

ARTICULATED MODES OF INTEGRATION : THE STRUCTURING OF THE EUROPEAN URBAN SYSTEM

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Abstract

European integration is for its essential part reflected in the building of urban networks that are increasing interdependencies between cities. Evidence of this process is brought through the observation of a variety of networks whose nodes are located in cities, especially the development of international functions. Analysis of airlines networks (2000) as well as the economic linkages between multinational firms (1990,1996) provide a good illustration reflecting the dominant features of such a process (Rozenblat, 1993, 1997, Amiel, 2003). But other international networks as those created by cultural or scientific activities introduce may have distinctive patterns compared to the previous ones (Rozenblat, Cicille, 2003).

From these analyses, four major modes can be identified in the spatial construction of urban networks in Europe (ESPON, 2003):

- 1) integration according to the urban hierarchy at the European scale*
- 2) integration according to a national urban hierarchy*
- 3) integration according to border and regional effects*
- 4) integration through functional specialisation*

We will demonstrate to which extent each integration mode is effective in the set of urban networks that we analyse. Second, we shall try to show how the four modes are interacting by analysing their variations in space and time.

Introduction

Integration of the European society and territory mainly occur through developing new linkages between cities, especially the largest. But this process cannot be considered as limited to a few cities or capitals. National urban systems as a whole are involved in this growing interaction between territories at the international level.

Though, after a wave of comparative studies of full sets of European towns and cities during the eighties and nineties (Brunet, 1989, Conti and Spriano, 1990, Pumain and Saint-Julien, 1996, Cattani et alii, 1999), there has been a shift in research towards monographs of a little number of global cities (Sassen, 1991, Hall, 1995). Actually, global cities raised new theoretical questions about the role of cities in the globalisation of the economy (Friedmann, 1986). On the other hand, the changing status of cities and regions within a context of weakening nation-states was questioning everywhere the forms of their governance (Scott, 2001). Through regional decentralisation and increasingly autonomous urban management, "city-regions" are now driven to direct negotiations with the actors who are building the global networks. For instance, the air flight deregulation, since 1993, has given a stronger role to air line companies, airports and their strategic agreements, in organising the air transportation networks that are linking cities (Storper, 1997). Urban developments no longer can be understood (and perhaps never have) without considering the networks and systems that cities belong to.

The competitiveness of places is now evaluated in the perspective of networks. Polycentric urban systems are put forward for examining the capacity of European space to support equity and to redistribute the leading activities (European Communities, 2001, ESPON, 2003). The urban managers need to estimate the position and influence of their city within the European urban system, as the comparable urban data are still too rare. A command from the public management board for the development of the city of Marseille, Euroméditerranée, and the French DATAR, was the origin of our comparative study of European cities in 2000 (Rozenblat, Cicille, 2003). 180 urban agglomerations of 200 000 inhabitants and more, located in European Union plus Norway and Switzerland, were compared through a set of 15 synthetic indicators of their influence (table 1).

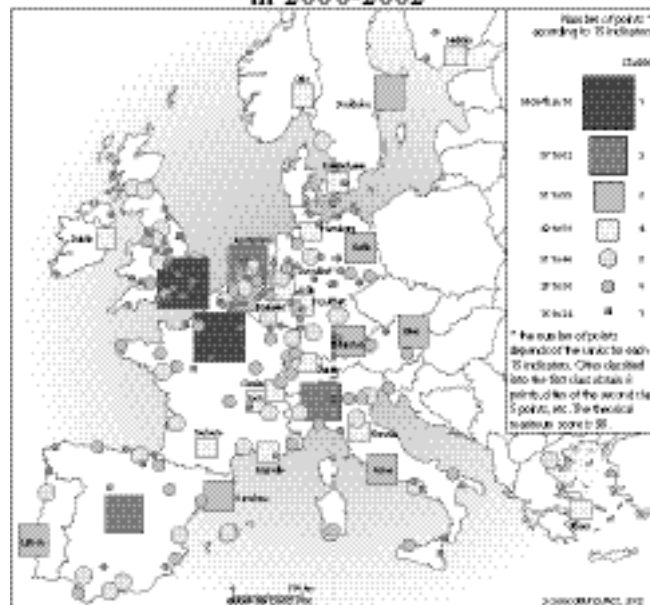
Table 1: Choice of 15 indicators of urban influence

