1644	26	7622	19015	9665	24636
22	AMST.	201463	105855	246492	265812	287831	121977	33706	64244	212347	85617	142144	268345	567000	431777
23	OSLO	12013	57581	5071	17205	159083	15854	8968	12091	67424	106	24726	617628	16849	10001
24	LIS.	18178	185429	87968	114851	146818	19387	23432	44443	107813	31666	19980	48275	153403	339468
25	GOTH.	15343	75084	878	2011	105621	5709	4899	10826	44389	325	6039	191895	9799	14516
26	STOCK.	58013	90894	37317	92266	234048	14975	12851	28400	110515	852	15732	583943	49740	79608
27	MAN.	25559	92600	51830	45923	171334	24634	37748	71374	69327	18372	24439	107024	101573	47218
28	LON.	465444	446934	858775	746626	836773	251091	256396	375545	636573	195189	465754	631576	866474	821892
TOTAL		3555518	3772381	3288905	4317879	8287006	3706353	2631369	3622888	6757175	2178891	5418468	4976836	6806624	7260846

Technical Annex 2: Real and estimated air passenger flows between the airports of the sample. Dark shaded cells denote no value between the airport and itself[435].

[435] EUROSTAT (own elaboration)

DESTINATION		15	16	17	18	19	20	21	22	23	34	35	26	27	28
ORIGEN		HEL.	PARIS	ATH.	DUB.	MIL.	ROME	LUX.	AMST.	OSLO	LIS.	GOTH.	STOCK.	MAN.	LON.
1	VIEN.	63413	254790	63575	52979	110333	119965	25894	205213	11956	19094	15485	60930	25459	479909
2	BRUS.	111068	156875	147757	111313	222670	257175	0	108766	73444	186106	74554	89755	94213	488082
3	GEN.	5019	508949	44588	44603	51524	89237	14120	242420	2164	87754	906	39619	50249	914407
4	ZUR.	71011	281856	76705	59235	134767	124990	20077	263200	9955	113919	2039	93704	48592	828074
5	FRAN.	190218	485663	255151	207324	297269	314044	70179	277539	163799	140061	108443	243474	175717	828057
6	HAM.	50173	162545	30645	17187	9140	12018	14	123015	18306	19575	4880	12652	24472	249009
7	COL/BN.	16856	86781	28935	16888	63730	52835	25	34060	9116	22737	5064	13127	38271	255479
8	DÜS.	60702	196953	76851	75678	100433	38512	9	66291	9150	42476	10499	27219	70591	378619
9	MUN.	114076	330673	199590	130359	123685	200114	17079	215394	69576	110240	42580	105986	66332	639929
10	STUT.	12416	136134	44150	30207	48933	39189	31	84138	47	30683	582	1508	18102	192947
11	BER.	46842	264193	59015	13864	78785	70010	6849	138177	22976	17365	6206	15995	24070	466133
12	COP..	289597	307176	67131	77418	125641	104879	20271	266317	598048	49917	192668	588710	107389	636900
13	BAR.	47678	614748	30406	91442	279722	245668	9916	563287	17125	157135	9131	47156	102750	871639
14	MAD.	27531	825002	102290	96983	352049	428021	24864	430648	10665	353670	15629	83888	48238	837199
15	HEL.		138086	5601	15427	46821	36090	0	181547	93991	0	59087	387247	42715	257592
16	PAR.	145583		332760	297987	798729	639396	61484	506928	128150	461878	59259	194826	264329	1564110
17	ATH.	5914	337067		191	311129	234577	6347	162662	1725	6615	7177	16757	129078	605088
18	DUB.	15018	257220	204		90595	96473	3002	218038	17484	18077	1	29982	313746	2291765
19	MIL.	39852	792985	301803	181149		1560764	71	295994	7413	112879	1564	40557	65218	746532
20	ROME	42388	666631	228829	168556	1602946		14273	313750	29456	131259	6022	42449	39531	567947
21	LUX.	45	62413	7776	2324	67	14970		36617	0	14168	0	2315	10545	223197
22	AMST.	184381	485103	159196	188484	311032	293731	37136		234756	216470	140141	245868	254580	1718905
23	OSLO	104174	128308	1430	18046	7086	16423	0	232042		16001	39940	429578	17640	343963
24	LIS.	3	459339	7374	17779	109954	124455	36877	208895	12802		2998	18674	65606	453302
25	GOTH.	58247	59483	6644	12	2028	2650	0	137761	35294	3744		495354	3595	184910
26	STOCK.	381454	195605	14921	29395	20856	43212	2579	243192	434617	28831	509976		19432	428761
27	MAN.	42016	261541	128363	312832	66233	39475	10472	255776	16698	65571	178642	20049		1096750
28	LON.	256813	1459025	601439	1943990	751869	542602	131618	1715975	339611	442993	186460	428165	1045392	
TOTAL		2382484	9915138	3023125	4201648	6118022	5741471	513186	7527638	2368323	2869215	1679930	3775540	3165849	18549202

Technical Annex 2 (continued): Real and estimated air passenger flows between the airports of the sample. Dark shaded cells denote no value between the airport and itself.

DESTINATION		1	2	3	4	5	6	7	8	9	10	11	12	13	14
ORIGEN		VIEN.	BRUS.	GEN.	ZUR.	FRAN.	HAM.	COL/BN.	DÜS.	MUN.	STUT.	BER.	COP.	BAR.	MAD.
1	VIEN.	0	0.00425	0.00051	0.00881	0.00812	0.00358	0.00355	0.00623	0.00299	0.00353	0.00367	0.00242	0.00035	0.00038
2	BRUS.	0.00425	0	0.00347	0.00196	0.00303	0.00041	0	0	0.00143	0.00015	0.00059	0.00388	0.00539	0.00823
3	GEN.	0.00051	0.00347	0	0.01264	0.00262	0.0002	0.00006	0.00026	0.00049	0.00001	0.00001	0.00075	0.00297	0.00121
4	ZUR.	0.00881	0.00196	0.01264	0	0.00396	0.0046	0.00113	0.0054	0.00152	0.00014	0.00456	0.002	0.0012	0,00144
5	FRAN.	0.00812	0.00303	0.00262	0.00396	0	0.02783	0.00028	0.00472	0.01561	0.00288	0.03135	0.00321	0.00279	0.00385
6	HAM.	0.00358	0.00041	0.0002	0.0046	0.02783	0	0.00966	0.00372	0.04085	0.02102	0.00981	0.00042	0.00013	0.00024
7	COL/BN.	0.00355	0	0.00006	0.00113	0.00028	0.00966	0	0.00362	0.02983	0.00338	0.06014	0	0.00019	0.00021
8	DÜS.	0.00623	0	0.00026	0.0054	0.00472	0.00372	0.00362	0	0.03613	0.00277	0.01344	0.00097	0.00161	0.00086
9	MUN.	0.00299	0.00143	0.00049	0.00152	0.01561	0.04085	0.02983	0.03613	0	0.00069	0.03296	0.0013	0.00136	0.00155
10	STUT.	0.00353	0.00015	0.00001	0.00014	0.00288	0.02102	0.00338	0.00277	0.00069	0	0.03486	0.00056	0.00099	0.00019
11	BER.	0.00367	0.00059	0.00001	0.00456	0.03135	0.00981	0.06014	0.01344	0.03296	0.03486	0	0.00082	0.00045	0.00029
12	COP..	0.00242	0.00388	0.00075	0.002	0.00321	0.00042	0	0.00097	0.0013	0.00056	0.00082	0	0.00089	0.00077
13	BAR.	0.00035	0.00539	0.00297	0.0012	0.00279	0.00013	0.00019	0.00161	0.00136	0.00099	0.00045	0.00089	0	0.1675
14	MAD.	0.00038	0.00823	0.00121	0.00144	0.00385	0.00024	0.00021	0.00086	0.00155	0.00019	0.00029	0.00077	0.1675	0
15	HEL.	0.00093	0.00272	0.00001	0.001	0.00378	0.00061	0.00009	0.00086	0.00163	0.00006	0.00036	0.01405	0.00027	0.00012
16	PAR.	0.00365	0.00133	0.01545	0.00372	0.00581	0.00148	0.00061	0.00226	0.00318	0.00176	0.00263	0.00384	0.01159	0.01864
17	ATH.	0.00076	0.00376	0.0004	0.00089	0.00525	0.00015	0.00019	0.00093	0.00372	0.00075	0.0004	0.00059	0.0001	0.00098
18	DUB.	0.0003	0.00109	0.00019	0.00028	0.00192	0.00004	0.00005	0.00061	0.00068	0.00013	0.00002	0.00063	0.00061	0.00062
19	MIL.	0.00105	0.00404	0.00026	0.00128	0.00339	0.00001	0.0005	0.0009	0.00071	0.00037	0.00037	0.00107	0.00374	0.00555
20	ROME	0.00142	0.00588	0.00085	0.00128	0.00446	0.00002	0.00037	0.00014	0.00203	0.00025	0.00031	0.00076	0.00303	0.00845
22	LUX.	0.00057	0	0.00022	0.00034	0.0023	0	0	0	0.00008	0	0.00004	0.00029	0.00005	0.00031
23	AMST.	0.00306	0.0008	0.00479	0.00427	0.00256	0.00109	0.00012	0.00031	0.00179	0.00088	0.00096	0.00383	0.01259	0.00676
24	OSLO	0.00003	0.00096	0	0.00004	0.00265	0.00007	0.00003	0.00003	0.00058	0	0.00009	0.06263	0.00004	0.00001
25	LIS.	0.00007	0.0063	0.00162	0.00209	0.00173	0.00007	0.00014	0.00036	0.00122	0.00031	0.00005	0.00034	0.00249	0.01145
26	GOTH.	0.00008	0.00187	0	0	0.00175	0.00001	0.00001	0.00004	0.00036	0	0.00001	0.00946	0.00002	0.00004
27	STOCK.	0.00052	0.00113	0.00024	0.00105	0.00365	0.00003	0.00003	0.00011	0.00092	0	0.00002	0.0367	0.00018	0.00048
28	MAN.	0.00011	0.0014	0.00048	0.00031	0.00222	0.0001	0.00034	0.00085	0.00041	0.00009	0.00007	0.00141	0.00095	0.00019

Technical Annex 3: Interaction values between the airports of the sample. Dark shaded cells denote no value between the airport and itself.

