Henk van Dijk (ed.)

THE EUROPEAN METROPOLIS 1920-2000

Proceedings of a Conference at
The Centre of Comparative European History
Berlin 2002

European Cities in the World City Network

Peter Taylor

Sponsored by the European Science Foundation

European Cities in the World City Network

Peter Taylor

Abstract

This is primarily an empirical paper that brings together selected results from the GaWC research programme. The latter studies inter-city relations at a global scale. Empirical research is based upon a model of world city network network formation as a product of the location strategies of global service firms. A range of findings relating to the network connectivities of European cities are presented. Beginning with a ranking of European cities in terms of their global network connectivity, further results include comparisons across different sectors, comparisons with the US cities, comparisons within major European economies, and listings of the global network powers of leading European cities.

Preamble

This paper has three purposes.

First, I aim to initiate discussion of cities as networks of cities. This is to bring connections of cities to centre stage. It is, of course, connections that make cities in the first place and it is old and new connections that subsequently sustain cities. Generally speaking, cities grow on the basis of expanding connections, declining cities have reduced connections, and a city ceases to be when it has no connections. These may be simple truisms but in urban studies its 'external' programme of research has been severely neglected in recent research. Rather 'internal' research programmes have flourished in which individual case studies and comparative studies of a small number of cities dominate at the expense of studying inter-city relations. This situation has only been partly rectified by recent interest on world/global cities.[1]

Second, I introduce the work of the Globalization and World Cities (GaWC) Study Group and Network that focuses upon inter-city relations under conditions of contemporary globalisation. This exists as a virtual global network of researchers (http://www.lboro.ac.uk/) that have identified the lack of available data on inter-city relations as a prime reason for its neglect as a research focus. Therefore much effort has gone into data collection. But conceptualising a research object must come before data collection and world cities are interpreted as global service centres providing financial and business services (accountancy, law, etc.) to transnational corporations. Thus world city network formation is the result of the locational policies of major service firms creating global office networks to service their global clients. In this way the world city network is specified as an 'interlocking' network with service firms doing the 'interlocking'.[2] To research such a network requires detailed information on the offices of leading service firms; the research reported here utilizes a large data set that describes the office networks of 100 global service firms (in accountancy, advertising, banking/finance, insurance, law, and management consultancy) across 315 cities worldwide.[3]

Third, I present some quantitative results from recent GaWC analyses of the world city network with specific reference to European cities. There are some important studies of European cities under conditions of contemporary globalization[4] but there has been no previous research that systematically locates European cities within an encompassing world city network. The GaWC research has focussed upon the latter and my purpose here is to focus on European cities by abstracting them from the global urban analyses. Thus the paper is very empirical; it consists largely of a commentary on a set of tables that display European cities from different analyses of the world city network covering such features as connectivity, network powers and global urban arenas. The main source of these analyses is the 100 x 315 dataset described above but other analyses are introduced for comparative purposes (e.g. on media cities). The theoretical framework for this work is not discussed here.[5] What I provide is a brief description of the contemporary role of European cities in the world-economy.

Comparative city connectivities

Connectivities can be computed from the city-firm data on the basis of where the service firms in a city have offices elsewhere in the network.[6] Obviously a city housing many service firms with offices in a large number of other cities is better connected than a city only housing a few service firms with smaller office networks. All connectivities are presented as proportions of the highest city connectivity thus creating a scale from 1 to 0. On this basis the global network connectivity of all 315 cities have been computed: the top 35 European cities are ranked by this connectivity in the first column in Table 1. Of the 100 firms in the data, 23 are banking/finance firms and if only these firms are used in the computation, then a measure of banking/finance connectivity is derived. This is given in the second column of Table 1 to provide an interesting comparison.

First, considering the global network connectivity: there are no major surprises here, the main value of the results is in their originality as the first measures of the connectivity of European cities in the world city network. The following features may be considered minor surprises: the relatively low ranking of Frankfurt; the high ranking of Dublin; the appearance of many eastern European cities in the ranking.

The key value of measurement is that enables direct comparisons to be made and here the banking/finance connectivities are used to illustrate this utility. It can be immediately noted that Frankfurt is ranked third as a financial centre in Europe. What the two connectivities for Frankfurt on Table 1 show it that the city is not a 'well-rounded' service centre; its prowess in banking/finance is not backed up by equivalent levels of service provision in other sectors of business servicing. It is interesting that this pattern is repeated for the other German cities in Table 1. Not surprisingly, the other city that rises appreciably in the second column is Luxembourg City. In contrast Scandinavian cities are less important for banking/finance connectivity (Helsinki drops out) and other eastern European cities appear in the list (Kiev and St Petersburg).