Indicators	Source
Population of urban agglomerations 2000	National censuses
Evolution of population (1950-1990)	Geopolis, 1993
Harbour traffic 1999	Journal de la marine marchande, ESPO
Air line passengers 2001	Airport Council international
Airline and railway accessibility 2002	Amadeus Global Travel Distribution
Headquarters of European main firms	Forbes, 2002
Stock exchanges	The Bankers Almanac 2002 (Reed BI)
Tourist overnight stays 2001	National censuses and touristic sites
Fairs and exhibitions 2002-2003	Chambre de Commerce et d'Industrie de Paris
International congresses 1993-2000	Union des Associations Internationales
Museums 2002	International Council of Museums (ICOM)
Cultural sites and events	Michelin 2001
Students 2001	National or Regional Institutes
Scientific publications	Institute for scientific information (ISI) 2000
Research networks	CORDIS, 2002

Source : Rozenblat, Cicille (2003)

A global classification was made using all indicators for measuring the rank of each city according to its attractivity and share of international functions. No specific weighting was used for the indicators, as their distribution in different themes is equilibrated (demography:2, transport:3, economy:4, tourism and culture:3, university and research:3).

Figure 1: Classification of cities according to international functions in 2000-2002



The classification of cities according to their global influence (fig. 1) is tied-up to different principles of spatial ordering and distribution of international functions. Four of them have been identified, following more or less the theoretical approach that was suggested by Cattani et alii (1999) and put forward in ESPON (2003):

- 1- a principle of hierarchical networking
- 2- a principle of national integration
- 3- a principle of selective specialisation
- 4- a principle of regional cross border integration

After describing the spatial distribution that result from each principle, we will analyse the product of their combination at different scales across the European urban system and their effect on the network organisation of European cities.

1 Identifying the Integrative Principles of European Cities

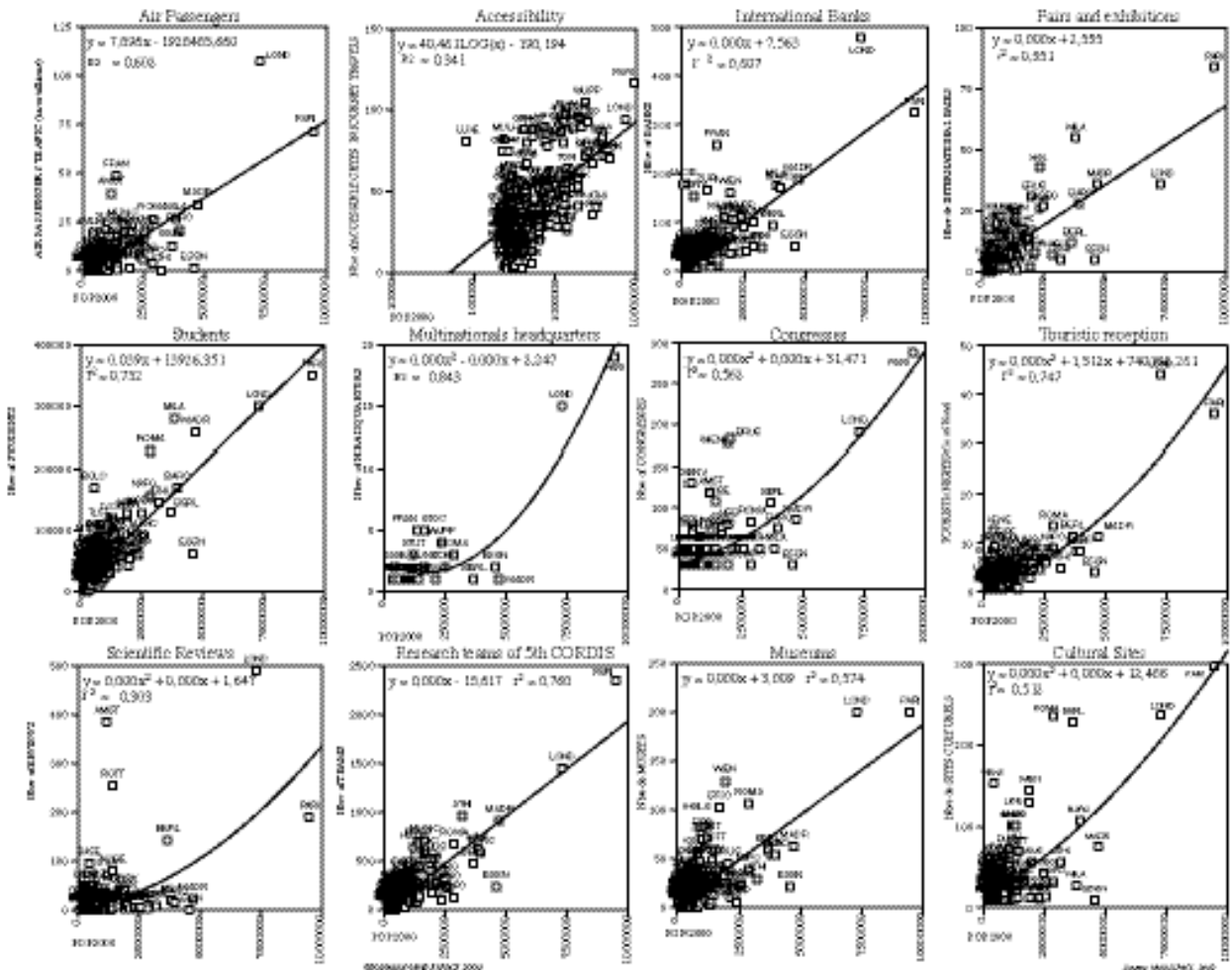
Specific features of the urban influence and attractivity are revealed by each different measurement of the international functions. Of course many functions are linked together and mutually reinforcing. Within the