DESTINATION		15	16	17	18	19	20	22	23	34	35	26	27	28
ORIGEN		HEL.	PARIS	ATH.	DUB.	MIL.	ROME	AMST.	OSLO	LIS.	GOTH.	STOCK.	MAN.	LON.
1	VIEN.	0.00093	0.00365	0.00076	0.0003	0.00105	0.00142	0.00057	0.00306	0.00003	0.00007	0.00008	0.00052	0.00011
2	BRUS.	0.00272	0.00133	0.00376	0.00109	0.00404	0.00588	0	0.0008	0.00096	0.0063	0.00187	0.00113	0.0014
3	GEN.	0.00001	0.01545	0.0004	0.00019	0.00026	0.00085	0.00022	0.00479	0	0.00162	0	0.00024	0.00048
4	ZUR.	0.001	0.00372	0.00089	0.00028	0.00128	0.00128	0.00034	0.00427	0.00004	0.00209	0	0.00105	0.00031
5	FRAN.	0.00378	0.00581	0.00525	0.00192	0.00339	0.00446	0.0023	0.00256	0.00265	0.00173	0.00175	0.00365	0.00222
6	HAM.	0.00061	0.00148	0.00015	0.00004	0.00001	0.00002	0	0.00109	0.00007	0.00007	0.00001	0.00003	0.0001
7	COL/BN.	0.00009	0.00061	0.00019	0.00005	0.0005	0.00037	0	0.00012	0.00003	0.00014	0.00001	0.00003	0.00034
8	DÜS.	0.00086	0.00226	0.00093	0.00061	0.0009	0.00014	0	0.00031	0.00003	0.00036	0.00004	0.00011	0.00085
9	MUN.	0.00163	0.00318	0.00372	0.00068	0.00071	0.00203	0.00008	0.00179	0.00058	0.00122	0.00036	0.00092	0.00041
10	STUT.	0.00006	0.00176	0.00075	0.00013	0.00037	0.00025	0	0.00088	0	0.00031	0	0	0.00009
11	BER.	0.00036	0.00263	0.0004	0.00002	0.00037	0.00031	0.00004	0.00096	0.00009	0.00005	0.00001	0.00002	0.00007
12	COP..	0.01405	0.00384	0.00059	0.00063	0.00107	0.00076	0.00029	0.00383	0.06263	0.00034	0.00946	0.0367	0.00141
13	BAR.	0.00027	0.01159	0.0001	0.00061	0.00374	0.00303	0.00005	0.01259	0.00004	0.00249	0.00002	0.00018	0.00095
14	MAD.	0.00012	0.01864	0.00098	0.00062	0.00555	0.00845	0.00031	0.00676	0.00001	0.01145	0.00004	0.00048	0.00019
15	HEL.	0	0.00168	0.00001	0.00005	0.00026	0.00022	0	0.00373	0.00347	0	0.00183	0.03283	0.00046
16	PAR.	0.00168	0	0.00737	0.0037	0.02065	0.01448	0.00142	0.00652	0.00138	0.01476	0.00045	0.00202	0.00421
17	ATH.	0.00001	0.00737	0	0	0.01013	0.00604	0.00006	0.00227	0	0.00001	0.00002	0.00004	0.00334
18	DUB.	0.00005	0.0037	0	0	0.0016	0.00152	0.00001	0.00265	0.00006	0.00005	0	0.00011	0.01441
19	MIL.	0.00026	0.02065	0.01013	0.0016	0	0.13942	0	0.00401	0.00001	0.00142	0	0.00009	0.00043
20	ROME	0.00022	0.01448	0.00604	0.00152	0.13942	0	0.00014	0.00418	0.00008	0.00194	0	0.00017	0.00016
22	LUX.	0	0.00142	0.00006	0.00001	0	0.00014	0	0.00067	0	0.00105	0	0.00001	0.00013
23	AMST.	0.00373	0.00652	0.00227	0.00265	0.00401	0.00418	0.00067	0	0.00611	0.0042	0.00326	0.00422	0.0053
24	OSLO	0.00347	0.00138	0	0.00006	0.00001	0.00008	0	0.00611	0	0.00006	0.00076	0.04174	0.00008
25	LIS.	0	0.01476	0.00001	0.00005	0.00142	0.00194	0.00105	0.0042	0.00006	0	0.00001	0.00011	0.00092
26	GOTH.	0.00183	0.00045	0.00002	0	0	0	0	0.00326	0.00076	0.00001	0	0.08515	0.00562
27	STOCK.	0.03283	0.00202	0.00004	0.00011	0.00009	0.00017	0.00001	0.00422	0.04174	0.00011	0.08515	0	0.00006
28	MAN.	0.00046	0.00421	0.00334	0.01441	0.00043	0.00016	0.00013	0.0053	0.00008	0.00092	0.00562	0.00006	0

Technical Annex 3 (continued): Interaction values between the airports of the sample. Dark shaded cells denote no value between the airport and itself.

DESTINATION		1	2	3	4	5	6	7	8	9	10	11	12	13	14
ORIGEN		VIEN.	BRUS.	GEN.	ZUR.	FRAN.	HAM.	COL/BN.	DÜS.	MUN.	STUT.	BER.	COP.	BAR.	MAD.
1	VIEN.	0	21.70	62.81	15.07	15.69	23.65	23.74	17.91	25.85	23.79	23.35	28.76	75.04	72.90
2	BRUS.	21.70	0	24.01	31.97	25.69	69.57	10724.06	11764.41	37.38	114.72	58.33	22.71	19.26	15.59
3	GEN.	62.81	24.01	0	12.58	27.65	100.75	186.99	87.64	64.20	440.09	444.37	51.51	25.97	40.63
4	ZUR.	15.07	31.97	12.58	0	22.48	20.85	42.11	19.24	36.23	119.15	20.95	31.61	40.90	37.20
5	FRAN.	15.69	25.69	27.65	22.48	0	8.48	84.51	20.59	11.32	26.36	7.99	24.96	26.79	22.80
6	HAM.	23.65	69.57	100.75	20.85	8.48	0	14.39	23.18	7.00	9.75	14.27	69.17	124.55	92.10
7	COL/BN.	23.74	10724.06	186.99	42.11	84.51	14.39	0	23.51	8.19	24.33	5.77	1567.85	102.42	98.10
8	DÜS.	17.91	11764.41	87.64	19.24	20.59	23.18	23.51	0	7.44	26.86	12.20	45.48	35.23	48.23
9	MUN.	25.85	37.38	64.20	36.23	11.32	7.00	8.19	7.44	0	54.03	7.79	39.22	38.38	35.96
10	STUT.	23.79	114.72	440.09	119.15	26.36	9.75	24.33	26.86	54.03	0	7.57	59.74	44.85	103.55
11	BER.	23.35	58.33	444.37	20.95	7.99	14.27	5.77	12.20	7.79	7.57	0	49.43	66.57	82.87
12	COP..	28.76	22.71	51.51	31.61	24.96	69.17	1567.85	45.48	39.22	59.74	49.43	0	47.44	50.96
13	BAR.	75.04	19.26	25.97	40.90	26.79	124.55	102.42	35.23	38.38	44.85	66.57	47.44	0	3.45
14	MAD.	72.90	15.59	40.63	37.20	22.80	92.10	98.10	48.23	35.96	103.55	82.87	50.96	3.45	0
15	HEL.	46.29	27.11	560.42	44.64	23.00	57.06	149.32	48.21	35.07	183.21	74.92	11.93	86.49	129.97
16	PAR.	23.42	38.75	11.38	23.20	18.56	36.78	57.45	29.74	25.09	33.75	27.58	22.83	13.13	10.36
17	ATH.	51.30	23.05	70.35	47.43	19.52	116.05	103.21	46.34	23.18	51.58	70.65	58.13	144.55	45.22
18	DUB.	81.53	42.72	102.54	83.64	32.26	228.34	196.24	57.24	53.90	122.88	336.76	56.42	57.28	56.99
19	MIL.	43.56	22.25	88.35	39.48	24.29	428.74	63.44	47.16	53.08	73.43	73.12	43.24	23.12	18.98
20	ROME	37.52	18.45	48.60	39.58	21.15	330.56	73.70	119.25	31.40	89.57	80.17	51.18	25.71	15.38
22	LUX.	25.56	49.96	20.43	21.66	27.93	42.89	131.26	79.98	33.41	47.64	45.54	22.86	12.60	17.20
23	AMST.	243.68	45.66	719.86	229.03	27.48	172.44	276.41	273.63	58.62	27647.00	150.31	5.65	235.65	403.27
24	OSLO	172.08	17.82	35.09	30.91	33.97	166.49	118.92	74.13	40.46	80.06	210.52	76.84	28.32	13.21
25	LIS.	154.55	32.85	2566.54	1296.54	33.81	453.28	409.11	224.35	75.31	3933.36	477.73	14.57	344.59	225.47
26	GOTH.	61.86	42.03	91.89	43.62	23.41	268.40	242.44	132.90	46.73	2337.87	284.93	7.38	104.08	64.24
27	STOCK.	134.44	37.88	64.57	79.96	30.03	141.27	77.23	48.54	69.52	146.35	173.71	37.63	46.03	102.58
28	MAN.	17.07	17.79	8.74	11.28	14.73	32.63	26.99	21.50	17.39	32.36	21.27	14.97	12.73	13.89

Technical Annex 4: Functional distances between the airports of the sample. Dark shaded cells denote no value between the airport and itself.

DESTINATION		15	16	17	18	19	20	22	23	34	35	26	27	28
ORIGEN		HEL.	PARIS	ATH.	DUB.	MIL.	ROME	AMST.	OSLO	LIS.	GOTH.	STOCK.	MAN.	LON.
1	VIEN.	46.29	23.42	51.30	81.53	43.56	37.52	25.56	243.68	172.08	154.55	61.86	134.44	17.07
2	BRUS.	27.11	38.75	23.05	42.72	22.25	18.45	49.96	45.66	17.82	32.85	42.03	37.88	17.79
3	GEN.	560.42	11.38	70.35	102.54	88.35	48.60	20.43	719.86	35.09	2566.54	91.89	64.57	8.74
4	ZUR.	44.64	23.20	47.43	83.64	39.48	39.58	21.66	229.03	30.91	1296.54	43.62	79.96	11.28
5	FRAN.	23.00	18.56	19.52	32.26	24.29	21.15	27.93	27.48	33.97	33.81	23.41	30.03	14.73
6	HAM.	57.06	36.78	116.05	228.34	428.74	330.56	42.89	172.44	166.49	453.28	268.40	141.27	32.63
7	COL/BN.	149.32	57.45	103.21	196.24	63.44	73.70	131.26	276.41	118.92	409.11	242.44	77.23	26.99
8	DÜS.	48.21	29.74	46.34	57.24	47.16	119.25	79.98	273.63	74.13	224.35	132.90	48.54	21.50
9	MUN.	35.07	25.09	23.18	53.90	53.08	31.40	33.41	58.62	40.46	75.31	46.73	69.52	17.39
10	STUT.	183.21	33.75	51.58	122.88	73.43	89.57	47.64	27647.00	80.06	3933.36	2337.87	146.35	32.36
11	BER.	74.92	27.58	70.65	336.76	73.12	80.17	45.54	150.31	210.52	477.73	284.93	173.71	21.27
12	COP..	11.93	22.83	58.13	56.42	43.24	51.18	22.86	5.65	76.84	14.57	7.38	37.63	14.97
13	BAR.	86.49	13.13	144.55	57.28	23.12	25.71	12.60	235.65	28.32	344.59	104.08	46.03	12.73
14	MAD.	129.97	10.36	45.22	56.99	18.98	15.38	17.20	403.27	13.21	225.47	64.24	102.58	13.89
15	HEL.	0	34.50	467.28	207.19	87.88	95.10	23.15	24.00	1367564.59	33.09	7.80	66.00	25.58
16	PAR.	34.50	0	16.47	23.23	9.84	11.75	17.50	38.06	11.64	67.06	31.50	21.80	8.92
17	ATH.	467.28	16.47	0	17981.88	14.05	18.21	29.67	1693.73	420.81	316.47	213.13	24.48	12.29
18	DUB.	207.19	23.23	17981.88	0	35.25	36.02	27.46	177.02	192.69	301001.95	133.48	11.79	4.09
19	MIL.	87.88	9.84	14.05	35.25	0	3.79	22.33	525.41	37.56	1715.70	148.86	68.08	14.05
20	ROME	95.10	11.75	18.21	36.02	3.79	0	21.86	156.54	32.06	654.81	109.82	110.95	18.58
22	LUX.	23.15	17.50	29.67	27.46	22.33	21.86	0	18.10	21.81	24.79	21.76	19.44	6.80
23	AMST.	24.00	38.06	1693.73	177.02	525.41	156.54	18.10	0	179.95	51.36	6.92	162.32	19.19
24	OSLO	1367564.59	11.64	420.81	192.69	37.56	32.06	21.81	179.95	0	626.91	135.26	46.69	16.08
25	LIS.	33.09	67.06	316.47	301001.95	1715.70	654.81	24.79	51.36	626.91	0	4.85	18.01	28.78
26	GOTH.	7.80	31.50	213.13	133.48	148.86	109.82	21.76	6.92	135.26	4.85	0	177.94	19.29
27	STOCK.	66.00	21.80	24.48	11.79	68.08	110.95	19.44	162.32	46.69	18.01	177.94	0	7.19
28	MAN.	25.58	8.92	12.29	4.09	14.05	18.58	6.80	19.19	16.08	28.78	19.29	7.19	0

Technical Annex 4 (continued): Functional distances between the airports of the sample. Dark shaded cells denote no value between the airport and itself.