In Table 2 I extend the connectivities to further interlocking activities but consider only European cities ranked in world top 25. Thus the first two columns are based on the same results as Table 1 but are presented slightly differently. This shows, for instance, that European city world rankings tend to be lower for banking/finance connectivities than for overall

connectivities (this reflects the relative importance of Pacific Asian cities in banking/finance). The connectivities for media[7] immediately show the particular importance of European cities in this area: 16 of the top 25 cities in the world are European. Notice that this does not include Frankfurt. Scandinavian cities are important in media connectivies. In contrast, using NGOs as the interlockers of cities produces connectivies in which European cities are weakly represented.[8] The 6 European cities that do appear are predictable but this measurement exercise does locate the cities in their global context. Finally I have found another set of results that rank world cities by their connections but not through the interlocking model used in GaWC. Matthiessen, Schwarz and Find[9] use bibliographic indicators to identify 'research gateways'. Using data on co-authorship of nearly 200,000 articles, links between urban regions are defined; the fifth column of Table 2 lists European cities in the top 25 ranked in terms of number of inter-city links.[10] In this list European cities dominate at the same level as for media cities: German and British cities are particularly well represented.

In conclusion: this section illustrates the varying importance of European cities in worldwide city networks and shows how difference city functions generate different patterns of connections for different European cities.

European cities within political structures: network and territory

World cities might be involved in a range of global networks but they remain also within political jurisdictions. The relations between the resulting network and territorial 'logics' is only just beginning to be explored.[11] For European cities the political territorial logics occur at two main levels: the EU and the nation-state. I treat each level in turn.

Table 3 is derived from analysis of cities that have at least one fifth of the global network connectivity of the most connected city. Of these 123 cities 28 are in the EU and their world and EU rankings are shown in the left columns of Table 3. In the right hand columns I have listed the 23 US cities in the top 123 cities for comparison. As world economic blocs the EU and USA are broadly of equivalent sizes and therefore the comparison is a reasonable one. The results are quite remarkable and certainly not unsurprising like the previous sets of findings. EU cities are generally more connected into the world city network than their corresponding US cities. It is not just that there are more EU cities, for every EU/US ranking, the EU city has the higher world ranking. For instance, whereas Brussels and Washington, DC both rank 7th in their political zone, Brussels' world ranking is 22 places above Washington (15 to 37). Here is a conundrum: the US as leading national economy in the world is not spawning the most connected world cities. European cities are leading in connectivity perhaps because of world historical traditions or perhaps because of the still fragmented national politics within the EU: 15 of the 28 EU cities are capital cities. The US as a single nation-state may therefore require less world cities for servicing clients doing business in its long established single market. Whatever the reason, the connectivity results do point to a need for new research on how and why European cities connect into the world city network.

The most familiar way in which inter-city relations have been studied in the past is as 'national urban hierarchies'.[12] Although superseded by the world cities literature, it is still the case that former national patterns of inter-city relations will be reflected in the contemporary world city network. The way this network/territory interrelation operates for the largest five EU countries is shown in Table 4. The extremes are the UK and Germany: whereas the latter

has a relatively 'flat' pattern of cities connecting to the world city network, the UK has London as the most connected city and no other UK city in the top 100. France mimics the UK pattern with its large gap between Paris and Lyons. This may well signify that globalization is accentuating urban differences in these traditionally 'primate' national urban 'systems'. Between these cases and Germany, both Italy and Spain show a 'dual-primate' tendency again reflecting past national urban developments. These patterns are all quite predictable given reasonable knowledge of European cities but there is one feature of Table 4 that is less obvious. Although the number 2 in the UK has the lowest world ranking of all the national second place cities in the table, the UK's number 5 is the highest world ranking number five in the table bar Germany. (This feature of relatively high rankings of UK cities extends to other cities not shown in the table.) It seems that the importance of 'Anglo-American' firms in the generation of contemporary globalisation and the world city network is reflected in the higher connectivities of medium cities in the UK relative to the rest of Europe.

In conclusion: cities in globalisation remain within political structures and the relations between network measures and territorial locations can be explored to show both continuities (with past national inter-city relations) and new findings notably in the EU-US comparison.

