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"Europe in the world city network"

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## Introduction – Background to the analyses

Network theory has lent weight to the need to understand contemporary development processes as essentially articulated by relations between cities. Castells' (1996) theory of a paradigm shift in spatial relations at the end of the twentieth century, interpreted city interrelations in the networked tertiary economy as generating a global 'space of flows' which does not map onto the territorial reference points of states. According to Castells, ICT has brought about an openness of spatial relations constituting "a multi-edged network" (1996, pp. 75-76) within which the new economy is "informational, global, and networked" (1996, p.77) operating on a global scale. However, far from losing importance in this process of spatial transformation, major business cities have continued to be basing points for network centralities in the tertiary world economy as first expounded by Sassen (2001). As operational nodes for informational and financial flows in global networks, cities are interlinked across territorial borders and are characterized by distinctive functional internationality.

This paper engages directly with key questions posed in the TIGER project on the changing position of the European territory as global dispersion and centralizing tendencies impact on its cities in the twenty first century by utilizing data from 'World City Network' (WCN) research.

The Globalization and World Cities (GaWC) research network (GaWC, <http://www.lboro.ac.uk/gawc>) has measured and analyzed the spatial configuration of tertiary knowledge-based business relations in the WCN, using information on the locations of global Advanced Producer Services (APS) firms - banking/finance, accountancy, law, advertising and management consulting firms - with multiple city-based offices worldwide (Taylor 2001, 2004; Taylor et al. 2011). The size and the functions of offices within a given business network generate connections between cities in which they are located. Thus calculating the connectivity conferred on cities in an 'interlocking network model' by multiple global APS networks allows important inter-city relations in the WCN to be described (for technical details about the method see GaWC Research Bulletin 310 (<http://www.lboro.ac.uk/gawc> and Taylor 2004).

The purpose of this paper is to understand the relationship between these business-generated interrelations and territorial space at different geographical scales. By examining the APS connectivity of cities world-wide it is possible to see how the European territory is positioned in contemporary economic globalization. Furthermore, utilizing GaWC data collected in three census periods during the first decade of the twenty first century, it is possible to analyze changes in the structure of European city network (ECN) relations in a global (WCN) context. The approach to analysis adopted is unique in its focus on the territorial effects of developing business practices in globalization which can inform European spatial policy. We use a time-series approach in order to assess how Europe's place in the WCN is changing, especially in the context of the financial crisis which came to a head in 2008, the last census date for which GaWC data are available for analysis in this project. The data thus benchmark the structural evolution of the WCN up until immediately before the impact of the crisis.

Given the role of banking/financial activity in contributing to economic recession, we undertake a sectoral analysis which seeks to understand the changing roles of cities as basing points for these services; the results also inform consideration of the implications of flows of financial capital associated with real estate investments in working paper 9. Analysis of the ways in which different APS sectors are using cities in the WCN also sheds light on which

specific tertiary business activity is interconnecting cities in the world and within Europe, and on sectoral specializations relevant for policy in leading business cities and cities which are globalizing, in the European territory.

### **The data and the standardization method**

GaWC datasets available for analysis refer to the years 2000, 2004 and 2008. However, time series comparisons across these years was far from straightforward because the composition of the dataset in terms of the number of firms, sectors and cities studied has changed over time, reflecting changes in the structure of the service networks and the cities constituting the WCN. The first data collection in 2000 included six service sectors: banking/finance, accountancy, insurance, law, advertising and management consulting (Taylor, 2001) however insurance was not studied as a separate sector in 2004 due to increasing service integration between insurance and finance functions. In addition, the number of firms studied also changed between 2004 and 2008 due to corporate restructuring (e.g. mergers and acquisitions). For the banking/financial services sector, in 2000, 34 firms were included in the dataset and in 2004, only 29 firms, while the number increased again to 75 firms in 2008. Furthermore the proportion of the different sectors combined in connectivity calculations has also changed significantly across the time period. The total number of cities incorporated in the dataset has also increased greatly in the 2008 data. Due to these changes in the composition of the dataset for the three census periods, direct comparisons could not be made without adopting a rigorous standardization method to regularize the basis for data analysis.

A comparative method adopted by Derudder *et al.* (2010) standardizes connectivity values at an index level. However, for the present exercise we adopted a different approach in order to achieve greater accuracy required for the in-depth analyses to follow. In order to avoid the removal of cities with low connectivity for the year 2008 when considering time series changes, we standardized the GaWC datasets at the most disaggregated level of city pairs ('dyads'). This standardization method results in a smaller overall database however connectivity changes observed on this basis allow us to focus on changes in the constitution of the WCN and the ECN (European Cities Network) scales with precision.

The final standardization for the three census periods covers five sectors: banking/finance (hereafter referred to as financial services), accountancy, law, advertising and management consultancy, involving the following numbers of firms and cities worldwide:

- Year 2000, 100 leading APS firms present in 315 cities world wide;
- Year 2004, 92 APS firms in 315 cities;
- Year 2008, 175 APS firms in 525 cities.

We follow Derudder *et al.* (2010) in extracting a subset of 285 cities present in all three datasets. All connections were then recalculated for each year, and also separately for each sector. Standardizing at this level does not change the characteristics of the network so the new global network connectivities (GNCs) are directly comparable without other need of data transformation.

After recalculating all connectivities, the dyad values across the whole network matrix were standardized again for each year and also separately for each sector. Because the datasets contain a different number of firms in each sector for the three years, to give each sector the same weight in terms of global connectivity across the years, we have then given each sector the same weight it had in 2008 and adapted the previous years to this. All dyads were thus rescaled for each sector to the same proportion over the years by adapting the connectivities

for each sector to the 2008 weight. Finally, summing all dyads across the five sectors we obtain a new standardized GNC that can be directly compared. Figure 1 and figure 2 (in appendix A) provide distributions of standardized connectivities for all APS, in other words GNC, and for banking/financial services network connectivity (FNC) respectively, showing that there is no sub-network distortion.

This data standardization allows direct comparisons to be made between the three census periods however an important limitation is that observations regarding emerging cities in the WCN during this period are not possible if they were not included in earlier census periods. For example, Eastern European cities not included in the first datasets, but which have since developed significant connectivity in the WCN, are missing from the analysis. For this reason, we include additional analyses using non-standardized data for the year 2008 only, in order to reveal cities which have gained connectivity by the time of the last census period. This is important to show changes in regions, for example Eastern Europe, which have been undergoing significant political and/or economic change during the past decade.

Because a key objective of this working paper is to examine Europe's changing territorial relations in global advanced services networks, in some analyses, a 'Mappa Mundi' exercise (Vinciguerra *et al.*, 2010) has been used to identify and visualize the position of cities and territories in terms of their network centrality where geographical distance is not considered. Visualizations represent the servicing spaces between cities, and within and between states (territories). These are achieved by using a spring embedding algorithm which assigns forces to every city link (dyad), represented by 'springs', hence the term 'spring embedding'. The effect is that a repelling force is applied when nodes are too close together and an attractive force is applied when nodes are too far apart, at the same time, the strength of forces is influenced by the link value. The outcome is a continuous changing in the position of nodes within the graph, throughout iterations, until an approximate equilibrium is reached. Euclidean distances between nodes are proportional to graph distances thereby representing the relations of cities and territories in network space, however it should be noted that the method results in a variance of outcomes between the visualizations which must be taken into account in making comparisons.

### **APS connectivity - Developments in the European City Network**

This section documents the connectivity position of cities for all APS sectors, their rankings and their changing positions over time, in the European WCN subnet, here referred to as the ECN. By reference to the APS standardized time series data, changes in city connectivity rankings at a European scale can be noted. Tables in appendix A provide complete data whilst highlights from the analyses are discussed in the main body of the paper and illustrated in figures presented in appendix B.

Two main observations are the consistent top rank position of London's APS connectivity in all years and the rise of Eastern European cities' connectivity.

Table 1 shows that London remains Europe's top-ranking APS centre followed by Paris, Milan and Madrid. This group of four cities leads consistently in each year. Other consistently high performers are Brussels, Munich and Amsterdam, although Amsterdam loses some connectivity by the year 2008. By comparison, Frankfurt shows a significant decline in ranking position and connectivity over time, rank 14 in 2000, 12 in 2004 and 29 in 2008. In contrast to Frankfurt's diminishing importance within the ECN, Athens increased its rank position from 55 in 2000 and 45 in 2004, to 37 in 2008, just before the impact of the current financial crisis.