CHAPTER 9. – MADRID AND BARCELONA WITHIN THE EUROPEAN METROPOLITAN HIERARCHY

Introduction

This penultimate chapter looks to draw together a number of issues relating to the spatial positioning of Spain's metropolitan system (Madrid and Barcelona) within the wider European urban system. While the thesis itself has set out to determine the spatial positioning of the 'national' metropolitan system (taken to comprise Spain's seven principal metropolitan urban regions) within Europe, the evidence provided in Part One made the two-tiered nature of the Spanish metropolitan system patently clear. At the European territorial scale, the two principal metropolises of Madrid and Barcelona clearly pertain to a different urban hierarchy than those accommodating the five remaining metropolitan urban regions (Valencia, Sevilla, Bilbao, Zaragoza and Málaga). For these reasons this chapter places greater emphasis on the two Spanish 'European engine' metropolises.

The chapter firstly addresses the theme of European economic integration and examines the extent to which Spanish structural funding has had an effect upon the relative positioning of Spain and the Spanish regions within Europe. It then discusses recent spatial policy declarations with regard to European metropolitan urban regions. This is followed by giving brief consideration to a number of comparative scenarios for the territorial structure of Europe in the period up to 2020, emanating from research carried out through the ESPON network and based upon different possible development paths. The results from Chapter 8 are then compared with the urban hierarchies cited in Chapter 7, and interpreted in terms of spatial positioning and the limitations deriving from a strictly Cartesian territorial perspective.

9.1. Economic integration and Spanish structural funding

It will be recalled from Chapter 6 that one of the founding principles of the then European Economic Community was the concerted effort towards the achievement of a common economic market and economic integration. This founding principle has been maintained throughout the successive enlargements of the EU since 1957. One of the classical measurements, if not 'the' classical measurement, for determining the degree of such integration has been and continues to be that deriving from the indicator of GDP per capita. Figures 9.1 and 9.2 indicate the relative change in GDP per capita in Spain at the scale of the metropolitan provinces, both in terms of PPP per inhabitant and Euros per inhabitant relative to the EU average, over the period 1995-2004. The two figures clearly illustrate the overall improvement in each of the provinces over this period, corroborating the positive comments contained in the *Fourth report on cohesion* (2007) (CEC, 2007d) with regards to convergence, albeit with the poor performance and degree of integration experienced by the 'southern' metropolitan provinces of Valencia, Sevilla and Málaga relative to the EU averages. This same assessment can be made from Figures 6.3, 6.5, 6.6 and 6.7 in Chapter 6, examining the evolution of GDP per capita across all of Europe in the period 1993-2004.

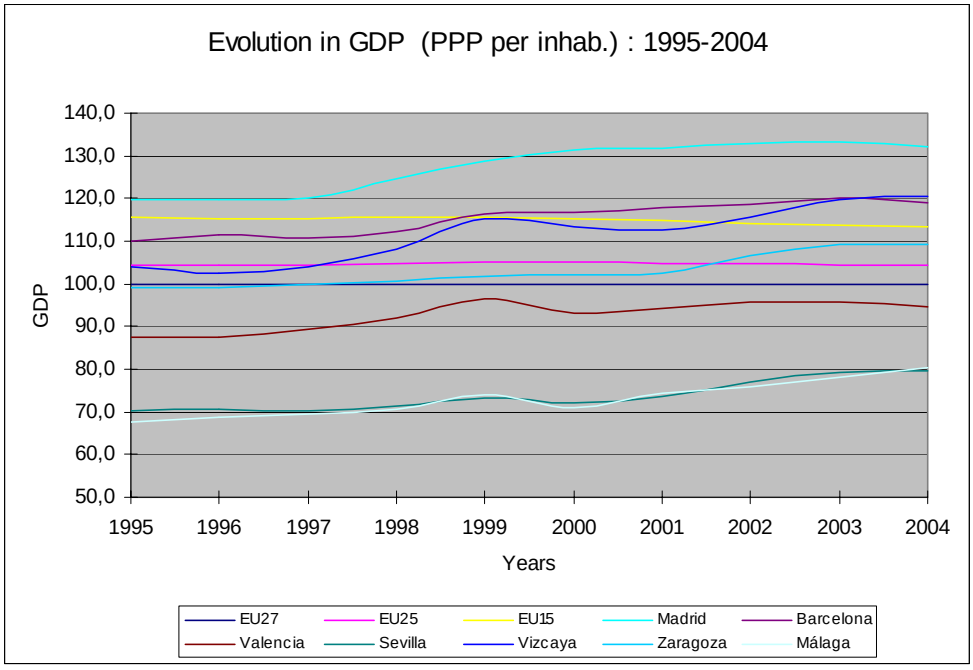


Figure 9.1. Evolution in GDP (PPP per inhabitant): 1995-2004[436]

[436] EUROSTAT (own elaboration)

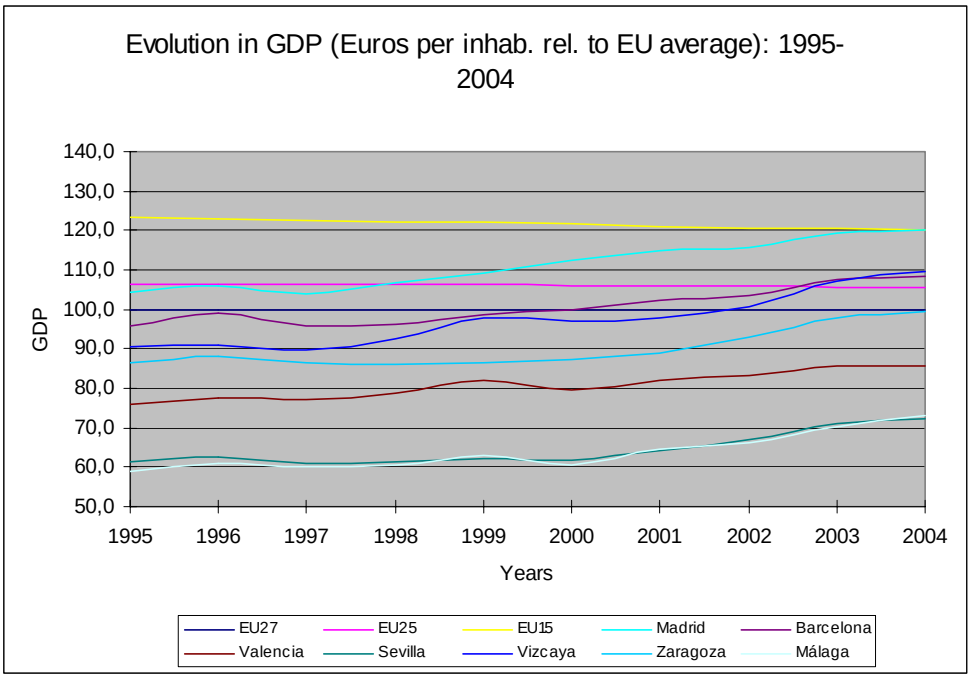


Figure 9.2. Evolution in GDP (Euros per inhabitant relative to the EU average): 1995-2004[437]

An inverse way of examining this same phenomenon is through the diminishing need for regional funding to correct regional imbalances resulting from an overall reduction in such regional disparities. When Spain entered the then European Community in 1986, the disparities between the Spanish regions and the EU12 were significant. When the cohesion policy was introduced throughout Europe, the inclusion of Spain in the group of four 'cohesion countries' was symptomatic of these very real differences relative to the rest of Europe. The gradual erosion of the regions able to claim assistance through the EU Regional Development Programme, as illustrated through Figures 9.2, 9.3 and 9.4, reflecting the changes in the post-1994 period, and in the periods between 2000-2006 and 2007-2013 respectively, is indicative of the previously strong disparities with the rest of Europe changing over time and the progress achieved in terms of reducing the gaps between some parts of Spain[438] and the rest of Europe.

[437] EUROSTAT (own elaboration)

[438] Such change has been most striking in the regions of 1) Cantabria (Objective 1 in the post-1994 period, Objective 1 'phasing-out' up until 31.12.2006 and competitiveness and employment' region between 2007-2013); 2) Valencia and Castilla y León (both regions classified as Objective 1 in the post-1994 and 2000-2006 periods; and 'phasing-in' regions between 2007-2013); and 3) Asturias and Murcia (both classified as Objective 1 in the post-1994 and 2000-2006 periods, and phasing-out regions between 2007-2013).

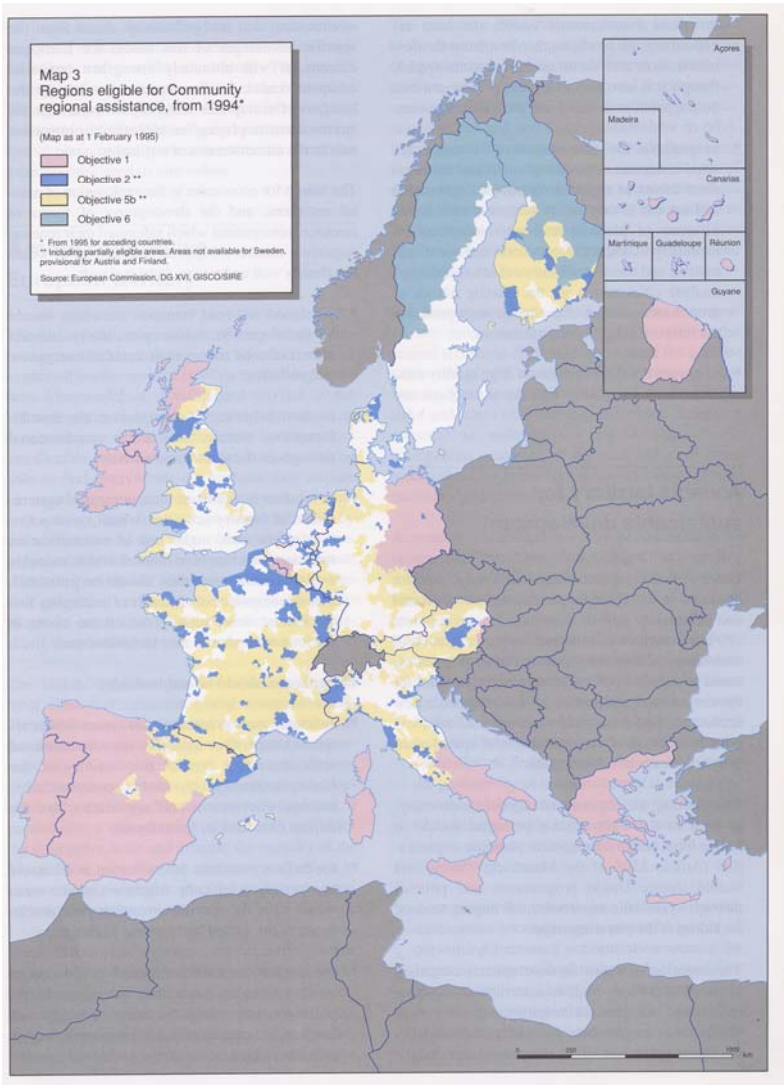


Figure 9.3. Regions eligible for Community regional assistance, in the post-1994 period[439]

Within the 2007-2013 Structural Funding period, the Spanish Regions of Andalucía, Castilla-La Mancha, Extremadura and Galicia are classified as *convergence regions* (illustrated by the red tone of Figure 9.5) on the basis of their GDP (Gross Domestic Product) per inhabitant being inferior to 75% of the Community average. The Principado de Asturias and the Región de Murcia are deemed as *phasing-out regions* (illustrated by the soft-pink tone of Figure 9.5), given that they would have been eligible for funding under the convergence objective if the threshold of 75% of GDP had been calculated for the EU15 rather than the EU25 group of countries.