general framework of agglomeration economies, various processes are constrained by size effects, by national boundaries, specialisation and innovation cycles, and by regional path dependency.

1.1 Hierarchical Networking

The constraining effect of urban size on the concentration of some functions is revealed by the correlation between urban influence and the population figures of the agglomerations (figure 2). The relations differ in shape and intensity according to the urban activities.

Figure 2: Relations between International Functions and Population size of European Cities

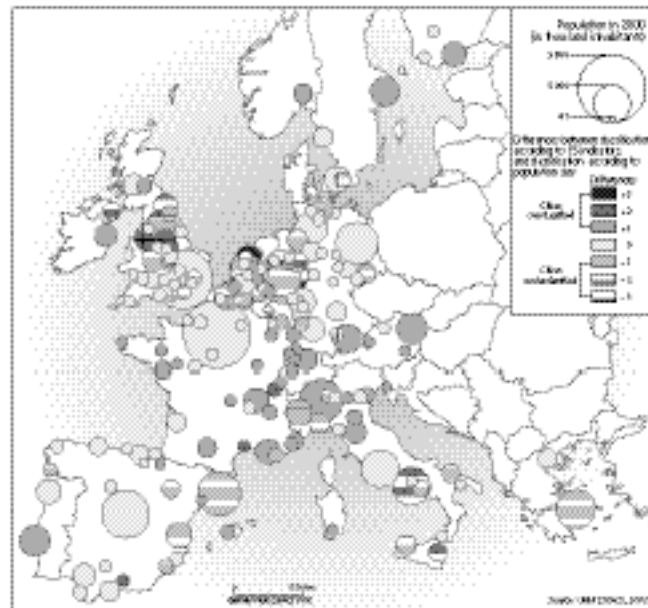


The attraction of the headquarters of multinational firms and the high level tourist functions are better modelled by power laws of the urban size, with a high statistical significance. Less powerful dependencies to the size are represented by linear functions that are linking the population figures to the number of research groups involved in CORDIS programmes, the number of students, of air passengers or museums. In the case of accessibility, the shape of the relation is a logarithmic function of size, much less significant. The harbour traffics are not really correlated to city size, due to the high specialisation of that city profile.

For each of these indicators, cities can have over or under representation compared to their size. These deviations can be summarised, by comparing the class to which each city belongs in the global ranking of influence, with its ranking according to population size (fig.3).

The most over-classified city is Amsterdam, that has a global ranking much higher than would be expected after its population figure. As the capital of the Netherlands, that city with little more than one million inhabitants in 2000 is integrated in a regional context of high urban densities and well connected to the other large European capitals. Despite its modest size, it is a large European metropolis including many economic and financial functions, relying on strong infrastructures in terms of transportation networks, attracting tourist from all over Europe for congresses as well as its cultural heritage.

Figure 3: Classification and population size of European cities



To a lesser extent than Amsterdam, four other cities below 500 000 inhabitants have a much wider influence than the other cities of similar size. Luxembourg, head of European institutions, as well as Geneva, where many international organisations are located, have developed other functions of European significance in the domains of air transportation, general accessibility, banking, congresses and tourism. Montpellier and Grenade, both university towns, with a high cultural reputation and rapid demographic growth, have greater influence than expected from their size: Montpellier through its research networks, and Grenade through its historical heritage. Among the cities that are slightly over-ranked compared to their population, Edinburgh can be mentioned as an exception in the United Kingdom, due to its classification within the world heritage by UNESCO, that cause tourism attraction and air traffic. In Italy, there is a regional pattern differentiating cities from the north, having a broader influence than those from the south.