ECN 'Mappa Mundi' maps based on time series, standardized, data (see further explanation of this term and the method used in Vinciguerra *et al.*, 2010) depicted in figures 3, 4 and 5,

show the changing territorial position of European *countries* through a city-centred lens. Note however that countries with emerging APS connectivity will appear peripheral in 2008 because only cities having connectivity in all three censuses are included in the standardized database used in this comparative analysis. This will apply particularly to East European countries with cities undergoing political economy changes that have paved the way for connectivity increases which have become significant by the year 2008.

Focusing first on the North West European and Southern/Mediterranean regions, in both 2000 and 2008, Germany can be seen to have a central position in the ECN. Whereas the UK is relatively central in 2000 and in 2004, its position is less central than that of Germany by 2008. All other countries are on the periphery of the network in 2000, but by 2004, France and Italy join Germany and the UK in a group of countries that have a semi-peripheral network position; Italy is replaced by Switzerland in this grouping by 2008.

Turning to consider the connectivity position of the East European region, which we expect to be under-represented in the Mappa Mundi exercise, table 1 (appendix B) reveals that, in spite of the region's peripheral position in the ECN between 2000 and 2008, a number of cities are increasing the connectivity position of their countries. Warsaw increased its ranking from 37<sup>th</sup> (134) in 2000 to 25<sup>th</sup> (186) in 2008. Prague and Budapest have also increased their ranking and their connectivity during this time period. The ranking of Bucharest has increased substantially from 80<sup>th</sup> in 2000 to 53<sup>rd</sup> in 2008. There is clear evidence that the region is changing and there is a general pattern of rising connectivity. Sofia has also increased its ranking from 120<sup>th</sup> in 2000 to 77<sup>th</sup> in 2008. Given the comparative database will under-record overall changes for the region, the developments noted in Eastern Europe are significant.

Figure 6 (in appendix A) shows a different visualization of the territorial geography associated with ECN connectivity for the year 2008, again using the standardized data. Here we show the connectivity that cities confer on European regions. Figure 6 shows 'four Europes' which have differing interrelationships in APS cross-border networks. Ex-Communist Eastern Europe is strongly connected to North West Europe by its cities that are nodes in APS networks, North West Europe is also strongly interconnected with Southern/Mediterranean Europe however Northern Europe proves less well connected in the ECN than all other European regions (followed by Southern/Mediterranean Europe) although its strongest connections are again with North West Europe. Figure 7 shows the position in 2008 according to the non-standardized data in order to include the connectivity of cities which are not represented in the time-series analyses. This shows the rise of semi-peripheral cities such as Warsaw and Moscow. The 2008 Mappa Mundi treating Europe as a 'state', based on this same non-standardized data (figure 8), shows Europe's centrality in the WCN compared with the US, and also the centralizing dynamic of China, followed by India.

### **APS connectivity – Europe's place in the world**

Considering the European territory in a world perspective, the data in table 1 (appendix B) show that 61 out of 95 cities in Europe have increased their WCN connectivity between 2000 and 2008. The APS WCN Mappa Mundi shown in Figs 9, 10 and 11, in which cities are grouped by countries, shows how the US has centralized in the WCN during this time period. China can be seen to have moved towards a central position from the year 2004 however, as discussed with reference to Eastern European countries in the ECN, the rising position of China is underplayed in this analysis because Chinese cities which have only connected to the WCN recently are not included in the standardized data set. Significantly, by 2008, the UK has apparently moved into a peripheral position in the WCN in spite of the top world connectivity rank of London.

Table 3 sheds light on the dynamics of the connectivity changes of specific cities by 'rank jump' and by 'connectivity jump' in the WCN respectively. Cities can gain connectivity while decreasing their rank order position. Connectivity jump analysis makes it possible to see how individual cities are gaining or losing connectivity as globalization proceeds, independent of their changing rank order.

In China, Shanghai and Beijing have gained substantial APS connectivity during the eight year time period, ranking 28<sup>th</sup> and 30<sup>th</sup> respectively in 2000, 22<sup>nd</sup> and 20<sup>th</sup> in 2004, and 8<sup>th</sup> and 10<sup>th</sup> in 2008. In general, Asia Pacific cities have dramatically increased their share of the upper rankings. For example, Sydney has increased its rank position from 12<sup>th</sup> in 2000 to 7<sup>th</sup> in 2008 and Seoul's rank has jumped from 32<sup>nd</sup> to 12<sup>th</sup> in this period. In central Asia, Mumbai has increased its connectivity from 23<sup>rd</sup> to 16<sup>th</sup> and in the Middle East, Kuwait's rank position has changed from 123<sup>rd</sup> to 76<sup>th</sup>. Shanghai's connectivity jump has been a remarkable 93, Beijing 89, Moscow 79, Seoul 76 and Rome 57, followed by significant connectivity jumps by Tel Aviv, Mumbai, Kuala Lumpur, Sydney, Warsaw and Hong Kong respectively. In contrast, Los Angeles has experienced the second worst rank decline (25 rank positions) in the world while Abidjan has been the world's worst performer (140 rank positions).

Turning to the world geographical dimension of these developments, whilst the Asian region, especially Pacific Asia, contained many of the world's most upwardly mobile cities by the year 2008, cities in the US have lost rank position and in some cases actual connectivity by 2008 except for New York. Chicago has shifted rank position from 7<sup>th</sup> to 19<sup>th</sup> even though its actual connectivity has been quite stable. However Los Angeles' falling rank from 10<sup>th</sup> to 35<sup>th</sup> has been associated with an actual connectivity loss and San Francisco's fall from rank 17<sup>th</sup> to 44<sup>th</sup> reflects a connectivity reduction from 167 to 141.

In addition to the previous cities discussed, there has been a pattern of large falls in rankings for North American cities in general – Atlanta 36 to 46, Miami 27 to 67, Montreal 48 to 72, Vancouver 66 to 88, Minneapolis 72 to 92, Seattle 65 to 93, Philadelphia 70 to 98. Only 20 out of 48 cities in the North American region of the world have increased their connectivity. Even the WCN connectivity and rankings for Sub Saharan Africa have been more stable than those of North America. In comparison with North America, South America has shown a less consistent pattern of change. For example, Buenos Aires has jumped from rank 22 (connectivity 153) to rank 17 (connectivity 199). Santiago has also increased both its ranking and its connectivity but in spite of having a connectivity gain, Sao Paulo has lost out in terms of its rank position.

The Mappa Mundi presented in figure 8 has been created using non-standardized data for the year 2008 in order to check the position of the European territory against this backdrop of world change by grouping together the countries of constituent Member States. Figure 8 illustrates that Europe has a very central position in the 2008 WCN, which surpasses that of the US, when depicted according to present territorial policy cooperation. Its position is enhanced in this analysis by the inclusion of more East European cities than in the standardized data used to examine change dynamics. It should be noted from figure 8 that India and China were moving towards the centre of the WCN in 2008 also.

Overall, the picture described in APS connectivity analysis is one of increasing connectivity of most WCN cities. In the order of 60% of cities (171 out of 285 cities) increased their connectivity between 2000 and 2008. However some other cities have fared badly for reasons which cannot be explained on the basis of quantitative data and analyses alone.

### **Connectivity conferred on the WCN by different APS sectors**

Next we delve deeper into the structures of the WCN to gain an understanding of the specific APS sectors – financial and business services: law, accountancy, advertising and management

consultancy that are interlinking the European territory to the WCN space of flows. At a WCN scale, London, New York, Hong Kong and Paris show stability across the census periods. Tokyo's connectivity declines a little but not for financial services. This general stability of established APS centres is counterbalanced by a global shift to the Pacific Asia region with strongly increased connectivity of Shanghai, Beijing, Seoul and Sydney in terms of rank order and connectivity for 2008.

First we examine the rankings and connectivity over time of cities in the five sectors (see tables 4 to 13). Decreasing and/or increasing rankings are not always represented by the same downward and/or upward dynamic in connectivity levels, for example, an increase in connectivity could be associated with a decrease in ranking, and vice versa, dependant upon the relative network dynamics involving other cities. Second, we consider the top city dyad relations for all APS and for each sector in the three censuses (tables 14 to 19).