[439] CEC (1994)

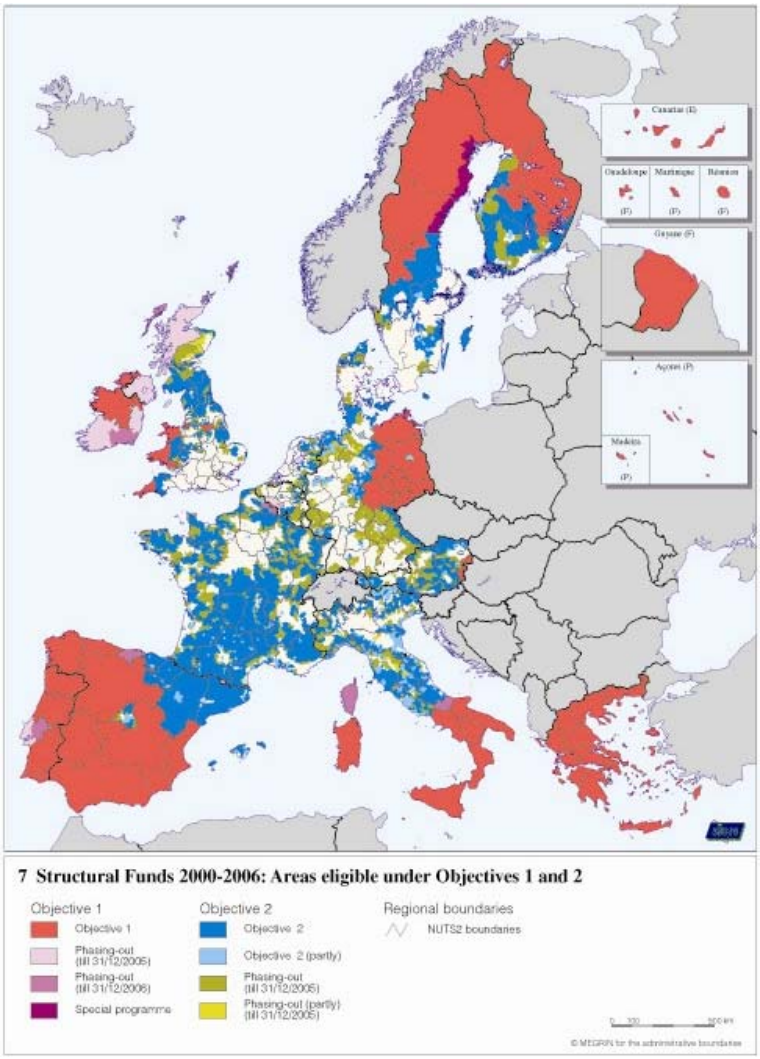


Figure 9.4. Areas eligible for Community regional assistance, 2000-2006[440]

The regions of Canarias, Castilla y León and the Comunidad Valenciana are all classified as *phasing-in regions* (illustrated by the strong blue tone of Figure 9.5), being eligible for funding under the regional competitiveness and employment objective. This transitional assistance, up until 2013, is applicable to all NUTS 2 regions covered by the former Objective 1, whose GDP exceeds 75% of the average GDP of the EU15. Finally the remaining Spanish regions of Aragón, Cantabria, Catalunya, Comunidad de Madrid, Illes Balears, La Rioja, Navarra and País Vasco are all eligible for funding under the *competitiveness and employment objective*.

[440] http://ec.europa.eu/regional_policy/atlas/index_en.htm (consulted 15.07.07)

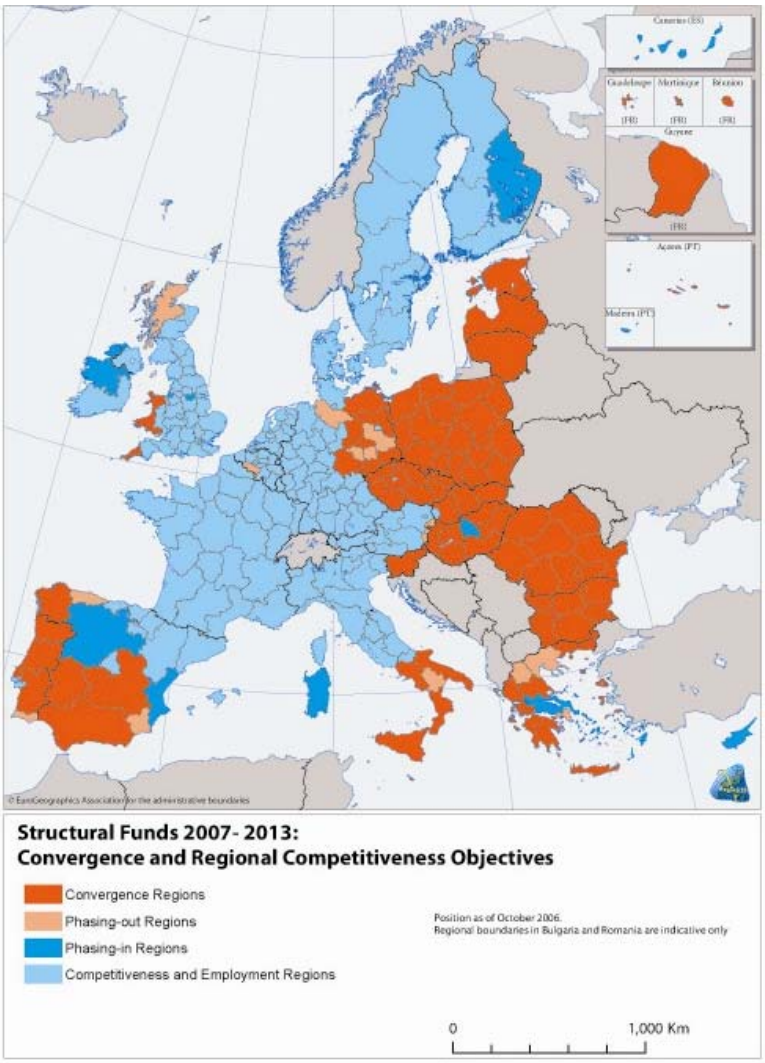


Figure 9.5. Areas eligible for Community regional assistance, 2007-2013[441]

While the focus of the thesis has been on the (re)positioning of the Spanish metropolitan urban regions within the European urban system, the regional perspective cannot be ignored. Furthermore the regional perspective is of crucial importance in the case of Spain, as Spain's overall position within Europe in terms of its gradually reducing dependency upon Regional Development funding is a clear refection of its positive economic integration within Europe. It is suggested that this factor has contributed to the overall strengthening at a national scale of Spain's metropolitan urban regions and metropolitan system as a whole.

[441] http://ec.europa.eu/regional_policy/images/map/eligible2007/sf200713.pdf (consulted 15.07.07)

9.2. The 'territorial capital' of Madrid and Barcelona

At this stage it is appropriate to take up the issue which was left open at the close of Section 6.2.6 in relation to the *Territorial state and perspectives* background document (CEC, 2007c) to the *Territorial Agenda* (CEC, 2007b), in terms of the priority given to the promotion of a territorial policy for metropolitan regions, cities and other urban areas in a polycentric pattern as motors of Europe's development.

The notion of 'territorial capital' appears repeatedly in the background document. An attempt at defining territorial capital was offered by the OECD in 2001 (OECD, 2001) and is reproduced in the background document:

> A region's territorial capital is distinct from other areas and is determined by many factors (which) … may include … geographical location, size, factor of production endowment, climate, traditions, natural resources, quality of life or the agglomeration economies provided by its cities … Other factors may be "untraced dependencies" such as understandings, customs and informal rules that enable economic actors to work together under conditions of uncertainty, or the solidarity, mutual assistance and co-opting of ideas that often develop in small and medium-size enterprises working in the same sector (social capital). Lastly there is the intangible factor, "something in the air", called the environment and which is the outcome of a combination of institutions, rules, practices, producers, researchers and policy-makers, that make a certain creativity and innovation possible. This "territorial capital" generates a higher return for certain kinds of investments than for others, since they are better suited to the area and use its assets and potential more effectively …" (OECD, 2001, cited in CEC, 2007c).

In assessing the current territorial state of Europe, the background document sets out to demonstrate how the territorial diversity can be seen as a potential for the EU in the light of the Lisbon strategy. The document reiterates the key challenge for the EU of becoming more competitive and dynamic, and the need for action if Europe wishes to retain its model for sustainable development. As a consequence a stronger focus on growth and employment is required, while taking account of social and environmental issues. It is suggested that 'the capital apparent in different regions and larger territories is diverse and present different opportunities for development, some of which are currently not used at all' (Section 2. (24), CEC, 2007c).

Emphasis is placed upon Europe being continent of 'large territorial diversity' which on the one hand can comprise 'positive assets which can be capitalised and which can contribute to making Europe the most competitive territory in the world', while on the other hand ' can … take the form of disparities which challenge … European cohesion

and integration' (Section 2.1 (25), CEC, 2007c). In this context of the 'diversity of economic competitiveness' reference is the 'concentration of GDP' in 2002 within the core, but with other concentrations around (inter alia) Madrid (Section 2.2.1 (33)); as well as the 'different recipes for success' amongst which Barcelona is cited as having shown that 'cultural and administrative functions as well as conventional industries can still be a viable economic base for regional development' (Section 2.2.1 (46)). Turning to the places of innovation and research and development it is stated that not all metropolitan urban regions need rely upon high R+D activity, citing Barcelona's success through a combination of conventional industries, culture and tourism (Section 2.2.2 (55); and the importance of cultural and creative skills as territorial potential being evidenced through the high share of cultural employment in some urban regions which are also capitals, as in the case of Madrid (Section 2.2.2 (57); highlighting the tendency of some regions of northern countries, together with the core of Europe, of being further advanced in terms of ICT, but other high performers include Madrid (Section 2.2.3 (60)). In the context of examining transport networks and accessibility, and in particular the 'hotspots of multimodal accessibility', attention is given to agglomerations in more remote areas such as Madrid and Barcelona, amongst others[442], enjoying 'good or medium multimodal access, largely because of the existence of international airports' (Section 2.3.1 (68)).

Looking at the role of the 'urban regions and major cities' of the territorial structure, the document identifies a number of 'future hotspots for a more balanced Europe' (CEC, 2007c, Section 2.6.2 (106)). According to the document beyond the central core of Europe one finds 'more sparsely but quite evenly distributed networks of individual metropolitan regions and other urban regions to counterweight the predominance of the core area towards a more polycentric structure at EU scale.' Interestingly the first of these such 'future hotspots' to be named are Madrid and Barcelona, and these are followed by Rome and Athens in the South; Dublin in the West; and Copenhagen, Stockholm and Helsinki in the North.

What then follows is a justification of the generally good 'European wide accessibility' enjoyed by these metropolitan urban regions outside the core.

> "The metropolitan areas outside the core are mainly areas which have comparatively good European wide accessibility. Because of airports, they tend to perform better than their surroundings in economic terms, and they may attract young labour force also in future and thus become important

[442] The full list of such cities reads as follows: Madrid, Barcelona, Lisbon, Dublin, Glasgow, Kobenhavn, Malmo, Goteborg, Oslo, Roma, Napoli, Thessaloniki and Athinai.