The global powers of European world cities

The power of cities in the world city network encompasses two types of power. Power of command is found in cities that house the headquarters of firms. It is from these cities that offices in other cities are controlled. But the world city network does not operate as a simple hierarchy with orders going down from top to bottom cities. There are many cities where any firm with global service pretensions 'has to be'. This is a network power and such cities are usually called gateway cities. For the world city network both the command and network power of cities has been measured; the former by aggregating connections for firms headquartered in a city, the latter through aggregating 'sub-dominant' linkages indicating quantities of 'ordinary' offices in a city.[13]

The results of these measurements are shown in Table 5. If we take the dominant cities first it will be noted that command power is found in only one part of Europe, the north-west. This is the historical legacy of this region's long-term core status in the world-economy. In Table 5, the ranking is a little misleading: New York and London are by far the leading dominant cities in the world so that, for instance, London has about twice the combined command power of all other European cities put together. Network power shows a different geography: the gateway cities are largely located around the edge of Europe in the east and south. Thus the leading gateway is Moscow that attracts many firms hoping for a slice of the new Russian services market but there are no global service firms from Moscow itself (i.e with headquarters there). Network cities are locales being 'used' by firms to enter particular markets. This includes just three north-west Europe cities that each have particular attractions: for instance, Dublin is a special case for back office work. Brussels and Zurich appear in both lists: the former's political role as 'EU capital' attracts more global servicing than its local economic role would draw, and the same is true for Zurich as it straddles core and periphery in its particular financial role in the world-economy.

In conclusion: command power through European cities is a feature of north west Europe with London by far the most dominant city but network power is more dispersed as leading firms 'have to be' in certain cities to reach their chosen markets.

The changing world importance of European cities

It is very difficult to assess the roles of cities in the wider economy and the results presented thus far are from a unique data collection exercise describing contemporary inter-city relations. But, despite references to 'historical legacies' in interpreting contemporary patterns above, it is a fact that long—term trend data on inter-city relations are virtually non-existent. Thus what can we say about understanding how contemporary European cities reached their current statuses under conditions of contemporary globalisation? Does this historical question inevitably lead researchers back to case studies and (limited number) comparative analyses? To answer the latter with a 'yes' is to abandon the study of past inter-city networks, surely an unacceptable position. But the problem remains of how to find out about past inter-city relations. I have broached this issue previously[14] but with little to offer; I am now of the opinion that it is almost impossible to figure out how to add a historical dimension to our understanding of external relations using roughly equivalent information to that above. In fact, I have found only one publication that provides any hard evidence for the changing world importance of cities through the twentieth century.

Reed[15] provides information on the relative importance of international financial centres from 1900 to 1980. Based upon a large-scale analysis to generate changing hierarchies of financial centres, Reed's quantitative appendices do provide much information that is relevant to our concerns here. In particular, he lists rankings of the top ten international financial centres at five years intervals over his study period.[16] These results are derived from data that includes not just bank headquarters in a city but also numbers of branches with direct links to other centres for both local banks and foreign banks.[17] Thus although the analyses are very different from that reported above, his findings are based on relational data and therefore may be considered to be broadly comparable.

Table 6 shows the European cities that appear in Reed's rankings at twenty year intervals to which I have added banking/financial connectivity rankings (from results presented in Table 1) for 2000. This table shows the long-term stability of London and Paris's pre-eminence as the European financial centres within the world-economy (in Reed's results London only loses number one rank to New York between 1920 and 1940). German cities feature prominently in these rankings but which German city varies over time with Frankfurt's position as number three in Europe only being consolidated relatively recently. However, the key historical finding of this table is the post-World War II demise of European cities as international financial centres with still only two cities (London and Paris) featuring in 1960. It may be noted that the 2000 list is the second shortest for European cities; this reflects the importance of the 'rise' of Pacific Asian cities in the contemporary globalisation of banking and finance.

In conclusion: although obtaining historical data similar to that used to compute the current connectivities of cities is difficult, using the work of Reed does provide a glimpse of inter-city relations in banking/finance across the twentieth century.

Concluding comments

Other researchers have noted the peculiar position of Europe in world city formation with many relatively small cities (in global terms, e.g. Amsterdam and Frankfurt) having very important global functions[18] but this has never been quantified as relational measures within a world city network. The latter has been illustrated in the tables reported on above: there is now no room to doubt the immense importance of European cities in the constitution of the world city network. But such measurement inevitably brings up more questions than answers both for contemporary processes and historical trends and comparisons. The research challenge is to build upon these unique findings on external relations of cities to better understand European cities, their pasts and their futures.