*Accountancy:* For the accountancy sector, London and New York were always the two most highly connected cities in the WCN for each census period. Paris had third position in 2000 but decreased to 7<sup>th</sup> rank position in 2008. Hong Kong was third in 2008 having had a connectivity jump of 26.16 and a rank jump of seven positions (see table 5). These four cities were consistently the world's most important cities in terms of their accountancy network connections with other cities worldwide. In all, a total of 173 cities increased their connectivity in world-wide accountancy networks. Cities across Eastern Europe represented in the time-series data, have been important locations for increased connectivity in this sector. Warsaw has been the leading city, followed by Bucharest, which had a very large WCN rank jump from 147<sup>th</sup> in 2000 to 47<sup>th</sup> in 2008. Together with Prague and Budapest, these are the leading four accountancy cities of the region. Sofia, Ljubljana and Krakow all experienced large connectivity and rank jumps, moving up in the order of 100 rank jump positions. Cities in emerging world regions also show major accountancy network connectivity jumps. Beijing, Tel Aviv, Shanghai, Seoul and Kuwait have top connectivity and rank jumps.

*Advertising:* In the advertising sector, New York, London, Paris, Hong Kong, Tokyo and Singapore are the most highly connected WCN advertising cities for all three years 2000, 2004 and 2008 (see table 6) however 176 cities in the world increased their connectivity in this sector. As in the case of accountancy, cities in emerging economies showed the strongest connectivity increases. Moscow had the biggest connectivity and rank jumps of any city in the WCN (rank 53 in 2000 to 7 in 2008, table 7). Shanghai jumped from rank 41 in 2000 to 8<sup>th</sup> in 2008. Bangkok in the emerging world and Stockholm in Northern Europe also outperformed other cities. Eastern Europe however proved less well connected in world advertising networks with Warsaw ranking 9<sup>th</sup> in 2008 but followed next by Budapest at rank 23.

*Management consultancy:* 169 cities across the world increased their connectivity in management consultancy networks. New York, London and Paris are consistent top connected cities in the WCN in the three census periods and in this sector (table 8) Chicago has also performed well (rank jump 9 in 2000 to 4 in 2008, see table 9). Again the Asian region shows increasing strength; the largest connectivity jumps were Mumbai (rank 56 in 2000 to 11 in 2008), Shanghai (rank 64 to 22). Hong Kong and Singapore also had important jumps. Some Chinese cities had low or zero connectivity in management consultancy in 2000 but have experienced very large rank jumps to 2008. East European cities have also had connectivity and rank jumps (Budapest rank 32 and Warsaw rank 35) however they are outperformed by Chinese cities.

*Law:* In contrast to other sectors, the connectivity of cities in law networks has been relatively stable. Top WCN rankings in this sector were New York and London (table 10). Paris increased its rank from 7<sup>th</sup> in 2000 to 3<sup>rd</sup> in 2008, whereas the rank of Frankfurt dropped from 3<sup>rd</sup> in 2000 to 4<sup>th</sup> in 2004 and the ranking of Brussels (6) did not change across the census dates. In the US, Washington similarly ranked 5<sup>th</sup> in 2000 and 2008. Across the world, law

generated less significant rank jumps than the other sectors studied – only 62 cities increased their connectivity and many cities lost connectivity. The biggest rank changes were again in emerging regions where Shanghai jumped from rank 29 in 2000 to 11 in 2008 (table 11) and Dubai jumped from 80 in 2000 to 35 in 2008. In general however, law networks appear to have been more closed than services in other sectors in recent globalization.

*Financial services:* Banking/financial networks are of special significance in considering territorial relations and distinctions in the European and world regions due to their interdependencies with real estate investment flows and crisis, studied in working paper 3. As for the other service sectors, not all of the 285 cities studied are connected to financial services networks; individual cities are involved in different networks to different degrees. Only 82 cities increased their connectivity in this sector by the year 2008, showing that much of the WCN connectivity which is increasing in APS overall, is contributed to by other sectors.

Similar to other sectors, London and New York have kept their predominance in financial services (table 12) through the years also; these cities are followed consistently over time by other major world cities Tokyo, Hong Kong, Singapore and Paris, confirming their dominance in global financial services. In China, as for APS, Shanghai and Beijing have gained significant financial services connectivity, Shanghai's connectivity has increased from 25.78 in 2004 to 34.03 in 2008. This is reflected in the ranking of Shanghai which has changed from 18<sup>th</sup> in 2000, to 10<sup>th</sup> in 2004 and 8<sup>th</sup> in 2008 (table 13). Furthermore, Beijing's rank position has also changed considerably, going from 24<sup>th</sup> in the year 2000 to 12<sup>th</sup> in 2008. Increasing rankings in financial services make this APS sector a key driver increasing the world city network connectivities and rank positions of these Chinese cities.

Elsewhere in the world, Moscow has had the highest financial services connectivity increase world-wide, increasing from 17.79 in 2000 to 27.29 in 2008, followed by Seoul (22.62 in 2000 to 30.93 in 2008) and Dusseldorf (1.72 to 8.96). At the same time, cities experiencing decreases were Durban (from 21.22 to 1.18), San Francisco (from 27.31 to 18.12) and, in Europe, Hamburg (from 17.50 to 7.02). Luxembourg stands out as an example of a city having a dominance of financial services; its consistent rankings of below 50 in other sectors are contradicted by a higher connectivity position these services (28 in 2000, 21 in 2004, and down to 36 in 2008). Evidently financial services are a very strong component of Luxembourg connectivities in the world compared to the other APS sectors studied in this analysis.

Figures 12, 13 and 14 present the financial services standardized data in Mappa Mundi analyses in order to show how network connectivity in this sector has been connecting countries to the WCN in the three census periods. They show that the US was more central in the WCN in 2000 for this sector than for APS as a whole (see figure 9). The UK and Italy were more central than Germany in 2000 unlike the relative Mappa Mundi position for Germany for all APS (see figure 9). The US has retained this strong position in 2004 and 2008 and significantly China became more central in financial services than the UK by 2008 (figure 14).

### **Europe's position in the world – City dyad analysis**

In order to look more closely at the ways in which the different service sectors have been interconnecting European cities in the WCN at the time of the three census periods, we also use a sector-based dyad analysis to shed light on their emergent network interrelations. Tables 14 and 15, show that the top dyad in the WCN for all APS and for financial services from 2000 to 2008 has consistently been London-New York. Due to the importance of this dyad,



we consider London's other top sectoral dyad relations over time in order to see how these have been positioning Europe in the WCN.

Looking at the change in dyad values over time, it can be observed that in general all values have increased (tables 14 to 19). Although the London-New York dyad is the maximum value for each year of analysis, relative to this, many dyad values have increased over time, especially dyads involving European cities. The top dyad values involving European cities (table 20), reveal an overall increase in value but some differences between sectors. Whereas financial services show a slight increase in dyad values, accountancy and advertising services show an important increase. In contrast, law can be considered stable over time and management consultancy has decreased its dyad values.

The Paris-London dyad dominates in most sectors in 2008, but this has not always been the case. In previous years, London-Amsterdam dominated for the advertising sector in 2000 and 2004, and the London-Frankfurt dyad was strongest in legal services in 2000 and 2004. In general however, considering all APS sectors, the combination of top dyads within Europe has not changed much over time. London was connecting to Paris, Frankfurt, Milan, Brussels, Madrid, Amsterdam and Zurich in the year 2000 and Paris was similarly connecting with Milan, Frankfurt and Madrid. In the following years the connections between London and Munich, Warsaw and Budapest increased their importance by 2004 but decreased again in 2008. Nevertheless, this group of cities is present in all the top European dyads, connecting either to London or to Paris, with some exceptions, meaning that London and Paris have a very central position among all European cities in all APS sector networks analyzed.

For *financial services* dyads, there are slight differences with other APS sectors, except for the presence of a strong Dublin-London dyad in all three years.

In *accountancy*, the Vienna-London dyad has increased its value over time but still ranks in a high position changing from 2<sup>nd</sup> in 2000 to 4<sup>th</sup> in 2008. Below that, in 2000, cities like Copenhagen, Stockholm, Oslo and Barcelona connecting to London with high dyad values have been overtaken by Rome and Lisbon in 2008 as they have gained higher connectivities to London in this sector.

In *advertising*, Lisbon, Copenhagen and Vienna are connecting to London and joining the top 10 dyads connections in 2000.

In *law*, the first dyad that does not include London or Paris is the Frankfurt-Brussels dyad which has consistently been present amongst the top 10 law dyads over the years, reflecting the connectivity falls of some European cities in law networks (table 20).

Turning to the non-standardized data for financial services alone, Mappa Mundi network visualizations treating the EU as a state (figure 15), and on a country basis within Europe (figure 16), show the territorial geographies of the world and of Europe.