> nodes in the future European structure. Cooperation arrangements might provide added value even for the biggest urban nodes in the EU mainly in competition at a world scale. Generally these areas are important as engines of development, which contribute to the dispersing European core-periphery pattern. Some of these areas are even outperforming the metropolitan areas in the core of Europe, with regard to specific economically significant factors" (CEC, 2007c, Section 2.6.2 (107)).

This explanation contrasts with the somewhat more negative interpretation given earlier in the document in the context of the transport networks and accessibility (Section 2.3.1). Here the core-periphery dichotomy is used to express the differential in the high values of potential road (p. 32) and rail (p. 33) accessibility (based upon 2006 data[443]) within the geographically central part of the EU and the inferior values found in the more peripheral areas. However the benefits deriving from investment in high-speed rail links and networks is clearly visible in France where the TGV lines extending towards the Mediterranean and Atlantic coasts have led to corridors where the rail accessibility is clearly superior to the European average, thereby 'softening' the core-periphery pattern. Time will tell whether this same 'softening' will be apparent in Spain with the planned high speed rail services and the eventual connections with France and Portugal.

Specific reference to the other principal Spanish metropolitan urban regions is made only twice, in the context of the 'diversity of economic competitiveness' with Valencia and Sevilla both being cited as urban areas of high economic growth (Section 2.2.1 (35)).

Apart from the writer's obvious satisfaction that the *Territorial state and perspectives* document offers an interpretation of the contemporary and potential positioning of Madrid and Barcelona, explained in part through none other than airport flows, thereby corroborating the results of the multidimensional scaling technique carried out in Chapter 8 (Section 8.4), it is interesting that these 'hotspots of multimodal accessibility' include both Helsinki and Athens. It will be recalled that in the case of these four named airports (Barcelona, Madrid, Helsinki and Athens), their 'functional proximity' (or connectivity) to the centre of the European space of air passenger flows was superior to their 'physical proximity' to the centre of gravity of the European space.

Section 4 of the *Territorial state and perspectives* background document sets out to develop future perspectives. Here the document states categorically that:

> "The key challenge for strengthening territorial cohesion – in the light of the Lisbon aims – is to enhance the territorial capital and potential of all EU regions and to promote territorial integration, i.e. by promoting trans-European synergies and clusters of competitive and innovative activities. These will have to be addressed in a sustainable way by promoting eco-efficient investments, the conservation and development of natural and environmental assets, understanding of demographic change, and life long learning. In practical terms the concept of territorial cohesion would mean the following:
>
> - focusing regional and national territorial development policies on better exploiting regional potential and territorial capital – Europe's territorial and cultural diversity;
> - better positioning regions in European, both by strengthening their profile and by trans-European cooperation aimed at facilitating their connectivity and territorial integration;
> - promoting the coherence of EU Policies with a territorial impact, both horizontally and vertically, so that they support sustainable development at national and regional level.
>
> If territorial cohesion is the policy objective, territorial development policies are the policy tools. In this light, the challenge of territorial cohesion covers more than EU cohesion policy in the narrow sense. It adds an integrated and long-term approach to the process of exploiting territorial potential in the EU that has to be addressed at, and across, different policy levels … and across sectors" (CEC, 2007c, Part C (156)).

In view of the assessment of the 'state' of the EU carried out in Part B, the background document identifies the six potential priorities (previously referred to in Section 6.2.6) for enhancing the territorial capital and potential of all EU regions and for promoting territorial integration. It will be recalled that these relate to (i) the 'key role of cities as motors for development; (ii) addressing the potential for stronger urban-rural partnerships; (iii) (trans)national functional urban areas and strategic functional urban areas at the European or global scale; (iv) strengthening the main Trans-European Transport, ICT and Energy Networks; (v) promoting trans-European technological and natural risk management; and (vi) strengthening the main trans-European ecological structures and cultural resources. Clearly it is the first of these six priorities aimed at 'promoting a territorial policy for metropolitan regions, cities and other urban areas in a polycentric pattern as motors of European development', which is most closely related to the theme of the thesis.

Here the document discusses the strengthening of the metropolitan regions in the context of their international competitiveness. International examples are given of integrated metropolitan regions – areas between Tokyo and Kyoto in Japan, and the area between Washington D.C. and Boston in the United States. The comparable

[443] See ESPON (http://www.espon.eu) for revisions to the accessibility indicators.

'European' emerging metropolitan urban region is that of the Northwest-European Delta, containing a number of important urban clusters, but the document immediately recognises a 'two fold challenge for territorial cohesion'. On the one hand achieving 'an effective mix of complementarity and competition within and between urban clusters in each metropolitan region', and on the other hand the achievement of 'a more balanced European pattern of metropolitan regions'. The *Territorial state and perspectives* document continues to suggest the identification of the potential and interrelationships of EU metropolitan regions, as well as the contribution of EU policies to competitive and integrated EU metropolitan regions represent policy issues which to date have not been sufficiently addressed in the EU context. It is recommended that they be taken into consideration through a mid-term review of cohesion policy and the development of a forthcoming White paper on EU Transport (CEC, 2007c, Section 4.1 (159)).

With regard to the first of these two issues, the document suggests that 'the European Commission and the EU Ministers for Spatial Development should stimulate targeted analyses on the potential and interrelationships of EU metropolitan regions, and their role in Europe's competitiveness, including the issue of effective governance'.

The impression given from this text is that neither the European Commission nor the EU Ministers for Spatial Development fully appreciate the potential and interrelationships of EU metropolitan regions and their role in Europe's competitiveness. On the one hand there is a plethora of policy statements from the European Commission emphasising the importance of the large cities and metropolitan regions in the pursuit of European competitiveness (for example through 'the urban contribution to growth and jobs' – (CEC 2006a and 2006b)) yet what springs to mind is the image of the Ministers in search of the 'real potential' and the 'interrelationships', for the metropolitan regions. It is as if the authorities (EU Commission and EU Ministers) have joined forces with a joint objective in mind (that of territorial cohesion and maximising competition and complementarity), with an acknowledgment of the contribution of metropolitan regions as the motors driving economic development, but without appreciating the real potential nor the added value accruing from closer cooperation. Finding the right balance between complementarity and competitiveness is of paramount importance and it is to be welcomed that indications are given of the ways which might lead to correcting this. However there is irony in the admittance of a certain knowledge-gap in the area of the interrelationships between the EU metropolitan regions. It will be recalled from the Introduction that the issue of the interrelationships between the Spanish metropolitan urban regions and Europe beyond

was not addressed in the INTERREG IIC Project, carried out by the UPC in the period 1998-2001, and that it is for this reason that the thesis has sought to overcome this, through the modest contribution of the analysis of air passenger flows.

Waterhout et. al. (2005) emphasise the importance of spatial strategies at national and supranational scales, and recommend the *visioning process* as a means of ensuring a dynamic involvement of the actors in the process[444]. This might be one such way in which agreement could be reached at the European scale, though in reality possibly more achievable at the supra-regional scale for logistical purposes, as to the real potential and the interrelationships of the European metropolitan regions. If indeed the objective of international competition is to be pursued seriously, then the key players, in this case the EU's principal metropolitan urban regions need to be coordinated and follow development paths where the competition and complementarity are indeed mixed and balanced. Nevertheless it remains to be seen what will be offered as guidelines for increasing the potential and interrelationships of the EU metropolitan regions in the mid-term review of the Cohesion Policy.

[444] Interestingly one of the closing recommendations of the UPC's INTERREG IIC study relating to the Spanish metropolitan system carried out in 1999-2001 suggested that "if each of the Member States is truly committed to meet the challenges of balanced regional development, complementarity and social, economic and territorial cohesion, it is not sufficient to simply offer verbal support. It is essential for Madrid and Barcelona to maintain their positions as European and international metropolitan areas, that a policy of redistributing the benefits towards the other five components of the system be (backed), being able to be distributed from these two metropolitan areas of international standing, and that the other five in a synergic form contribute to the positioning of these two, within a strict framework of internal complementarity of the system itself. As has been mentioned previously, if each one of the seven metropolitan areas set out to maximize their own benefits, without taking into consideration the added value that can proceed from a common 'strategy', it will be all the more difficult to achieve such benefits. It is considered that in reality, the only feasible and reasonable way of being able to maximize the complementary functioning of the metropolitan areas, as the principal players of the Spanish urban system, by virtue of their 'critical mass', and to manage their territories in a sustainable way, is through a type of strategy built on consensus that would fill the policy void between the European guidelines and the strategic territorial policies which are the exclusive responsibility of the Autonomous Communities (CCAA). At the same time such a strategy would serve as instrument to promote a 'structure' for the Spanish metropolitan system. Clearly the limits of such a strategy and the manner in which the content would be linked with the responsibilities of the CCAA would have to be agreed. The overall objective would be to put forward a vision for the whole country, and thereby ensure that the interests of the different components and levels of the system would be satisfied."

9.3. Territorial scenarios for Europe

Research carried out in the context of the ESPON Programme (ESPON, 2007a) has produced a number of 'visions' of possible future territorial scenarios for Europe leading to some thought provoking 'images', as opposed to predictions, of what Europe could be like in 2030, though these have been achieved in the absence of any sort of participative visioning process. These contrasting scenarios look at the possible territorial impacts on the territorial structure and balance of Europe and the regions, urban and rural areas. Taking into consideration the evidence of a gradual erosion of the core-periphery model, it is relevant to make reference to the content of these scenarios and more importantly their effect upon the Spanish metropolitan urban regions.

The first of these – a *territorial trend* scenario – based upon the continuation of current trends and policies leads to the following territorial outcomes:

> "A remarkable concentration of activity has occurred in the metropolitan areas of the central economic area, the Pentagon, but also in less central regions (mainly capital cities and other European engines). As a result, the Pentagon has extended outwards along main transport corridors in the direction of major metropolitan areas like Barcelona and Madrid, Rome, Glasgow, Copenhagen, Stockholm and Oslo, Berlin and Warsaw, Prague, Vienna and Budapest" (ESPON, 2007b, p.9).

This possible scenario is illustrated in Figure 9.6 and as can be seen the 'area of concentration of flows and activities' extends into Spain to incorporate Bilbao, Madrid and Barcelona, and Valencia as well.

The second scenario – based upon *competitiveness* as the main driver – led to the following territorial outcomes:

> "The attraction and polarisation potential of metropolitan areas is particularly strong and activities are concentrated in the traditional Pentagon. Only very few metropolitan areas beyond it are able to generate significant attraction and polarisation effects. The area of concentration of flows and activities is much more limited than it would be following current trends. It covers only parts of the traditional Pentagon, although it also extends out along a few major corridors, to reach Vienna and Copenhagen.
>
> The risk of rural marginalisation is much more intense than with current trends. The areas at risk of industrial decline are more numerous and the intensity of risk is also higher.

External immigration flows are particularly intense. The areas with high potential for tourism and retirement are similar to current trends, but the areas with severe population ageing, generally in remote rural regions, are more extended. Impacts of natural hazards (drought, fires, and floods) are more intense than expected by current trends" (ESPON, 2007b, p.10).