Even if the city size explains a large part of the variations in urban influence, there are other principles shaping these variations, that are presented now.

1.2 National Frames

Despite our carefulness in establishing comparative European data, some national structural features still appear that are linked to institutional peculiarities of each country. It is especially the case of universities and museums. The organisation of academic systems are very different from one country to the next. In Switzerland, Germany and Belgium, 50 to 60% of the students only are concentrated in the large urban agglomerations of our sample. The real attractivity for the students is then not well represented in our study for some countries (fig.4). Many examples of famous academic towns that are outside of our sample of cities can be found as Neuchatel in Switzerland, Louvain in Belgium or Heidelberg in Germany. In the United Kingdom, the most famous universities, Oxford and Cambridge, are located in relatively small towns, although not far from London.

In the case of museums, concentrations are also very different according to the countries (fig. 5). In the United Kingdom, 26 millions of persons each year visit the museums in London, and that is half of the national museum attendance. A similar concentration but to a lower extent is observed in France (Paris) or Spain (Madrid and Barcelona). The situation is contrasted in Italy where about 600 museums are scattered in the 22 cities of the sample, or in the Netherlands where the 12 cities larger than 200 000 inhabitants share some 300 museums. This results from different histories in the management of cultural goods, that was more or less centralised.

For both indicators, but also for others, at a lesser degree as in the case of transportation systems, the organisation of the national institutions introduces significant bias in the level of concentration and shape of the distribution of the urban functions, and interferes with the city size in the measures of their influence.

Figure 4: Universities of European Cities

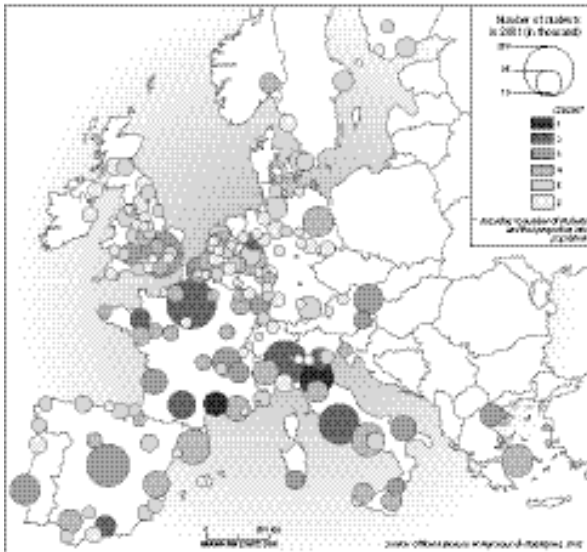
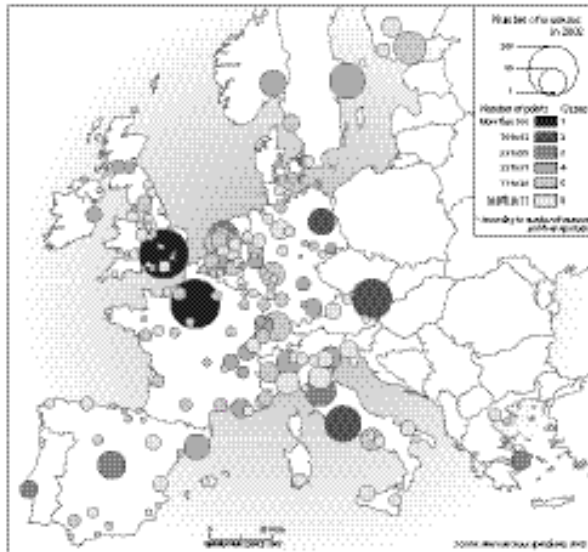


Figure 5: Museums in European Cities



1.3 Specialisations

The economic activities are integrating themselves within the hierarchised urban systems by exploiting the peculiarities of some cities. As a feedback they reinforce the specialisation of these nodes. That is especially the case for the headquarters of large firms and financial activities, that are discriminating among cities much more than the others indicators (fig.6, fig.7).