The US, led by New York, is shown to be central in financial services networks in 2008, followed by South Korea, due to the connectivity of Seoul alone. China is also shown to be centralizing in financial services networks, overtaking Japan. This country map shows that the UK has a peripheral position because the US gains strength from its scale of urbanization. This suggests that China could eventually overtake the US due to its dynamic urbanization strategy. The non-standardized 2008 data for financial services in the ECN show Germany to have the most central network position in Europe due to the high total connectivity of the group of cities within its territorial country boundary.

Table 2, also shows a comparison between APS and financial services connectivity for the non-standardized data in 2008. London, New York and Hong Kong are the top three centres for all APS but Hong Kong is stronger for financial services than for all APS. Paris had similar connectivity for all APS and for financial services but is ranked 4 and 6 respectively. Shanghai is rank 9 / connectivity 68.51 for APS and rank 7 / 76.86 for financial services.

Beijing ranks 12 for financial services. Seoul is 13 for APS and 9 for financial services. Taipei is 28 for APS and 13 for financial services. Frankfurt is 32 for APS and 16 for financial services. Warsaw is 20 for APS but only 28 for financial services though its respective connectivity levels are not very different. No other Eastern European cities are present in top financial services rankings though Budapest is APS 36 and 49 for financial services. Europe is thus less well connected for financial services than for APS.

### European globalization strategies

Allowing for territorial borders in network analysis shows the significance of state and EU policy for cities and the importance of city network connectivity for states and the European territory. The final analysis can inform strategic European policy by examining the strategies of 160 advanced producer services firms with offices located in European cities; 15 firms from the original 175 firms have dropped out because none of them had offices located in European countries. Cities with a GNC score of 0.2 and above have been selected, resulting in a population of 117 cities in total. The analysis illustrates the way in which the practices of global firms are impacting on the European space.

A principal components analysis has been run on a service values matrix comprising the 117 cities. A standard Varimax rotation was applied and the output scores have allowed analysis of city relational outcomes generated by the 160 firms. For six factors, output scores can be interpreted as representing the strategies of the global firms using cities in the European territory (table 24):

*Factor 1* – ‘‘Outer’ European Capitals Strategy’ (note London is low and not Paris)

*Factor 2* – ‘‘Primate’ Strategy’ (London) – i.e. firms just focusing on London for European work

*Factor 3* – ‘Major Western Europe Cities Strategy’ (but not Paris, London and Brussels)

*Factor 4* – ‘German Strategy’

*Factor 5* – ‘British Strategy’

*Factor 6* – ‘Dual Strategy’ (Paris-Brussels Axis)

Figures 17 to 22 show the relationships between European cities in each of the six strategies, with cities positioned in their approximate geographical locations. These ‘maps’ highlight the importance of each city in every group. The scores for each of the factors represent the strategies that are inter-connecting European cities which are generally invisible in conventional statistical studies informing policy debate. Negative scores are also informative because they reveal where global firms have a weak presence in Europe.

Positive score values (red cities in the figures) indicate where each strategy is strong whereas negative values (blue cities) indicate where these strategies are weak; grey cities are those which are not important for the group strategy. The size of the cities is proportional to their score values however in the case of negative values (blue cities), absolute values were applied in order to allow these cities to be visible. City labels are only shown for cities which are part of a group.

Notably, factor 1 is an ‘outer’ European capitals strategy, showing that nodal connectivity generated by global firms is leading to significant interrelations between Europe’s ‘less primate’ cities. Digging deeper into the database, the importance of *non-financial* services firms (79% of firms involved in the outer Europe strategy, mainly accountancy and advertising) in generating ECN connectivity is endorsed. In contrast, in the ‘primate’ strategy (factor 2 - London), 51% of firms are financial services. There appears to be no general North-South contrast but there are strategic East-West patterns (shown by the factor 3 strategy), suggesting that fractured territorial relations in the ‘Cold War’ has had a lingering influence on ECN development.

## Conclusion

The results from the APS analyses show that, at the WCN scale, the network positions of London, New York, Hong Kong and Paris have been stable from 2000 to the first half of 2008 just before the financial crisis. However there has been a dramatic re-balancing of WCN connectivity due to the increase in global APS firms and functions in cities in the Pacific Asia region, especially in Shanghai, Beijing, Seoul and Sydney. Furthermore, city APS connectivity is increasing more generally with 60% of cities worldwide becoming better connected to the WCN between 2000 and 2008. These connectivity increases, together with some decreases, are changing the rank order of cities in the WCN quite significantly.

Nevertheless, inter-city links generated by connectivity to APS overall, and to financial services specifically, have remained strongest between London and New York during this period of world change. Inter-linkages between many other city pairs (dyads) have increased over time, reflecting changing connectivity patterns and, significant for European policy, especially between city dyads involving Europe. Within Europe, it is interesting to note that East European cities are present in all the top ECN dyads, connecting either to London or to Paris, both of which have a central position. In spite of Eastern Europe's peripheral position in the ECN in 2000, a number of cities - Warsaw in particular but also Prague and Budapest - have increased the position of their countries by 2008.

Looking at the world through a territorial lens by taking into account nation state boundaries, in spite of the stable top world connectivity rank position of London, the UK (as a state) had moved into a peripheral position in the WCN by 2008 due to the relatively weak connectivity of other UK cities. In contrast, the US has retained its WCN centrality, reflecting the size of its territory and number of APS centres. Nevertheless, most US cities apart from New York, including Chicago, show a pattern of declining WCN rank position and, in some cases, falls in actual connectivity due to overall WCN rebalancing. A global shift in WCN connectivity has been greatly contributed to by Asia Pacific cities whereas, in contrast, Los Angeles in the US, has experienced the second worst WCN rank decline in the world.

If WCN connectivity is represented using a different *non-country* definition and lens which take into account the territorial cohesion and policy remit for the European Union, we see that in contrast to the structural changes occurring in the US, 61 out of 95 cities in Europe have increased their WCN connectivity between 2000 and 2008. This gives Europe, depicted as a geo-political entity, a more central position in the 2008 WCN than the US albeit the movement of China and India towards the centre will continue to be fuelled by rapid large scale urbanization and economic development. Ongoing fluidity of WCN geographies and continued developed/developing world region rebalancing with implications for territorial policy, can therefore be expected.

It will be important for European Union and member state policy responses to take into account the APS sectors that are driving WCN and ECN connectivity changes. In spite of the dominant position of the US (New York) and the UK (London) in financial services networks, Moscow has had the highest connectivity increase in financial services in the world since 2000 and China, now with three major international financial centres (Hong Kong, Shanghai and Beijing), became more central in WCN financial services than the UK by 2008. The European territory as a whole was less well connected in the WCN by financial services in 2008 than by other APS sectors.

Only 82 cities in the WCN increased their financial services connectivity between 2000 and 2008, demonstrating that important APS connectivity increases are generated by other sectors. For example, London and Paris have strong accountancy network connectivity and this is significant for policy given that as many as 173 cities in the world have increased their

connectivity in global accountancy networks. Notably, cities across Eastern Europe, led by Warsaw, Bucharest, Prague and Budapest, have been important locations for increased European accountancy connectivity and city rank jumps. Both accountancy and advertising firms are shown to be generating inter-city connectivity in the APS outer European capitals strategy which has equal significance to the primate (London) strategy.

The geography of the ECN space by 2008 shows 'four Europes' which have differing interrelationships in APS cross-border networks as a consequence of the strategies of global firms. Ex-Communist Eastern Europe and Southern/Mediterranean Europe were strongly interlinked with North West Europe. Northern Europe was least well connected in the ECN although its strongest inter-linkages are similarly also with North West Europe. The East-West strategies of global APS firms indicate the lingering influence of a legacy of political and economic division within the 'new Europe' territory. However there is clear evidence that Europe is changing with rising overall WCN connectivity across the territory, generated in and interlinking its global and globalizing APS centres.