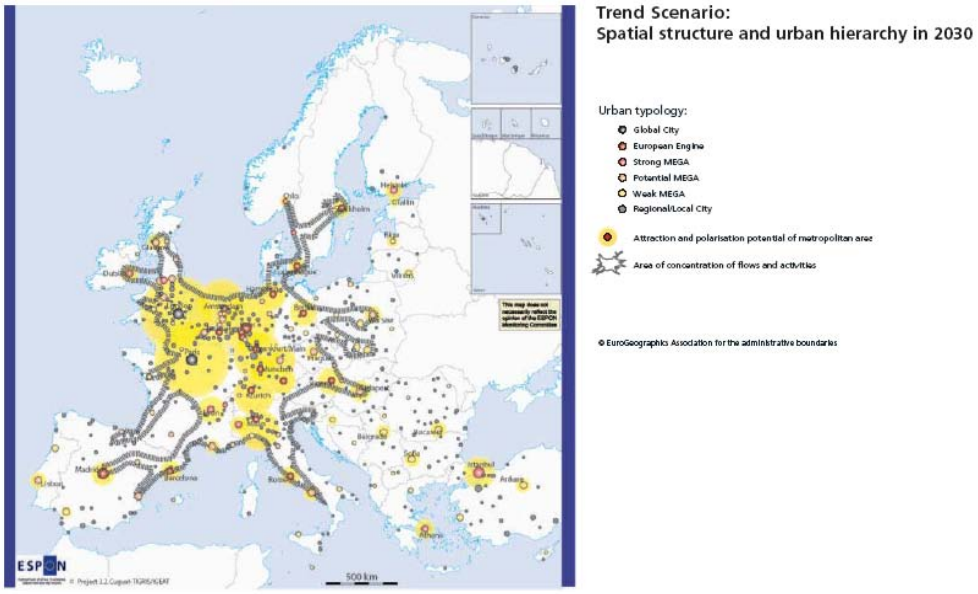


Figure 9.6. Trend scenario: spatial structure and urban hierarchy in 2030[445] © ESPON, 2006

As indicated by Figure 9.7 this scenario is extremely drastic in its previsions and none of the Spanish metropolitan urban regions is included within the 'area of concentration of flows and activities'.

[445] ESPON (2007b) p.9

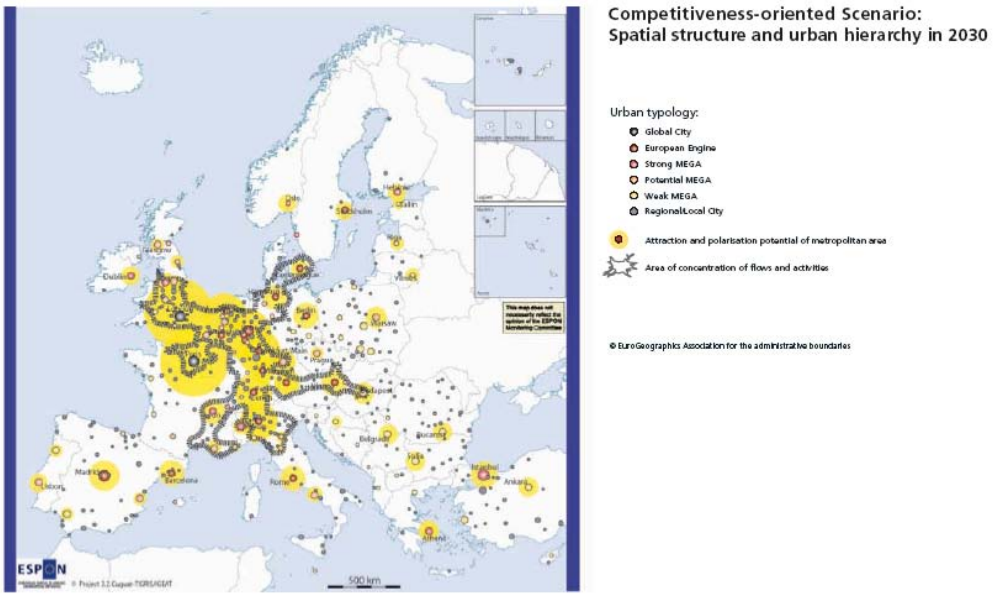


Figure 9.7. Competitiveness-oriented scenario: spatial structure and urban hierarchy in 2030[446]
© ESPON, 2006

The third of the scenarios is *cohesion-oriented* and the territorial outcomes, as illustrated by Figure 9.8 below can be summarised as follows:

> "The image of the European main territorial structure reveals a more diffused pattern as far as the attraction and polarisation potentials of metropolitan areas are concerned. Urban settlements are characterized by greater polycentricity, stretching over larger swathes of the European territory than in the trend scenario.
>
> In contrast to the trend scenario, several well-performing integrated zones have emerged outside the Pentagon, also in more peripheral areas. The Pentagon has grown and includes a larger number of cities outside this area.
>
> The number of areas at risk of marginalization and of declining activities is comparable to the trend scenario, but their size is reduced and intensity lower. The areas with high potential for tourism and retirement as well as those with severe population ageing remain similar.
>
> The impacts of natural hazards (drought, fires, and floods) are much lower than expected with respect to the current trends" (ESPON, 2007b, p.11).

In this case the 'area of concentration of flows and activities' extends well into Spain, to embrace the wider metropolitan urban regions of Barcelona and Valencia along the Mediterranean coastline, Madrid in the centre and Bilbao in the north,

[446] ESPON (2007) p. 10

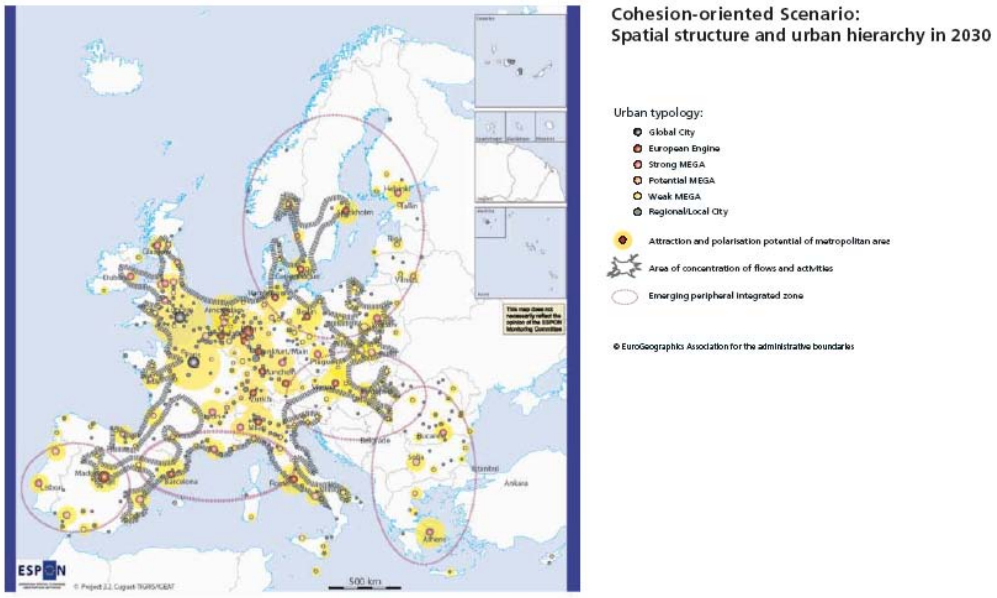


Figure 9.8. Cohesion-oriented scenario: spatial structure and urban hierarchy in 2030[447]
© ESPON, 2006

Finally a 'roll back proactive scenario' is offered, which accompanied by the following description:

> "The map illustrates the **emergence of economic integration areas** outside the pentagon, based on major urban networks. Within these major networks **regional and local networks** interlink neighbouring cities and towns. The various economic integration areas are interconnected by **major communication links**. A number of metropolitan areas act as **linking cities** along these communication links. Outside metropolitan regions, a number of rural areas fulfil significant new functions, for example the production of **biomass** or the development of a dynamic **residential economy**. The map also illustrates the need to promote **maritime freight routes** in order to increase the sustainability of transport" (ESPON, 2007a, p.60).

In this scenario Barcelona's area of economic integration is linked to Madrid, which is itself directly connected to Paris. Madrid acts as a linking city, between Sevilla and Málaga, and Lisbon and Oporto in Portugal. Valencia is seen as forming part of a major urban network with Barcelona and other Mediterranean locations in France and Italy.

[447] ESPON (2007b) p. 11

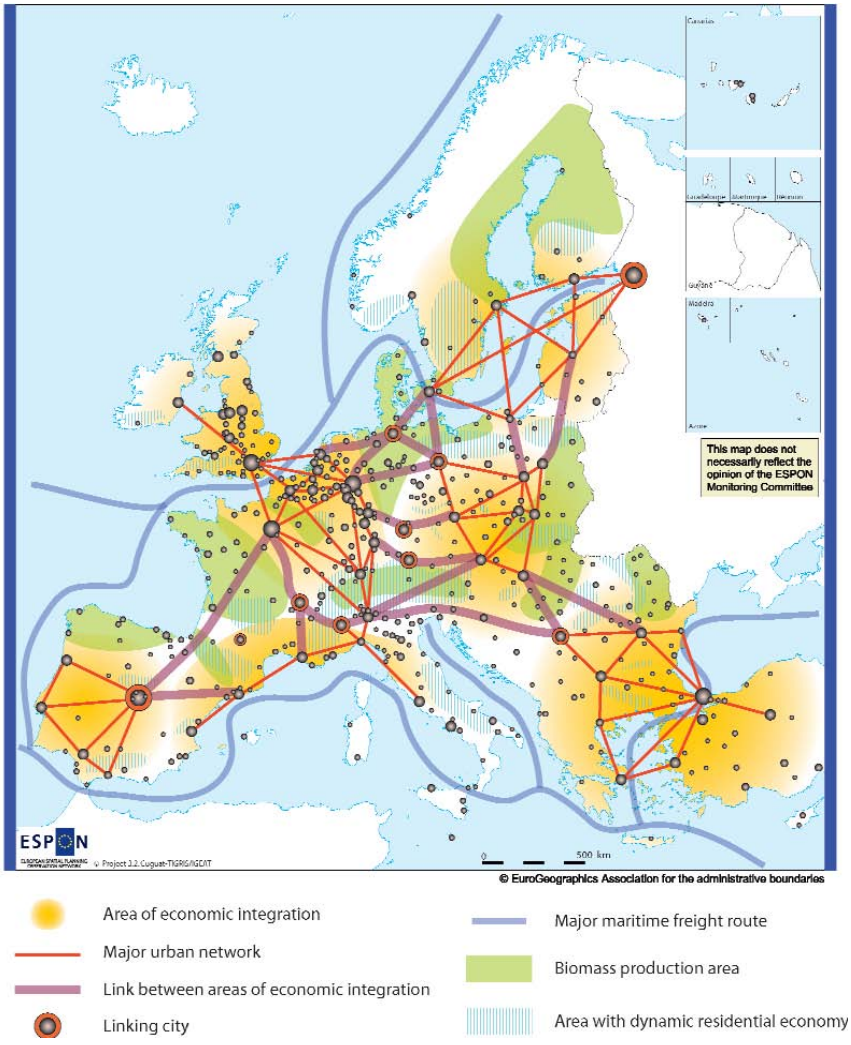


Figure 9.9. Roll back proactive scenario – image 2030[448] © ESPON, 2006

[448] ESPON (2007a) p.60

9.4. Cartesian conditioning and spatial positioning

Williams (1996) argues that the majority of planners working in the context of local planning, at a small scale, have an implicit understanding of the sense of place within which they are engaged within the wider national territory. However at a higher territorial scale, such as that at the supra-national and European level, the same ability to conceptualise and comprehend one's location does not come so easily and indeed needs to be developed. The name he offers for this skill to think about one's location within the wider European spatial structure is that of 'spatial positioning'. Furthermore Williams (1996) suggests that spatial positioning 'requires imagination and lateral thinking rather than any particular technical skill' (p. 97), and that at the European scale spatial positioning may indeed 'help to overcome the mental blocks of orthodoxy' (p. 98).

As Dühr (2003) points out, the cartographic visualisation of the territory forms a fundamental aspect of spatial planning. According to Kunzmann (1996) 'the visualisation of spatial problems in maps makes it much easier to communicate the problems to the public and the political arena. It facilitates the understanding of complex spatial systems' (p. 144). Zonneveld and Waterhout (2005) cite De Vries (2002, 2004) in the distinction he makes between 'planning as communication and planning as programming. If planning is regarded as communication, the main function of spatial plans is to provide interpretive frameworks of spatial structure or spatial development, and the intended effect of plans is to change the actor's frame of mind' (p. 23).