Their selective locations are reinforcing the leading role of some cities and contribute to a virtuous circle that maintains their attractiveness and economic growth. Industrial and financial groups are highly relying upon the social and urban amenities of the cities. They even add to these by patronising cultural activities or artistic creations (for instance the Lingotto project in Torino supported by the Agnelli foundation (Fiat industries)), or sport events, as Philipps financing the football club of Eindhoven. In any case, the mobility of these business groups is not as high as one would expect.

Figure 6: Headquarters in European Cities

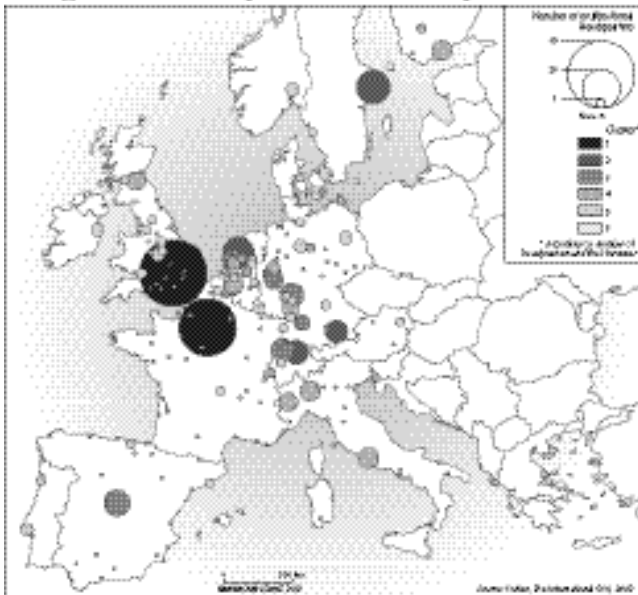
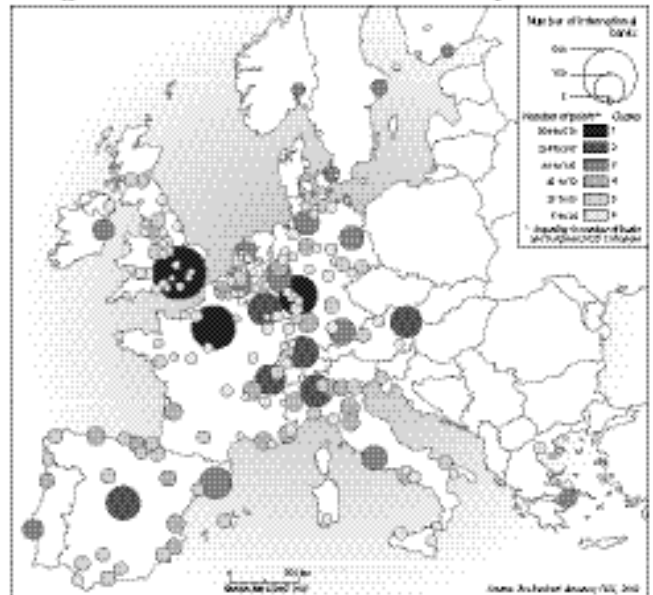


Figure 7: Financial Places in European cities



The map of headquarters (fig.6) reveals that, besides the dominance of London and Paris, many headquarters of companies still are located in ancient cities of the Ruhr region, including new activities as banking and insurance and new technologies. In the case of banking, the economic concentration, that happened earlier than in other sectors of activity, increased the weight but reduces the number of the banks. Banking networks are today multinational and use the upper part of national urban systems for diffusing their branches (fig.7). The largest financial places in Europe take place in four cities only: London, Paris, Frankfurt and Luxemburg. They concentrate 80% of the European financial flows (Pagetti, 1998). The

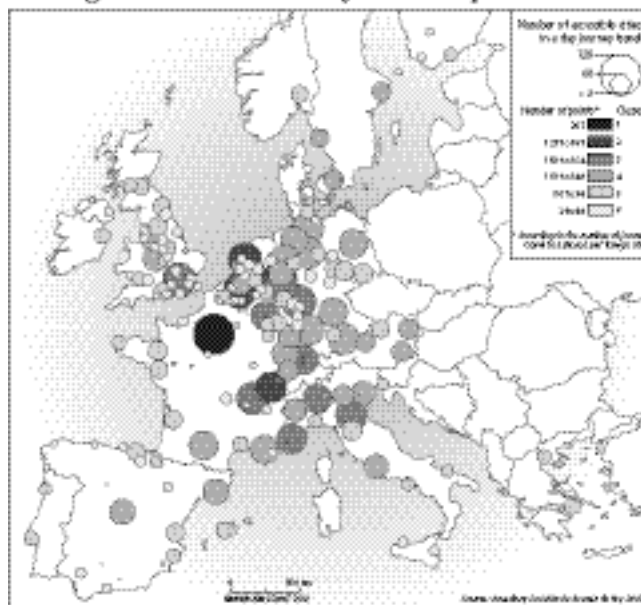
German cities are organised in a polycentric system of eight cities where a stock exchange is located. Other stock exchanges of European audience, connected to Euronext, are located in Lisboa, Porto, Valencia or Bilbao.