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## APPENDIX A – TABLES

Source: Authors, data supplied by the Globalization & World Cities (GaWC) Research Network: <http://www.lboro.ac.uk/gawc/>

**Table 1.** APS (all sectors) - standardized connectivity indices per year (2000, 2004, 2008)

2000			2004		2008	
rank	city	APS st. connectivity 2000	city	APS st. connectivity 2004	city	APS st. connectivity 2008
1	London	326.82	London	353.72	New York	341.00
2	New York	318.26	New York	344.44	London	333.41
3	Hong Kong	237.36	Hong Kong	257.83	Hong Kong	286.66
4	Tokyo	231.68	Paris	251.93	Paris	268.79
5	Paris	231.33	Tokyo	246.77	Singapore	259.05
6	Singapore	218.69	Singapore	239.55	Tokyo	253.30
7	Chicago	202.29	Brussels	216.93	Sydney	241.50
8	Milan	198.69	Madrid	214.43	Shanghai	235.77
9	Madrid	196.91	Toronto	214.01	Milan	232.53
10	Los Angeles	194.49	Milan	211.06	Beijing	229.68
11	Toronto	190.00	Amsterdam	206.32	Madrid	226.43
12	Sydney	189.84	Frankfurt	200.50	Seoul	215.34
13	Amsterdam	187.22	Sao Paulo	199.87	Moscow	213.48
14	Frankfurt	185.72	Zurich	195.42	Toronto	212.69
15	Brussels	185.39	Chicago	190.13	Brussels	210.19
16	Sao Paulo	179.68	Buenos Aires	189.22	Mumbai	203.58
17	San Francisco	167.86	Los Angeles	188.20	Buenos Aires	199.65
18	Zurich	159.79	Mexico City	185.34	Kuala Lumpur	198.06
19	Jakarta	158.29	Sydney	181.65	Chicago	197.40
20	Taipei	157.33	Beijing	179.42	Zurich	194.01
21	Mexico City	155.01	Jakarta	176.07	Taipei	191.31
22	Buenos Aires	153.99	Shanghai	173.56	Amsterdam	188.58
23	Mumbai	151.28	Mumbai	171.33	Sao Paulo	187.61
24	Melbourne	147.64	Seoul	170.06	Dublin	186.32
25	Kuala Lumpur	145.85	Warsaw	169.42	Warsaw	186.17
26	Bangkok	145.85	Munich	169.00	Mexico City	183.05
27	Miami	144.32	San Francisco	167.69	Bangkok	182.84
28	Shanghai	142.63	Dublin	167.42	Jakarta	180.16
29	Dublin	141.87	Taipei	166.80	Frankfurt	177.74

30	Beijing	140.62
31	Stockholm	139.75
32	Seoul	138.89
33	Prague	137.91
34	Johannesburg	135.99
35	Istanbul	135.25
36	Atlanta	134.87
37	Warsaw	134.71
38	Barcelona	134.38
39	Moscow	134.19
40	Manila	132.19
41	Washington	131.97
42	Lisbon	130.06
43	Budapest	128.92
44	Auckland	128.71
45	Dusseldorf	128.28
46	Vienna	125.00
47	Munich	123.77
48	Montreal	123.00
49	Hamburg	122.49
50	Copenhagen	121.86
51	Berlin	116.74
52	Boston	116.36
53	Bogota	116.35
54	Dallas	114.91
55	Athens	114.84
56	New Delhi	114.47
57	Santiago	113.85
58	Caracas	113.66
59	Rome	112.83
60	Houston	109.63
61	Cairo	109.46
62	Dubai	109.02
63	Luxembourg	107.42
64	Geneva	98.52
65	Seattle	98.20

Budapest	164.97
Santiago	163.73
Kuala Lumpur	162.94
Melbourne	161.07
Moscow	160.35
Stockholm	156.59
Bangkok	156.10
Johannesburg	154.92
Hamburg	154.08
Barcelona	153.84
Istanbul	153.72
Prague	152.99
Berlin	150.76
Vienna	150.47
Lisbon	149.97
Athens	149.78
Miami	147.99
Atlanta	147.01
Dusseldorf	146.46
Montreal	143.59
Luxembourg	141.74
Cairo	141.35
Bogota	140.56
Dubai	139.14
Rome	136.35
Caracas	134.77
Washington	131.92
Auckland	130.90
Dallas	130.50
Vancouver	130.22
New Delhi	127.20
Geneva	126.07
Manila	124.92
Rio de Janeiro	120.70
Houston	118.41
Beirut	116.93

Istanbul	173.00
Rome	170.14
Lisbon	168.39
Stockholm	167.98
Prague	160.11
Los Angeles	157.74
Budapest	156.65
Athens	156.11
Vienna	155.11
Santiago	150.07
Caracas	147.23
Auckland	146.27
Washington	144.03
Melbourne	143.49
San Francisco	141.88
Manila	140.04
Atlanta	140.02
Johannesburg	139.06
Dubai	139.06
Barcelona	130.22
Bogota	128.83
Geneva	126.87
New Delhi	122.36
Bucharest	122.23
Tel Aviv	121.96
Helsinki	119.26
Boston	119.12
Dallas	118.24
Berlin	117.89
Munich	117.41
Luxembourg	117.24
Cairo	116.66
Oslo	116.56
Copenhagen	113.98
Bangalore	113.17
Hamburg	110.54

66	Vancouver	96.22
67	Beirut	95.31
68	Rio de Janeiro	92.26
69	Oslo	92.12
70	Philadelphia	88.41
71	Denver	86.87
72	Minneapolis	84.50
73	Montevideo	83.28
74	Helsinki	82.93
75	Rotterdam	82.84
76	Manama	82.25
77	Stuttgart	82.04
78	Brisbane	80.86
79	Ho Chi Minh City	80.36
80	Bucharest	78.21
81	Wellington	77.72
82	Perth	77.60
83	Panama City	77.58
84	St Louis	77.24
85	Karachi	77.05
86	Cologne	76.83
87	Calcutta	75.33
88	Bangalore	74.67
89	Detroit	74.47
90	Lima	73.00
91	Riyadh	71.99
92	Jeddah	71.91
93	Antwerp	71.29
94	Portland	70.95
95	Guangzhou	70.13
96	Calgary	69.79
97	San Diego	69.72
98	Tel Aviv	69.40
99	Lyon	68.21
100	Nassau	67.49
101	Chennai	67.17

Copenhagen	116.35
Boston	111.66
Tel Aviv	111.51
Montevideo	107.12
Helsinki	106.01
Lima	104.70
Oslo	104.15
Stuttgart	103.06
Seattle	103.05
Bucharest	98.20
Chennai	96.89
Philadelphia	96.57
Bratislava	95.72
Brisbane	94.95
Manchester	90.23
Bangalore	89.41
Abu Dhabi	88.48
Birmingham	88.10
Cape Town	87.85
Calgary	87.52
Karachi	86.73
Nicosia	86.25
Port Louis	85.67
Perth	85.19
San Diego	85.08
Minneapolis	82.66
Guatemala City	82.37
Edinburgh	82.00
Manama	81.83
Denver	80.79
Detroit	79.79
Bristol	79.46
Colombo	79.00
Quito	78.00
Amman	77.67
Rotterdam	76.92

Riyadh	109.99
Miami	109.08
Guangzhou	107.60
Houston	107.21
Lima	104.94
Dusseldorf	102.77
Montreal	101.43
Karachi	100.73
Beirut	97.00
Kiev	96.99
Kuwait	95.15
Sofia	95.15
Montevideo	94.83
Jeddah	93.91
Ho Chi Minh City	92.59
Rio de Janeiro	92.48
Bratislava	92.46
Nicosia	91.08
Manama	89.05
Panama City	88.11
Denver	87.91
Chennai	87.09
Vancouver	86.71
Brisbane	85.10
Stuttgart	84.24
Nairobi	83.61
Minneapolis	82.23
Seattle	81.74
Casablanca	79.74
Shenzhen	77.86
Zagreb	76.13
Quito	74.41
Philadelphia	73.99
San Jose (Costa Rica)	73.92
Cape Town	72.90
Perth	72.20

102	Nairobi	67.06
103	Adelaide	66.58
104	Hamilton	66.50
105	Charlotte	65.29
106	Abu Dhabi	64.70
107	Cape Town	64.57
108	Cleveland	64.35
109	Quito	64.21
110	Manchester	64.14
111	Pittsburgh	63.98
112	Casablanca	63.68
113	Osaka	63.37
114	Kiev	63.18
115	Birmingham	62.25
116	Bratislava	61.97
117	Indianapolis	61.90
118	Port Louis	60.87
119	Kansas City	60.14
120	Sofia	58.94
121	Muscat	58.25
122	Hanoi	58.00
123	Kuwait	57.54
124	Nicosia	57.39
125	Abidjan	57.09
126	Amman	56.59
127	Bilbao	56.58
128	Almaty	56.28
129	Zagreb	56.25
130	Lagos	56.25
131	Harare	54.71
132	Labuan	54.69
133	Baltimore	54.41
134	Guayaquil	53.58
135	Valencia	53.09
136	Colombo	52.96
137	St Petersburg	52.56