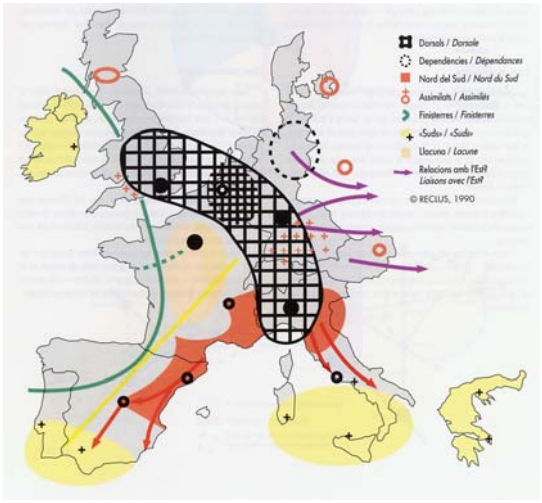
The territorial scenarios reproduced in Section 9.3 provide good examples of planning as communication, transmitting the complexity of spatial positioning. They illustrate the extent to which Europe might undergo changes in the until recently dominant spatial model of core and periphery. The simple comparison of the three scenarios indicates instantly how under the 'trend' (Figure 9.6) and 'cohesion-oriented' (Figure 9.8) scenarios, areas treated as peripheral and extending beyond the even more expansive 'pentagon' area lying between Manchester, Paris, Genoa, Venice and Berlin (ESPON, 2004), are projected to form areas of concentration of flows and activities.

In the same way it is suggested that the respective spatial images of Europe deriving from the different research studies referred to in Chapter 7, (Brunet, 1989; GaWC,1999; Rozenblat and Cicille, 2003; and ESPON, 2004) relating to the respective ordering of

the European metropolitan urban regions, and in particular those Williams (1996) characterises as 'spatial metaphors', convey instantly the complexity of the issues at stake. The degree of 'lateral thinking' required to decipher the 'imagination' of the creators differs from case to case. This also depends upon one's capacity to step beyond what could be termed as Cartesian conditioning, and conceptualise the territorial impact and representation of issues at a more abstract level.

For example the concept of Brunet's (1989) Blue Banana, for all its abstraction, is nevertheless firmly anchored over the geographical base or map of Europe. By contrast the GaWC (1999) inventory of world cities gives a notion of place and positioning, but requires a greater effort on part of the person trying to decipher the message. In both cases what is being conveyed is an ordering and some measure of relative positioning.

a



b

Figure 9.10. (a) Transnational territorial divisions and the European dorsal; and (b) The European component of the GaWC Inventory of World Cities [449]

In the same way, it is suggested that the spatial images deriving from the analysis of the flow of air passengers between the 28 metropolitan urban regions of the sample described in Chapter 8, and reproduced in Figure 9.11, convey the complexity of the resulting 'space of flows' within the system.

Table 9.1 illustrates the ordering of the first twenty eight cities of the respective hierarchies deriving from the studies referred to in Chapter 7 (Brunet, 1989; GaWC, 1999; Rozenblat and Cicille, 2003; and ESPON, 2004) together with the ordering of the cities, based upon the analysis of the air passenger flows carried out in Chapter 8.

[449] (a) Brunet (1989) and (b) Beaverstock et. al. (1999)

While clearly information can be extracted from this Table, the visual representations of the content are, it is suggested, considerably more communicative.

a b

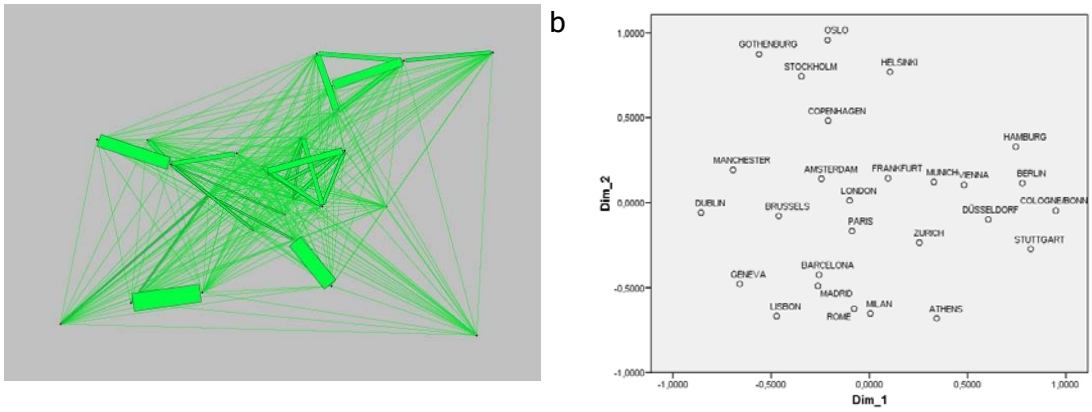


Figure 9.11.(a) Magnitude of the interaction value and functional distance between the 28 EU15+2 airports; and (b) Graphical representation of the spatial positioning of the cities

Ordering	Brunet (1989)	GaWC (1999)	Rozenblat and Cicille (2003)	ESPON (2004)	European space of air passenger flows (2007)
1	London	London	Paris	Paris	London
2	Paris	Paris	London	London	Frankfurt
3	Milan	Frankfurt	Madrid	Munich	Paris
4	Madrid	Milan	Amsterdam	Frankfurt	Amsterdam
5	Munich	Brussels	Milan	Madrid	Zurich
6	Frankfurt	Madrid	Barcelona	Brussels	Munich
7	Rome	Amsterdam	Berlin	Milan	Brussels
8	Brussels	Düsseldorf	Rome	Rome	Vienna
9	Barcelona	Geneva	Brussels	Hamburg	Barcelona
10	Amsterdam	Prague	Vienna	Copenhagen	Copenhagen
11	Manchester	Rome	Munich	Zurich	Madrid
12	Berlin	Stockholm	Stockholm	Amsterdam	Düsseldorf
13	Hamburg	Warsaw	Lisbon	Berlin	Rome
14	Stuttgart	Barcelona	Athens	Stockholm	Milan
15	Copenhagen	Berlin	Cologne	Stuttgart	Manchester
16	Athens	Budapest	Copenhagen	Barcelona	Athens
17	Rotterdam	Copenhagen	Dublin	Düsseldorf	Helsinki
18	Zurich	Hamburg	Lyon	Vienna	Berlin
19	Turin	Munich	Frankfurt	Cologne	Hamburg
20	Lyon	Dublin	Düsseldorf	Helsinki	Geneva
21	Geneva	Helsinki	Helsinki	Oslo	Lisbon
22	Birmingham	Luxembourg	Zurich	Athens	Stockholm
23	Cologne	Vienna	Florence	Manchester	Dublin
24	Lisbon	Athens	Hamburg	Dublin	Stuttgart
25	Glasgow	Birmingham	Marseille	Gothenburg	Cologne/Bonn
26	Vienna	Bratislava	Geneva	Turin	Oslo
27	Edinburgh	Bucharest	Oslo	Geneva	Gothenburg
28	Marseille	Cologne/Bonn	Toulouse	Lyon	

Table 9.1. Ordering of European metropolitan urban regions according to different studies

In each of the first four studies cited Madrid is positioned ahead of Barcelona, though as will be recalled these studies looked at a series of attributes and applied a score for the frequency of the attributes in each of the individual cases. Only in the final study, based on the interpretation of the European 'space of air passenger flows' i.e. the inter-city relations of a true network or system, do the results of the European ordering reflect the interrelationships between each and every one of the cities (airports).

However the key difference between the studies of the first four columns and that of the fifth column lies in the fact that only the last study determined a centre. The conceptual centre of the European space of air passenger flows enabled the Euclidean distances to be calculated from each airport to the said centre[450]. By contrast in each of the other studies there is no centre whatsoever and the ordering reflects a kind of nebulous positioning with no fixed frame of reference and certainly no notion of interrelations between the different cities. Only the last of the studies makes some headway in the direction indicated by the *Territorial state and perspectives* background document (CEC, 2007c) and referred to in Section 9.2, in the sense of proportioning an insight into the interrelationship between a fixed set of European metropolitan urban regions.

Furthermore, with regard to the notion of 'peripherality', the argument that the spatial or physical proximity of the more centrally located metropolitan urban regions of the sample to both the physical centre of gravity and the centre of the conceptual space of air passenger flows, with their concomitant dependence upon high speed rail travel doing away with their need for air connectivity certainly holds validity. Clearly here there is a question of choice. However in the case of the spatially separated metropolitan urban regions (in this case, Madrid, Barcelona, Lisbon, Helsinki and Athens) their functional proximity positions them more favourably in relative terms. Their spatial 'peripherality' is overturned by their functional proximity. So clearly connectability has more to do with the nature of the service or infrastructural connection, and the time required to connect, than the distance which has to be covered in order to be able to make the connection. Therefore these results add another dimension to the concept of spatial positioning and the comprehension of space, distance and interconnections. By stepping beyond the constraints of Cartesian conditioning, it is suggested that it is possible to arrive at a clearer understanding of the European metropolitan geography, which reflects the 'spatial positioning' deriving from inter-city relations in the era of advanced producer services.

[450] This gave the potential to calculate the distances between each of the airports. This was not carried out since it was considered the principal interest lay in determining the distance or proximity of each of the airports to the centre.

Concluding remarks

Clearly the component metropolitan urban regions of the Spanish metropolitan 'system' have always been 'positioned' within the wider European urban system. However in light of the evidence examined in this chapter, deriving from the gradual improvement of some of the Spanish regions in terms of their decreasing dependence upon structural funding, the prospects of forming part of a wide European territorial concentration of flows and activities, and the interpretation given to the quantitative evidence proportioned in Chapter 8, it is suggested that what such cities or metropolitan urban regions have undergone in recent years, in the post-1986 period, is a 'consolidation' of their positioning. Their 'position' and importance within the European urban system have increased and become consolidated, hence the coinage of the terminology *(re)positioning*.

This 'consolidation' or *(re)positioning* of Madrid and even more so in the case of Barcelona, Spain's two 'European engines' according to the ESPON MEGA classification, has been of such a magnitude to suggest that both Spanish metropolitan urban regions are now firmly placed within the hierarchy of European metropolitan urban regions. Furthermore, their appearing as forming part of the grouping of principal European metropolitan urban regions has entered into what might be described as conventional wisdom, reflecting an unquestionable and widespread acceptance. There is clear potential for other metropolitan urban regions of the Spanish metropolitan system to improve their 'positioning', in the case of Valencia and Bilbao, but for the moment it would seem that the pertaining to the European metropolitan hierarchy is a privilege restricted to just Madrid and Barcelona alone.

PART IV: CONCLUSIONS

"The evolution of metropolitan space remains fundamental in understanding the spatial organization of advanced economies."

Robert Lang and Paul Knox (2007) 'The New Metropolis: Rethinking Megalopolis', (p.1).

CHAPTER 10. – COMPETITION, COMPLEMENTARITY AND COHESION

It is now well over one hundred years since what were then the largest concentrations of urban population in the Western world, deriving from the accelerated and expansionist forms of population growth came to be named as *metropolitan* territories and formally embraced in measuring exercises on both sides of the Atlantic. Throughout the 20th Century this phenomenon became consolidated and spread to other parts of the world and today the term *metropolitan* is common parlance. The continuing outward expansion of cities and in some cases eventual joining of large urban regions has resulted in the applicability of the description of *metropolitan* long having been overtaken by other descriptions such as *megalopolis* and *mega-cities* (as outlined in Chapter One), *polyopolis* (Hall and Pain, 2006), *metroplex*, *corridor megapolitan*, *galactic megapolitan* and *megaplex* (Lang and Knox, 2007).