1.4 Regionalisation and accessibility

While specialised networks have developed long range connections, some linkages are revealing complementarities between neighbouring cities inside the same region. The hypothesis here is that a good access to a large diversity of functions can be attained by connecting cities that are close in terms of spatial or temporal distances.

The accessibility map measures for each of the 180 European cities, the number of cities that can be reached by plane or railway in a return trip within one day (fig. 8). Foreign cities are counted twice in order to favour the international access. Despite the hierarchical ranking that is produced by the airline connections of large capitals, there is a good accessibility in many places located in border regions, due to the high density of neighbouring cities. It is the case in the Rhine valley in Germany (especially Düsseldorf), in northern Italy for Bologna, in France for Lyon.

Figure 8: Accessibility of European cities



The accessibility is linked to the centrality of cities within the urban system, through the potential of trade that is linked with that position. A good accessibility is favourable to the development of international functions. However, that indicator is only partly linked with the city size (fig.2). As important is the regional urban density and the proximity to international borders. All things being equal in terms of population size, the number of reachable cities (and especially the foreign ones) is highly correlated with the presence of international banks ($R=0.76$), the number of congresses ($R=0.7$) and to a lesser extent with the number of headquarters ($R=0.49$), tourists (0.43) and international fairs (0.41).

Regional and long range accessibilities, together with the urban hierarchy, the national adherence and the economic specialisation, are the elementary structures shaping the integration process of cities in Europe. Their effects are differently combined according to each function and its location within the European urban system.

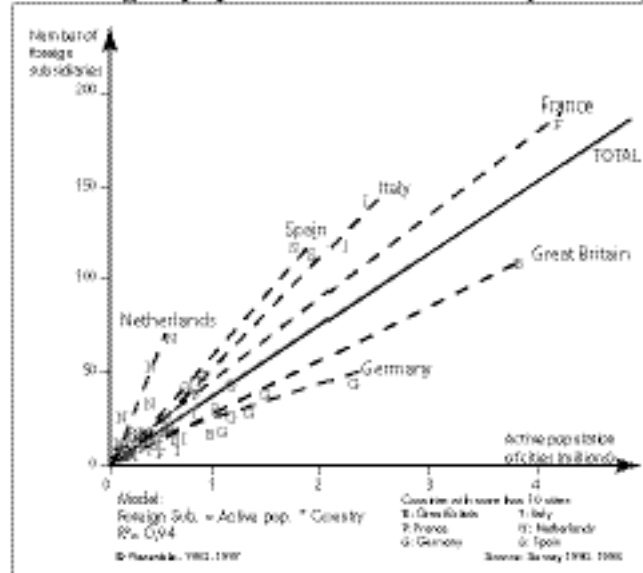
2 Combining the Integrating Principles

2.1 Urban Size and Countries

In previous studies, we analysed the organisation of multinational firm networks in foreign cities within the European urban system (Rozenblat, 1993, Rozenblat, Pumain, 1994, Rozenblat, 1998). In two surveys, we identified more than 3000 foreign branches in cities of western Europe in 1990 and more than 4000 in cities of western and central Europe in 1996. In both cases, more than 80% of branches are located in cities larger than 200 000 inhabitants. The number of foreign branches is depending upon the city size ($R=0.42$ in 1990, 0.46 in 1996). But this effect of the size is variable according to the country. By combining a linear regression and a variance analysis, 95% of the variance of the number of foreign branches is explained in

both cases by the city size and the country where it is located (fig.9). Both variables are important for defining the openness to foreign firms. With an equal size, two European cities do not welcome the same number of branches from abroad: that depends upon the mean national level of penetration that is represented by the slope of the corresponding country on the graph.

Figure 9: Foreign subsidiaries according to population size of cities by country



That double scale of opening to international investment is reflecting the strategy of firms that follows a hierarchic way of thinking (Crozet, Mayer, Mucchielli, 2004). First a continent is chosen, then a country, then a particular city. A country is chosen for its economic level and type, then the national urban hierarchy is a guide for locating the branches. The coupling of national and urban scales reflects the cumulative behaviour of more or less independent decision at firm level. By locating their investments in the vicinity of their competitors and partners, they contribute often to reinforce the previous structure of the national urban systems.