Calcutta	76.57
Guangzhou	75.28
Riyadh	75.06
Cologne	74.73
Osaka	73.52
San Salvador	73.45
Adelaide	73.20
San Jose (Costa Rica)	72.93
Casablanca	72.65
Ho Chi Minh City	71.51
Panama City	71.43
Cleveland	71.39
Antwerp	70.88
Jeddah	70.52
Sofia	70.03
Lagos	69.46
Hamilton	69.20
Kiev	69.01
Lyon	68.49
Hanoi	68.31
Portland	67.10
Charlotte	67.07
Zagreb	66.77
Wellington	66.08
Leeds	65.43
Phoenix	63.59
Nassau	63.30
Nairobi	62.74
Pittsburgh	61.32
Labuan	60.95
Guayaquil	59.99
Baltimore	59.08
Cincinnati	58.83
Dresden	58.73
Turin	58.50
Almaty	58.24

Portland	72.14
Guatemala City	71.57
Calcutta	71.35
Santo Domingo	70.45
Manchester	70.00
Detroit	69.97
Wellington	69.82
Antwerp	69.32
Ljubljana	69.05
Rotterdam	69.05
Edinburgh	68.68
Birmingham	67.85
Calgary	67.64
Doha	67.14
Lagos	65.26
Amman	64.98
Almaty	64.40
Columbus	62.67
Riga	62.31
San Diego	62.30
Colombo	61.45
San Salvador	60.47
Tallin	59.44
Port Louis	58.70
St Petersburg	58.58
Guadalajara	57.61
Tegucigalpa	57.53
Hanoi	57.48
Cleveland	57.13
Glasgow	56.86
Adelaide	56.76
Islamabad	56.26
Tampa	56.09
Guayaquil	56.08
Dhaka	55.59
Hyderabad (India)	55.24



138	Monterrey	52.54
139	Asuncion	52.19
140	Phoenix	51.74
141	Bristol	50.90
142	Cincinnati	50.78
143	Marseille	50.58
144	Glasgow	50.52
145	Edinburgh	49.86
146	Tampa	49.79
147	Lusaka	49.65
148	Accra	49.38
149	San Jose (Costa Rica)	49.26
150	Strasbourg	49.26
151	Leeds	48.88
152	Dhaka	48.55
153	Lahore	48.12
154	Rochester	48.08
155	Guatemala City	47.98
156	San Salvador	47.49
157	Tunis	47.47
158	Palo Alto	47.28
159	Islamabad	47.06
160	Buffalo	46.53
161	Santo Domingo	46.26
162	San Jose (CA)	45.50
163	Dresden	45.40
164	Windhoek	45.26
165	Columbus	45.13
166	Riga	45.05
167	Hartford	44.60
168	Kampala	44.29
169	Leipzig	44.16
170	Porto Alegre	43.60
171	Belo Horizonte	43.59
172	Kingston (Jamaica)	42.08
173	Bordeaux	41.76

Belgrade	57.57
Tunis	56.81
St Louis	56.59
Glasgow	56.49
Kuwait	55.99
Southampton	55.89
Bordeaux	55.65
Seville	55.39
Belfast	55.35
Doha	55.22
Indianapolis	55.11
Tallin	55.10
Lille	54.19
Marseille	53.87
Santo Domingo	53.14
Tampa	52.03
Leipzig	51.61
Malmo	51.56
St Petersburg	51.47
Durban	51.25
Buffalo	51.21
Honolulu	50.78
Basel	50.72
Guadalajara	50.65
Valencia	50.22
Christchurch	49.55
Porto Alegre	49.43
Brazilia	49.23
Suva	49.18
Dhaka	49.08
Harare	49.08
Riga	49.02
Liverpool	48.91
Hyderabad (India)	48.83
Cardiff	48.61
Vilnius	48.41

Vilnius	55.02
Phoenix	54.50
Lahore	54.04
Kansas City	53.31
Leeds	52.91
Monterrey	52.74
Pittsburgh	52.15
Osaka	51.68
Charlotte	51.54
Bristol	50.67
Cologne	50.48
Tunis	50.37
Lyon	49.55
Indianapolis	47.72
Asuncion	47.46
La Paz	47.19
Belgrade	47.18
St Louis	46.96
Accra	46.19
Georgetown (Cayman)	45.88
Nassau	45.80
Bologna	45.62
Baltimore	45.57
Hartford	45.49
Sacramento	45.34
Canberra	44.44
Las Vegas	44.14
San Jose (CA)	43.27
Basel	43.24
Managua	42.37
Richmond	42.30
Ottawa	41.93
Hamilton	41.59
Lausanne	40.11
Omaha	40.11
Macao	39.64

174	Richmond	41.56
175	Turin	41.29
176	Lille	40.46
177	Doha	40.41
178	Edmonton	40.37
179	Tehran	39.99
180	La Paz	39.67
181	Ottawa	38.89
182	Durban	38.85
183	Gothenburg	38.80
184	Dar es Salaam	38.36
185	Honolulu	38.29
186	Guadalajara	38.27
187	Shenzhen	38.21
188	Winnipeg	38.07
189	Curitiba	37.95
190	Nuremberg	37.81
191	Belfast	37.74
192	Ljubljana	37.63
193	Tallin	37.58
194	Nottingham	37.53
195	Vilnius	37.27
196	Christchurch	37.20
197	Las Vegas	36.48
198	Basel	36.33
199	Utrecht	36.09
200	Seville	35.73
201	Maputu	35.72
202	Dakar	35.42
203	Tegucigalpa	35.24
204	Hannover	33.99
205	Newcastle	33.33
206	Hobart	33.33
207	Bandar Seri Begawan	33.00
208	Sacramento	32.94
209	Liverpool	32.38

Sacramento	48.22
Gaborone	48.19
Dar es Salaam	48.17
Newcastle	47.79
Lahore	47.43
Muscat	47.30
La Paz	47.10
Strasbourg	46.99
Accra	46.96
Canberra	46.15
Dakar	46.07
Ljubljana	46.04
Edmonton	45.86
San Jose (CA)	45.71
Curitiba	45.64
Hannover	45.20
Kingston (Jamaica)	45.10
Kansas City	45.04
Windhoek	44.89
Macao	44.28
Genoa	44.07
Rochester	44.03
Bologna	44.03
Lausanne	43.94
Lusaka	43.65
New Orleans	43.36
Abidjan	42.74
Managua	42.49
Las Vegas	42.48
Richmond	42.08
Asuncion	41.98
Naples	41.88
Shenzhen	41.74
Kampala	41.70
Tianjin	41.50
Tehran	41.38

Belfast	39.55
Honolulu	38.77
Tianjin	38.76
Labuan	38.72
Newcastle	38.70
Christchurch	37.35
Krakow	37.24
Aberdeen	37.03
Dar es Salaam	36.91
Lusaka	36.78
Medellin	36.40
Liverpool	35.59
Valencia	35.38
Tashkent	34.74
Nagoya	34.31
Harare	34.11
Porto Alegre	34.02
Leipzig	33.69
Curitiba	33.57
Cincinnati	33.40
Southampton	33.32
Marseille	33.23
Muscat	32.99
Reykjavik	32.98
Durban	32.87
Seville	32.68
Abu Dhabi	32.66
Jerusalem	32.57
Nanjing	32.54
Gaborone	32.51
Rochester	32.34
Baku	32.30
Kingston (Jamaica)	32.20
Dalian	32.16
Dresden	31.79
Winnipeg	31.71

210	Malmö	32.32
211	Dalian	32.30
212	Baku	32.12
213	Lausanne	32.00
214	Nagoya	31.68
215	Southampton	31.66
216	Aberdeen	31.57
217	New Orleans	31.53
218	Essen	31.18
219	Medellin	31.08
220	Bern	30.71
221	Tashkent	30.27
222	Luanda	30.13
223	Bologna	30.09
224	Douala	29.65
225	Yokohama	29.56
226	Port of Spain	29.43
227	Canberra	28.94
228	Salvador	28.84
229	Omaha	28.77
230	The Hague	28.55
231	Gaborone	28.43
232	Hyderabad (India)	27.45
233	Tianjin	27.21
234	Brazilia	26.98
235	Managua	26.89
236	Quebec	26.02
237	Norwich	26.01
238	Yangon	25.97
239	Naples	25.87
240	Penang	24.86
241	Belgrade	24.63
242	Sheffield	23.54
243	Macao	23.32
244	Tijuana	23.29
245	Pretoria	22.97