In the same way as the introduction of the *metropolitan district* nomenclature in the U.S. Census in 1910, in an era of expanding industrialisation, was in response to the observation of the functional catchments of cities having expanded beyond their administrative limits, today in the context of a globalised advanced producer service economy, the functional catchments of large metropolitan urban regions extend well beyond their own administrative limits. The notion of a 'network society' as proposed by Castells (1989; 1996) characterising spaces of flows and extending over national and international boundaries is a far closer description of the contemporary socio-economic reality. As a consequence the functional relations between cities have clear ramifications in understanding questions of location and territoriality. This in a very condensed form represents the broad background against which the thesis has been developed.

However prior to expounding upon the conclusions, it needs to be acknowledged that the development of the thesis has rested upon the institutional formality of EU socio-economic and spatial policy. That is to say the implicit recognition of the benefits of increased economic integration and the reductions of regional disparities, the benefits deriving from increased social, economic and territorial cohesion, and the benefits for the enlarged EU stemming from increased international competitiveness. While it is not the writer's intention to suddenly unveil the argument sustained up until this point as a

kind of 'straw man', it would nevertheless be negligent to reach the conclusions in the absence of some degree of critical reflection upon this dominant policy stance.

As has been repeated various times in the preceding chapters, the official stance of the EU is to maximise its international competitiveness, which is encapsulated in the very language used in slogans and policy guidance strategies. The ever-increasing importance of this international benchmarking is evidenced by a simple observation relating to the positioning of Europe with regard to its economic competitors. The *Second Cohesion Report* contained a map of the United States indicating the gross state product (GSP) per head (CEC, 2001c, Map A.8). Six years later the *Fourth Cohesion Report* () surpassed this ideological statement with maps of the growth of GDP in the period 1999-2004, not only of the USA, but of India, China and Japan as well (CEC, 2007d, Map 11). It is paradoxical that it is in the context of examining the social, economic and territorial cohesion of the European continent, in which this benchmarking is highlighted. Nevertheless voices of opposition to the formal overall objectives of the European Union and to a competitive development path of this nature can be heard clearly from a number of sectors, such as those articulated in the 'Charter of principles for another Europe', from the European Social Forum[451].

For all the rhetoric concerning social justice, and social, economic and environmental sustainability, it is valid to question the extent to which there will be sufficient political will to ensure that competition, complementary and cohesion will in fact be effectively reconciled. In the context of the Lisbon (CEC, 2000) and Gothenburg (CEC, 2001b) strategies, and the revitalisation of the Lisbon strategy (CEC, 2005), intuition would suggest that at the end of the day it is international economic competition which will be prioritised, relegating complementarity and cohesion to a secondary position. This therefore reflects the 'questionable' political context within which the thesis has been developed.

Turning to the degree to which the overall objectives of the thesis have been met, it will be recalled from the Introduction (p. 13) that the proposed hypothesis sought to demonstrate the (re)positioning of the Spanish metropolitan urban regions within the European urban system over the twenty year period 1986-2006. Furthermore it was proposed that this (re)positioning had allowed for a spatial integration of some of the

[451] See http://www.fse-esf.org and the closing words of the *Charter of Principles for Another Europe* which call for 'Peace, equality, justice, freedom, democracy, social and fundamental rights! For another Europe, for another world founded on solidarity, a sustainable environment!'

Spanish metropolitan urban regions to the extent of nullifying their physical separation from or peripherality with respect to the more central parts of the European Union.

The principal objective, also contained in the Introduction (p. 19) therefore lay in proportioning empirical evidence to support this hypothesis, through a measurement of the relations between the Spanish metropolitan urban regions and other European metropolitan urban regions, in the absence of having been able to pursue this within the context of the UPC's INTERREG IIC project, in order to seek to determine the positioning of the Spanish cities with the European urban system. Part of this ambitious challenge lay in the desire to produce cartographic visualisation of the measurement of the relationship.

From the evidence drawn upon throughout Chapters 1-9, it is considered reasonable to accept the hypothesis as proposed *in part* and confirm the consolidation or (re)positioning of some of the Spanish metropolitan urban regions. The acceptance of the hypothesis has to be 'partial' owing to the fact that it is only fully valid in relation to the positioning of Madrid and Barcelona. On the one hand these two 'European engines' were the only two Spanish cases included in the sample of 28 European metropolitan urban regions and subjected to the network analysis carried out within Chapter 8. Of the 27 European cases which formed the sample over which the multidimensional scaling of the functional distance was carried out, Madrid and Barcelona were ranked in the 11th and 9th positions respectively, with regard to their functional distances from the conceptual European centre of air passenger flows. The surprise was the closer functional proximity of Barcelona over Madrid, with Madrid being eclipsed by Copenhagen. On the other hand the non-inclusion of one or more of the other principal Spanish metropolitan urban regions in the network analysis sample was symptomatic of their inferior positioning with respect to the wider European urban system, as determined by the classification of the MEGAs (ESPON, 2004) upon which the selection of the case study metropolitan urban regions rested. This is not to say that they have not undergone a similar (re)positioning within the wider European urban system over the period studied. On the contrary, in the case of Bilbao and Valencia the ESPON study classifies both cities as potential MEGAs, and Sevilla is characterised as a weak MEGA. This in many ways is an affirmation, from a wider perspective, of the nature of the Spanish metropolitan system which was highlighted in Part One i.e. a divided system represented by two metropolitan urban regions of a European scale and five 'other metropolitan urban regions'.

The cartographic visualisation of the gross passenger flows (Figure 8.3) and the magnitude of the descriptive indicators deriving from the passenger flows (Figure 8.12), as well as the reduction of the 27 dimensions of flows (of the functional distance) to the two dimensions shown in Figures 8.16, 8.17 and 8.18, together with the other results of Chapter 8, is confirmation of having met the principal objective. It is suggested that these figures are just as informative of the results of the multidimensional scaling, conveying the positioning of the 27 metropolitan urban regions on the basis of the interaction through air passenger flows, as the graphical representations of the outward expansion of Boston in the 19th Century and the European spatial connectivity contained within Figures B (p. 15) and D-E (pp. 17-18) of the Introduction.

Furthermore Figures 8.16, 8.17 and 8.18 represent the nature of the tensions or forces of attraction between each of the cities (airports) of the sample. In this sense the results are representative of the dynamics of a true 'system', closed to external factors. All of these tensions are framed around the conceptual centre of the 'European space of air passenger flows'.

A further surprise was the confirmation of the relationship between Madrid and Barcelona, through the indicators of interaction value and functional distance. In both cases the relations between Madrid and Barcelona were the strongest of the entire sample, and thereby demonstrating a stronger relationship than the other cases where countries were represented by two principal airports. This helps to corroborate Peter Hall's characterisation of Madrid and Barcelona as *sub-continental capitals* (Hall, 2005) and indeed contributes to respond to one of the secondary objectives, together with the socio-economic evidence provided in Chapters 4-5, confirming the *bicephalous* nature of the Spanish metropolitan and urban system. It is a metropolitan system with a political capital for administrative purposes, but at the same time a system in which there is an extraordinary degree of complementarity in terms of economic activity, as highlighted in Chapter 5, between the two leading cities. Clearly from a central government perspective, there is the preference for the maintenance of a metropolitan system of this nature, which in turn contributes to a certain balance and cohesion. However this is a clear political choice. In other political and territorial circumstances a central government might not be as at ease with a situation of this nature, and indeed might well intervene through regional development policy to maximise the competition between two such cities, thereby nullifying the possibility of complementarity and obstructing the possibilities of cohesion.

With regard to the secondary objectives, it is considered that these have all been met, through the examination of the historical expansion of the Spanish metropolitan urban regions in Chapter 2 (i); by determining the spatial extent of the seven Spanish metropolitan urban regions according to the application of the methodology based upon travel to work commuting patterns in Chapter 3 (ii); by ascertaining the ordering of the Spanish metropolitan urban regions in population terms in Chapter 4, and characterising them all in terms of the different demographic and economic indicators employed in Chapters 4 and 5, indicating the strong critical mass vested in both Madrid and Barcelona (iii); and as mentioned enabling the continued use of the *bicephalous* descriptor for the Spanish metropolitan system (iv); through the examination of the European legislation to determine the increasing use of the notion of territorial cohesion as set out in Chapter 6 (v); and by way of the comparative approach to the studies chosen to observe the increase in the ranking of the Spanish metropolitan urban regions within the European urban system in Chapter 7 (vi).

However if an operational benefit can be accrued from the research presented in this thesis, then it must surely be in the achievement of an alternative ordering or hierarchy of European metropolitan urban regions (Chapter 8), in line with the last of the secondary objectives (vii). As set out in the *Territorial state and perspectives* background document (CEC, 2007c) the EC has set forth the challenge in the sense of the need for to stimulate analyses on the interrelationships of EU metropolitan urban regions. It is considered that part of the results respond to this challenge and proportion exactly this – an example of evidence of the interrelationship between some 28 principal European metropolitan urban regions, deriving from the interaction in the form of air passengers, through the construction of a conceptual 'space of air passenger flows'.

Moreover, the adoption of the mathematical technique for the analysis of the air passenger flows in Chapter 8 led directly to the visual representation of the complexity of these interrelations. It is considered that such a visual representation serves enormously as a starting point for questioning the nature of territorial dynamics, and re-questioning the appropriateness of descriptors such as core-periphery, accessibility and connectivity. In addition the visual representation of the complexity of the air-passenger flows as well as the reduction of the functional distance indicator to its graphical representation in two dimensions, abstraction apart, coincides with the notion of 'planning as communication' (cf. De Vries, 2002, 2004) and makes a useful contribution to understanding the complexity of the European territory from an alternative perspective.

However despite the results indicating the greater functional rather than physical positioning of Madrid and Barcelona (and Lisbon) within the European spatial configuration, it is considered appropriate to re-articulate the recommendation made within the UPC's INTERREG IIC project (CPSV, 2001) in calling for a 'visioning exercise' for the South-Western Mediterranean space. This area coincides with that identified as an emerging peripheral integration zone, as foreseen in the 'cohesion-oriented scenario' (ESPON, 2007a), incorporating Madrid and Lisbon, and Barcelona and other Mediterranean cities of the EUROREGION territorial space. It is recognised that recent projects of the different INTERREG programmes go some way to offering the possibility of reaching a deeper understanding of the potential and interrelationships of the EU metropolitan regions, in accordance with the message of the *Territorial state and perspectives* document (CEC, 2007c), but nothing would be lost in embarking on a 'visioning exercise' at a wider supra-regional scale, as a means of exploring and maximising such potential. The agreement to embark upon such an exercise is clearly dependent upon harnessing political will and commitment at a transnational scale, which is no small task. However it is considered that sooner or later such an exercise will be essential, with the ensuing results being nothing less than positive. Such results would enable a richer comprehension of the spatial dynamics of the South Western European territorial space and would contribute to indicate how this part of Europe might be in a position to respond to the contemporary challenges facing the wider continent, as identified by Garton Ash (2007) in the Introduction.

Further Research

The absence of a dynamic approach to the analysis of the European air passenger flows, as well as the dependence upon one modality – that of air transport – stand out as limitations of the results and the thesis. However in order to maximise the spatial coverage of the sample and guarantee a representation from at least every one of the EU15+2 group of countries the only option was to carry out the analysis for the year in question, i.e. 2004. It would clearly be appropriate at some future stage to re-run the analysis with more recent data, to be able to monitor and compare the evolution of the air passenger flows and obtain more conclusive results, as well as seek to incorporate other transport modes in the analysis. A multimodal analysis incorporating road, rail and air transport, tested over a wider number of metropolitan urban regions corresponding to the EU27+2 group of countries, would provide more conclusive results, reflecting the territorial positioning of such cities with much greater precision.