Table 1 Top 35 European cities for Network Connectivities

Global network connectivity		Banking/finance connectivity	
London	1.00	London	1.00
Paris	0.70	Paris	0.79
Milan	0.60	Frankfurt	0.70
Madrid	0.59	Madrid	0.69
Amsterdam	0.59	Milan	0.63
Frankfurt	0.57		
Brussels	0.56	Brussels	0.59
Zurich	0.48	Istanbul	0.55
		Amsterdam	0.54
Stockholm	0.44	Warsaw	0.53
Prague	0.43		
Dublin	0.43	Dusseldorf	0.51
Barcelona	0.43	Moscow	0.50
Moscow	0.42	Luxembourg	0.49
Istanbul	0.42	Dublin	0.48
Vienna	0.42		
Warsaw	0.42	Zurich	0.46
Lisbon	0.41	Athens	0.46
Copenhagen	0.41	Berlin	0.45
Budapest	0.41	Prague	0.44
Hamburg	0.39	Hamburg	0.41
Munich	0.39	Budapest	0.41
Dusseldorf	0.39	Munich	0.40
		Geneva	0.40
Berlin	0.36		
Rome	0.36	Barcelona	0.35
Athens	0.36		
		Rome	0.31
Luxembourg	0.32	Lisbon	0.30
Oslo	0.32		
Geneva	0.31	Stuttgart	0.28
Helsinki	0.29		
		Stockholm	0.26
Stuttgart	0.27	Cologne	0.26
Rotterdam	0.27		
		Kiev	0.24
Bucharest	0.25	Bucharest	0.23
Cologne	0.24	Vienna	0.23
Lyon	0.24		
Antwerp	0.24	Antwerp	0.20
		St Petersburg	0.19
		Bilbao	0.19
		Rotterdam	0.19
		Oslo	0.18

Table 2 European Cities in the Top 25 Global Connectivities

Global network connectivity	Bank network connectivity	Media network connectivity	NGO network connectivity	*Research network links*
London 1 Paris 4 Milan 8 Madrid 11 Amsterdam 12 Frankfurt 14 Brussels 15 Zurich 19	London 1 Paris 6 Frankfurt 7 Madrid 8 Milan 11 Brussels 19 Istanbul 21 Amsterdam 24 Warsaw 25	London 1 Paris 3 Milan 5 Madrid 6 Amsterdam 7 Stockholm 9 Copenhagen 10 Barcelona 13 Zurich 14 Vienna 15 Oslo 16 Prague 17 Brussels 19 Budapest 21 Warsaw 22 Lisbon 23	Brussels 2 London 4 Geneva 9 Moscow 10 Rome 18 Copenhagen 24	London 1 Geneva 5= Paris 7= Berlin 7= Mannheim 7= Munich 7= Manchester 11= Amsterdam 11= Basle 11= Milan 11= Edinburgh 17= Oxford 17= Cambridge 17= Frankfurt 17= Dortmund 17= Rome 17=

Numbers refer to world rankings

Table 3 Global Network Connectivities: EU and US Cities Compared

EU cities	EU rank	**World rank**	US rank	US cities
LONDON	1	**1**		
		2	1	NEW YORK
PARIS	2	**4**		
		7	2	CHIGAGO
MILAN	3	**8**		
		9	3	LOS ANGELES
MADRID	4	**11**		
AMSTERDAM	5	**12**		
FRANKFURT	6	**14**		
BRUSSELS	7	**15**		
		17	4	SAN FRANCISCO
		25	5	MIAMI
STOCKHOLM	8	**27**		
DUBLIN	9	**30**		
BARCELONA	10	**32**		
		33	6	ATLANTA
		37	7	WASHINGTON DC
VIENNA	11	**39**		
LISBON	12	**42**		
COPENHAGEN	13	**44**		
HAMBURG	14	**48**		
MUNICH	15	**49**		
DUSSELDORF	16	**50**		
BERLIN	17	**51**		
ROME	18	**53**		
ATHENS	19	**56**		
		60	8	BOSTON
		61	9	DALLAS
		62	10	HOUSTON
LUXEMBOURG	20	**63**		
		68	11	SEATTLE
HELSINKI	21	**70**		
		73	12	DENVER
STUTTGART	22	**74**		
ROTTERDAM	23	**75**		
		76	13	PHILADELPHIA
		77	14	MINNEAPOLIS
		81	15	ST LOUIS
		85	16	DETROIT
COLOGNE	24	**92**		
LYONS	25	**93**		
ANTWERP	26	**96**		
		98	17	SAN DIEGO
MANCHESTER	27	**101**		
		105	18	PORTLAND
BIRMINGHAM	28	**106**		
		108	19	CHARLOTTE
		112	20	CLEVELAND
		114	21	INDIANAPOLIS
		119	22	KANSAS CITY
		120	23	PITTSBURGH