2.2 Size and Specialisation

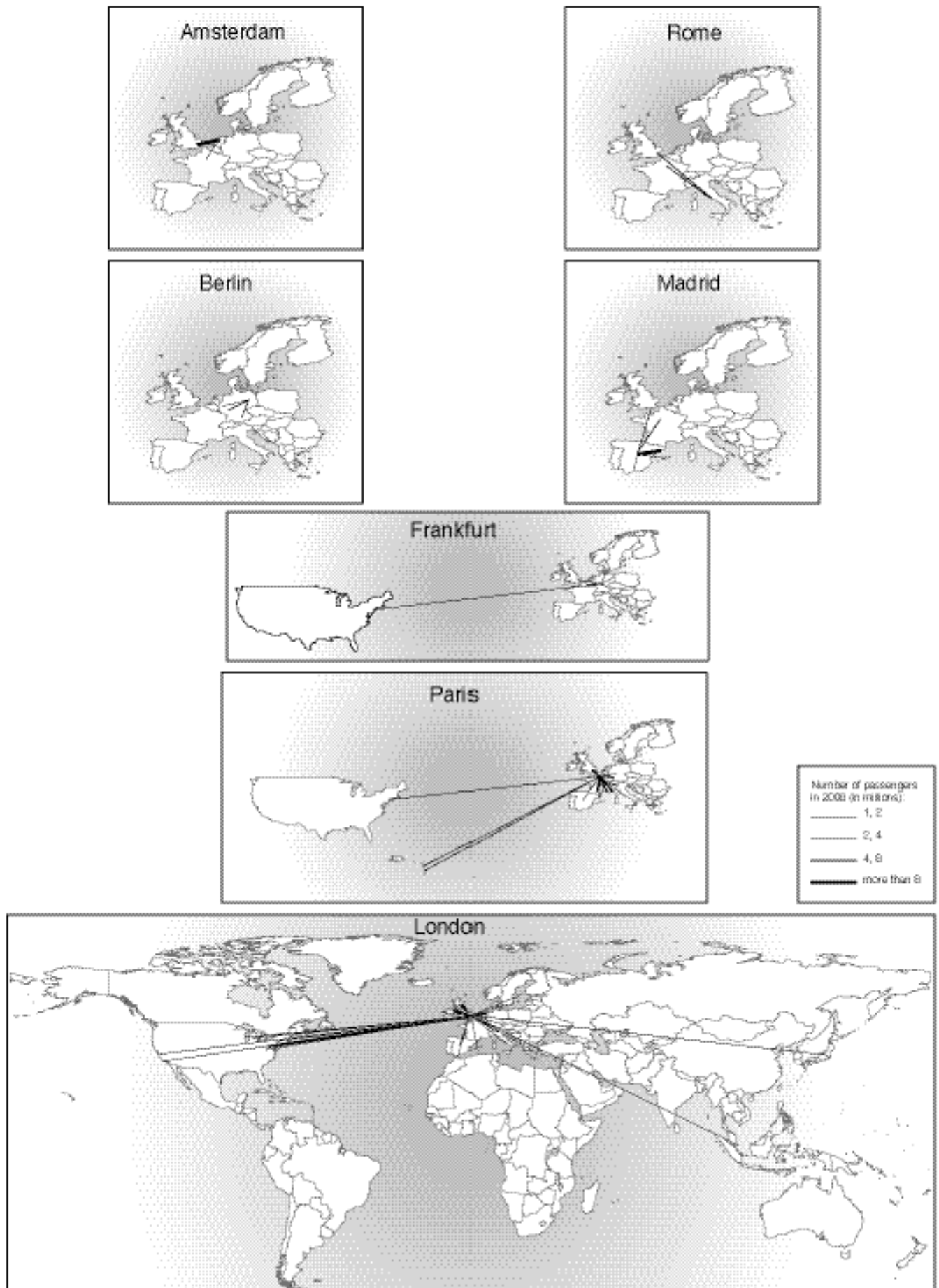
In some other cases, the global strategies of the firms lead to a specialisation of the cities that they choose. For instance, we have shown that the air passenger traffic is highly correlated to city size, but the air lines companies (most of times a national company) specialise a city by selecting a specific set of destinations from a city and then shaping its accessibility network.