Bilbao	41.15
Nottingham	40.99
Ottawa	40.37
Aberdeen	39.99
Douala	39.53
Norwich	39.36
Tijuana	39.06
Yokohama	38.52
Utrecht	38.30
Nagoya	38.23
Hartford	37.90
Tashkent	37.53
Gothenburg	37.25
Georgetown (Cayman)	36.91
Bandung	36.37
Tegucigalpa	35.86
Luanda	34.98
Medellin	34.38
Belo Horizonte	34.24
Sanaa	34.03
Kyoto	33.83
Reykjavik	33.74
Bergen	33.70
Islamabad	33.59
Pretoria	32.62
Kobe	32.00
Krakow	31.86
Algiers	31.74
Omaha	31.69
Baku	31.67
Palo Alto	31.42
Damascus	31.36
Sheffield	31.33
Monterrey	30.85
Sarajevo	30.58
Columbus	30.34

Algiers	31.51
Utrecht	30.85
Cardiff	30.27
Strasbourg	30.02
Genoa	30.00
Ankara	30.00
Edmonton	29.74
Kyoto	29.73
Turin	29.58
Penang	29.30
Nottingham	29.28
Dakar	28.90
Quebec	28.74
Essen	27.52
Bilbao	27.45
New Orleans	27.07
Buffalo	26.78
Tijuana	26.56
Norwich	26.48
Kampala	26.41
Hannover	26.35
Tbilisi	26.33
Bordeaux	26.32
Nuremberg	26.26
Arhus	25.98
Lille	25.84
Port of Spain	25.54
Sarajevo	24.77
Minsk	24.35
Belo Horizonte	24.33
Tehran	24.22
Sheffield	24.19
Ahmadabad	23.90
Bergen	22.17
Gothenburg	21.87
Recife	21.86

246	Dortmund	22.70
247	Genoa	22.65
248	Kyoto	22.49
249	Bergen	22.09
250	Bandung	22.07
251	Reykjavik	21.74
252	Kobe	20.87
253	Ahmadabad	20.20
254	Addis Ababa	20.04
255	Port Moresby	19.88
256	Cardiff	19.88
257	Plymouth	19.38
258	Pusan	19.23
259	Suva	18.72
260	Arhus	18.44
261	Recife	18.16
262	Damascus	17.88
263	Bulawayo	17.88
264	Georgetown (Cayman)	17.83
265	Algiers	17.53
266	Kinshasa	17.00
267	Ciudad Juarez	16.99
268	Palermo	15.42
269	Mombasa	15.20
270	Alexandria	15.08
271	Medan	14.51
272	Ankara	14.43
273	Tirana	13.76
274	Xiamen	13.31
275	Sanaa	13.18
276	Linz	12.73
277	Minsk	12.40
278	Trieste	12.26
279	Nanjing	11.96
280	Sarajevo	11.77
281	Jerusalem	10.88

Nuremberg	29.79
Salvador	29.77
Maputu	29.76
Quebec	29.69
Port of Spain	29.20
Essen	28.64
Ankara	27.77
Penang	27.67
Liege	25.54
Medan	25.08
Bern	24.98
Linz	24.41
Jerusalem	24.36
Alexandria	24.16
Kinshasa	23.68
Malacca	22.10
Dalian	21.80
Mombasa	21.52
Arhus	21.51
Plymouth	19.95
Pusan	19.24
Winnipeg	19.03
Dortmund	18.84
Ahmadabad	18.68
The Hague	18.34
Palermo	18.07
Trieste	17.42
Tirana	17.02
Xiamen	16.72
Tbilisi	16.23
Ciudad Juarez	16.08
Minsk	15.66
Hobart	14.73
Bulawayo	12.08
Yangon	11.64
Bandar Seri Begawan	10.94

Douala	21.19
Maputu	21.01
Liege	20.75
Ciudad Juarez	20.55
Xiamen	20.46
Mombasa	20.40
Palo Alto	20.30
Dortmund	19.74
Pretoria	19.26
Windhoek	18.79
The Hague	18.48
Tirana	18.18
Yokohama	17.78
Bern	17.50
Salvador	17.42
Linz	17.26
Bandar Seri Begawan	17.02
Hobart	16.86
Kobe	16.62
Abidjan	16.53
Malmo	16.10
Alexandria	15.95
Plymouth	15.84
Trieste	15.46
Pusan	15.37
Brazilia	13.91
Palermo	13.86
Naples	13.69
Kinshasa	13.50
Port Moresby	12.64
Luanda	12.09
Sanaa	12.06
Damascus	11.98
Medan	10.76
Addis Ababa	10.32
Bulawayo	9.28

282	Liege	10.37	Recife	9.95	Bandung	9.12
283	Tbilisi	10.23	Addis Ababa	7.10	Suva	8.99
284	Malacca	10.04	Nanjing	6.92	Yangon	6.73
285	Krakow	8.82	Port Moresby	5.83	Malacca	1.89

**Table 2.** APS and FS - connectivity indices 2008 (non-standardized data)

**APS**

Rank	city	country	GNC
1	London	United Kingdom	100.00
2	New York	U.S.	99.55
3	Hong Kong	China	83.45
4	Paris	France	78.24
5	Singapore	Singapore	75.41
6	Tokyo	Japan	73.52
7	Sydney	Australia	70.91
8	Milan	Italy	68.55
9	Shanghai	China	68.51
10	Beijing	China	68.50
11	Madrid	Spain	65.03
12	Moscow	Russia	63.77
13	Seoul	Korea	62.95
14	Toronto	Canada	62.80
15	Brussels	Belgium	62.59
16	Buenos Aires	Argentina	60.34
17	Mumbai	India	60.15
18	Kuala Lumpur	Malaysia	59.75
19	Chicago	U.S.	57.47

**FS**

Rank	city	country	FSNCs
1	London	United Kingdom	100.00
2	New York	U.S.	96.38
3	Hong Kong	China	92.62
4	Tokyo	Japan	82.24
5	Singapore	Singapore	82.06
6	Paris	France	79.01
7	Shanghai	China	76.86
8	Sydney	Australia	76.80
9	Seoul	Korea	70.21
10	Madrid	Spain	70.09
11	Milan	Italy	69.74
12	Beijing	China	69.21
13	Taipei	China	64.47
14	Toronto	Canada	63.91
15	Moscow	Russia	61.22
16	Frankfurt	Germany	60.63
17	Zurich	Switzerland	59.91
18	Mumbai	India	59.16
19	Brussels	Belgium	56.95

20	Warsaw	Poland	55.97
21	Sao Paulo	Brazil	55.39
22	Zurich	Switzerland	55.26
23	Amsterdam	Netherlands	55.16
24	Mexico City	Mexico	54.95
25	Jakarta	Indonesia	54.69
26	Dublin	Ireland	54.08
27	Bangkok	Thailand	53.99
28	Taipei	China	53.80
29	Istanbul	Turkey	52.64
30	Rome	Italy	52.57
31	Lisbon	Portugal	51.76
32	Frankfurt	Germany	50.03
33	Stockholm	Sweden	49.25
34	Prague	Czeck Republic	48.62
35	Vienna	Austria	48.38
36	Budapest	Hungary	48.22
37	Athens	Greece	47.85
38	Caracas	Venezuela	46.81
39	Los Angeles	U.S.	46.37
40	Auckland	New Zealand	46.31
41	Santiago	Chile	45.89
42	Washington	U.S.	44.49
43	Melbourne	Australia	43.58
44	Johannesburg	South Africa	43.15
45	Atlanta	U.S.	42.74
46	Barcelona	Spain	42.45
47	San Francisco	U.S.	42.31
48	Manila	Philippines	41.84

20	Kuala Lumpur	Malaysia	56.76
21	Chicago	U.S.	55.74
22	Amsterdam	Netherlands	55.63
23	Dublin	Ireland	55.57
24	Jakarta	Indonesia	54.47
25	Sao Paulo	Brazil	54.37
26	Bangkok	Thailand	54.19
27	Buenos Aires	Argentina	51.24
28	Warsaw	Poland	49.57
29	Los Angeles	U.S.	48.97
30	Istanbul	Turkey	48.80
31	Mexico City	Mexico	46.18
32	Stockholm	Sweden	44.35
33	Dubai	UAE	44.33
34	Manila	Philippines	42.92
35	Geneva	Switzerland	42.80
36	San Francisco	U.S.	41.55
37	Luxembourg	Luxembourg	41.36
38	Prague	Czeck Republic	39.79
39	Athens	Greece	39.48
40	Lisbon	Portugal	38.52
41	Guangzhou	China	37.89
42	Melbourne	Australia	37.58
43	Santiago	Chile	37.11
44	Rome	Italy	35.13
45	Washington	U.S.	34.71
46	Johannesburg	South Africa	34.32
47	Atlanta	U.S.	33.74
48	Caracas	Venezuela	33.49