Table 4 Global Network Connectivities: Five Countries Compared

UK		FRANCE		ITALY		SPAIN		GERMANY	
City	WR	City	WR	City	WR	City	WR	City	WR
LONDON	1	PARIS	4	MILAN	8	MADRID	11	FRANKFURT	14
MANCH'R	101	LYONS	93	ROME	53	BARCEL'A	32	HAMBURG	48
BIRMIN'M	106	MARSEI'S	140	TURIN	199	BILBAO	129	MUNICH	49
BRISTOL	135	LILLE	172	BOLOGNA	213	VALENCIA	132	DUSSEL'F	50
LEEDS	137	BORDE'X	183	NAPLES	241	SEVILLE	201	BERLIN	51

WR - world ranking

Table 5 Disaggregating Connectivities: Top 10 European Cities for Command Power and Network Power

Command power		Network power	
World rank	Dominant City	World rank	Gateway City
2	London	2	Moscow
6	Amsterdam	3	Zurich
7	Frankfurt	7	Prague
8	Zurich	9	Brussels
10	Brussels	12	Dublin
11	Paris	14	Milan
13	Munich	23	Warsaw
14	Lyon	24	Barcelona
15	Dusseldorf	25	Madrid
18	Stockholm	26	Lisbon

Table 6 European Cities in the Top 10 International Financial Centres, 1900-2000

1900	1920	1940	1960	1980	2000
London - 1	London - 2	London – 1	London – 1	London – 1	London – 1
Paris - 3	Paris - 3	Paris – 3	Paris – 3	Paris – 3	Paris – 5
Berlin - 5	Berlin - 4	Berlin – 4		Frankfurt – 4	Frankfurt – 6
Frankfurt - 9	Amsterdam –9	Amsterdam –5		Hamburg – 6	Madrid - 7
Amsterdam-10	Moscow - 10	Milam - 6		Zurich - 9	
		Hamburg - 8			

Numbers refer to worldwide ranking

NOTES

[1] For instance: Sassen, S., *The Global City* (2nd ed.), Princeton, NJ, (2001); Sassen, S., *Cities in a World Economy* (2nd ed.), Thousand Oaks, CA, 2000; Scott, A. J., ed. *Global City-Regions*, Oxford, 2000; Short, J. R. and Kim, Y-H, *Globalization and the City*, London, 1999

[2] Taylor, P J., "Specification of the world city network", *Geographical Analysis* 33 (2001): 181-94

[3] Taylor, P. J., Catalano, G. and Walker, D. R. F. "Measurement of the world city network", *Urban Studies* 39 (2002): 2367-77

[4] For instance, see the chapters in Bagnasco, A. and Le Galès, P. eds., *Cities in Contemporary Europe*, (Cambridge, 2000)

[5] See Jacobs, J. *Cities and the Wealth of Nations*. (New York, 1984) and Taylor, P. J. *World City Network: a Global Urban Analysis*, (London, 2003)

[6] Details are provided in Taylor, Catalano and Walker, 2002, "Measurement"

[7] These are from Kratke, S. and Taylor, P. J., "The world geography of global media cities', GaWC Research Bulletin No. 95 (2002) available from www.lboro.ac.uk/gawc

[8] These results are from as yet unpublished research.

[9] Matthiessen, C. W., Scharz, A. W. and Find, S., "Research gateways of the world: an analysis of networks based on bibliometric indicators" in *Gateways to the Global Economy*, eds. A. E. Andersson and D. E. Andersson (Cheltenham. 2000)

[10] Matthiessen, Scharz and Find, 2000, "Research Gateways", 24 (Table2.2)

[11] Taylor, P. J., "World cities and territorial states under conditions of contemporary globalization', *Political Geography* 19 (2000): 5-32

[12] See: Bourne, L. S., *Urban Systems* (Oxford, 1975) and Bourne, J. S. and Simmons, J. W eds. *Systems of Cities* (Oxford, 1978)

[13] Taylor, P. J., Catalano, G., Walker, D. R. F., and Hoyler, M., "Diversity and power in the world city network", *Cities* 19 (2002): 231-41

[14] Taylor, P. J., "Hierarchical tendencies amongst world cities: a global research proposal", *Cities* 14 (1997): 323-32

[15] Reed, H. C., *The Preeminence of International Financial Centers*. (New York, 1981)

[16] Reed, 1981, *The Preeminence,* 131-41 (Table A.11).

[17] Reed, 1981, *The Preeminence* , 10 (Table 1.1).

[18] See, for instance, Castells, M. "European cities, the informational society, and the global economy", *Tijdschrift voor Economische en Sociale Geografie* 84 (1993): 247-57