As an example are represented the largest aerial European flows (more than one million passengers) that are linking mainly seven cities (London, Paris, Frankfurt, Amsterdam, Berlin, Madrid, Rome) (fig.10). Berlin has many links towards other German cities, but its international go mostly through Frankfurt. Madrid articulates is national network mainly with London and Paris, as is the case for Amsterdam and Rome in Europe. Paris and London develop the wider networks with the rest of the world, Paris towards New York and the Antilles, London with New York, Malaysia and Japan. Together with Frankfurt, they are like hubs at the European level. But the directions of their links are fluctuating according to the strategies of the companies. The game of alliances between companies (mainly Sky Team, Star Alliance and One World) and low costs partners redefines the spatial organisation of the connections.

So the aerial system of connections is complex since it involves not only the activity of the city at the origin and destination of the flows but also the strategies of air flight and airports companies that evolve according to changing international policies.

On the whole, the activities that are building networks, as international functions, are always reflecting the spatial inscription of the strategies of several groups of actors. In a similar way the networks of multinational companies are a product of spatial inequalities, but also external competition and internal governance of firms. Cities also may intervene in the location process through more or less deliberate decisions and attracting policies influencing the location of firms.

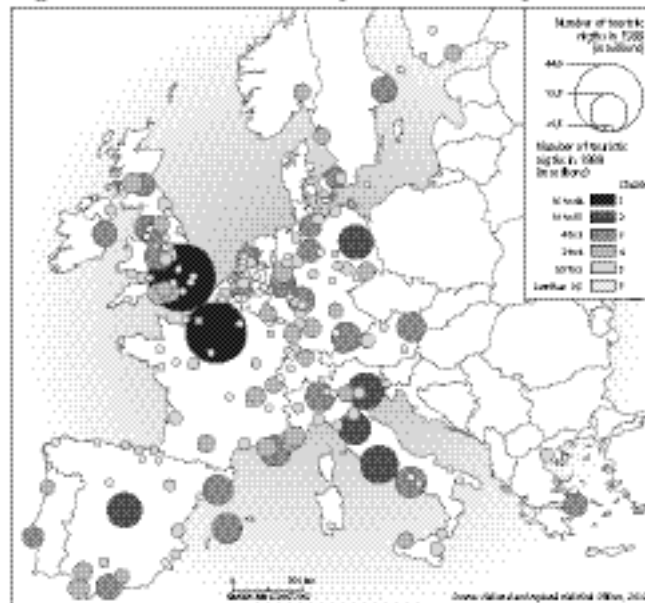
Figure 10: Principal air passengers traffics of European cities in 2000



2.3 Functional Specialisations and Regional Accessibility

In the case of tourism activities or congresses, the cities are part of a system articulating transportation firms, regional infrastructures and tour operators or other organising associations. The urban tourism activity is more regular during the year than other destinations because of the compensating effects between business and leisure tourisms. That is why this activity is highly correlated to city size (fig.2). But, all things being equal according to the size, the tourism also rely upon cultural diversity ($R=0.54$), it is linked with international banking ($R=0.49$), the congresses ($R=0.49$), accessibility (0.43) and aerial traffic (0.42).

Figure 11: Touristic reception in European cities



The marked specialisations (as in Venice, Blackpool or Palma de Majorca) rely upon regional or long range organisations (fig.11), that exploit different local or regional amenities.

III Conclusion: the Network Economy in Urban Systems

From the analysis of the spatial patterns that underline the distribution of international functions within European cities, two main conclusions can be derived. First, such functions do not locate anywhere: they do follow the main hierarchical and national differentiations in the pre-existing spatial structure. The European integration builds itself on the urban hierarchy of large cities and national capitals. The degree of freedom for the location of foreign investment is limited when related to activities of international influence. Not only agglomeration economies but also network economies are essential in this very selective but strongly constrained location process.

Second, this aggregated result of many micro decisions can only be understood by a careful examination of the rationales that are behind the development of each kind of international network. In our study, we could observe some linkages at the micro level, as in the case of entrepreneurial networking between firms or research networks, other networks were identified through aggregated flows, as in the case of aerial passenger traffics, but some had to be inferred from hierarchies of urban attributes, as in the case of functional specialisation. Further detailed investigations are needed for understanding how the motives at the level of individual actors are producing the connections and rankings within the system of cities. The participation of private and public actors, at different territorial levels, and the “dialogic” between competition and co-operation enhancing the emulation for innovation are providing clues for analysing and modelling the urban dynamics and predicting the future image of the European urban system.

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