49	Bogota	Colombia	41.67	49	Budapest	Hungary	33.25
50	Tel Aviv	Israel	41.18	50	Boston	U.S.	33.24

**Table 3. APS - Connectivity and rank changes over the years 2000, 2004 and 2008 (grouped by world regions)**

world regions	city	rank 2000	connectivity 2000	rank 2004	connectivity 2004	rank 2008	connectivity 2008	conn jump	rank jump
Europe	Aberdeen	216	31.57	213	39.99	181	37.03	5.46	35
Europe	Amsterdam	13	187.22	11	206.32	22	188.58	1.36	-9
Europe	Antwerp	93	71.29	114	70.88	109	69.32	-1.96	-16
Europe	Arhus	260	18.44	264	21.51	234	25.98	7.54	26
Europe	Athens	55	114.84	45	149.78	37	156.11	41.26	18
Europe	Barcelona	38	134.38	39	153.84	49	130.22	-4.16	-11
Europe	Basel	198	36.33	160	50.72	166	43.24	6.91	32
Europe	Belfast	191	37.74	146	55.35	174	39.55	1.80	17
Europe	Belgrade	241	24.63	138	57.57	154	47.18	22.55	87
Europe	Bergen	249	22.09	232	33.70	243	22.17	0.08	6
Europe	Berlin	51	116.74	42	150.76	58	117.89	1.14	-7
Europe	Bern	220	30.71	256	24.98	259	17.50	-13.21	-39
Europe	Bilbao	127	56.58	210	41.15	224	27.45	-29.13	-97
Europe	Bologna	223	30.09	196	44.03	159	45.62	15.54	64
Europe	Bordeaux	173	41.76	144	55.65	232	26.32	-15.44	-59
Europe	Bratislava	116	61.97	78	95.72	82	92.46	30.49	34
Europe	Bristol	141	50.90	97	79.46	147	50.67	-0.23	-6
Europe	Brussels	15	185.39	7	216.93	15	210.19	24.81	0
Europe	Bucharest	80	78.21	75	98.20	53	122.23	44.02	27
Europe	Budapest	43	128.92	30	164.97	36	156.65	27.74	7

Europe	Cardiff	256	19.88	172	48.61	212	30.27	10.40	44
Europe	Cologne	86	76.83	105	74.73	148	50.48	-26.36	-62
Europe	Copenhagen	50	121.86	66	116.35	63	113.98	-7.88	-13
Europe	Dortmund	246	22.70	268	18.84	253	19.74	-2.96	-7
Europe	Dresden	163	45.40	135	58.73	208	31.79	-13.61	-45
Europe	Dublin	29	141.87	28	167.42	24	186.32	44.46	5
Europe	Dusseldorf	45	128.28	48	146.46	71	102.77	-25.51	-26
Europe	Edinburgh	145	49.86	93	82.00	112	68.68	18.82	33
Europe	Essen	218	31.18	251	28.64	223	27.52	-3.66	-5
Europe	Frankfurt	14	185.72	12	200.50	29	177.74	-7.98	-15
Europe	Geneva	64	98.52	61	126.07	51	126.87	28.35	13
Europe	Genoa	247	22.65	194	44.07	214	30.00	7.35	33
Europe	Glasgow	144	50.52	141	56.49	131	56.86	6.34	13
Europe	Gothenburg	183	38.80	222	37.25	244	21.87	-16.93	-61
Europe	Hamburg	49	122.49	38	154.08	65	110.54	-11.95	-16
Europe	Hannover	204	33.99	189	45.20	230	26.35	-7.64	-26
Europe	Helsinki	74	82.93	70	106.01	55	119.26	36.33	19
Europe	Krakow	285	8.82	236	31.86	180	37.24	28.42	105
Europe	Lausanne	213	32.00	197	43.94	171	40.11	8.11	42
Europe	Leeds	151	48.88	126	65.43	142	52.91	4.03	9
Europe	Leipzig	169	44.16	154	51.61	191	33.69	-10.46	-22
Europe	Liege	282	10.37	254	25.54	248	20.75	10.38	34
Europe	Lille	176	40.46	150	54.19	235	25.84	-14.62	-59
Europe	Linz	276	12.73	257	24.41	261	17.26	4.53	15
Europe	Lisbon	42	130.06	44	149.97	32	168.39	38.33	10
Europe	Liverpool	209	32.38	170	48.91	185	35.59	3.22	24
Europe	Ljubljana	192	37.63	185	46.04	110	69.05	31.42	82
Europe	London	1	326.82	1	353.72	2	333.41	6.59	-1
Europe	Luxembourg	63	107.42	50	141.74	60	117.24	9.82	3



Europe	Lyon	99	68.21	120	68.49	150	49.55	-18.66	-51
Europe	Madrid	9	196.91	8	214.43	11	226.43	29.52	-2
Europe	Malmo	210	32.32	155	51.56	266	16.10	-16.23	-56
Europe	Manchester	110	64.14	80	90.23	106	70.00	5.85	4
Europe	Marseille	143	50.58	151	53.87	195	33.23	-17.35	-52
Europe	Milan	8	198.69	10	211.06	9	232.53	33.83	-1
Europe	Munich	47	123.77	26	169.00	59	117.41	-6.35	-12
Europe	Naples	239	25.87	205	41.88	273	13.69	-12.18	-34
Europe	Newcastle	205	33.33	177	47.79	178	38.70	5.37	27
Europe	Nicosia	124	57.39	87	86.25	83	91.08	33.69	41
Europe	Norwich	237	26.01	215	39.36	228	26.48	0.47	9
Europe	Nottingham	194	37.53	211	40.99	220	29.28	-8.25	-26
Europe	Nuremberg	190	37.81	246	29.79	233	26.26	-11.56	-43
Europe	Oslo	69	92.12	72	104.15	62	116.56	24.45	7
Europe	Palermo	268	15.42	271	18.07	272	13.86	-1.56	-4
Europe	Paris	5	231.33	4	251.93	4	268.79	37.45	1
Europe	Plymouth	257	19.38	265	19.95	268	15.84	-3.54	-11
Europe	Prague	33	137.91	41	152.99	34	160.11	22.20	-1
Europe	Reykjavik	251	21.74	231	33.74	197	32.98	11.25	54
Europe	Riga	166	45.05	169	49.02	120	62.31	17.27	46
Europe	Rome	59	112.83	54	136.35	31	170.14	57.31	28
Europe	Rotterdam	75	82.84	101	76.92	111	69.05	-13.79	-36
Europe	Sarajevo	280	11.77	244	30.58	237	24.77	13.00	43
Europe	Seville	200	35.73	145	55.39	199	32.68	-3.05	1
Europe	Sheffield	242	23.54	242	31.33	241	24.19	0.65	1
Europe	Sofia	120	58.94	116	70.03	77	95.15	36.21	43
Europe	Southampton	215	31.66	143	55.89	194	33.32	1.66	21
Europe	Stockholm	31	139.75	35	156.59	33	167.98	28.23	-2
Europe	Strasbourg	150	49.26	181	46.99	213	30.02	-19.24	-63

Europe	Stuttgart	77	82.04	73	103.06	90	84.24	2.20	-13
Europe	Tallin	193	37.58	149	55.10	124	59.44	21.86	69
Europe	The Hague	230	28.55	270	18.34	256	18.48	-10.08	-26
Europe	Tirana	273	13.76	273	17.02	257	18.18	4.41	16
Europe	Trieste	278	12.26	272	17.42	269	15.46	3.21	9
Europe	Turin	175	41.29	136	58.50	218	29.58	-11.71	-43
Europe	Utrecht	199	36.09	218	38.30	211	30.85	-5.24	-12
Europe	Valencia	135	53.09	162	50.22	186	35.38	-17.71	-51
Europe	Vienna	46	125.00	43	150.47	38	155.11	30.11	8
Europe	Vilnius	195	37.27	173	48.41	138	55.02	17.76	57
Europe	Warsaw	37	134.71	25	169.42	25	186.17	51.46	12
Europe	Zagreb	129	56.25	124	66.77	96	76.13	19.88	33
Europe	Zurich	18	159.79	14	195.42	20	194.01	34.22	-2
Asia	Abu Dhabi	106	64.70	82	88.48	200	32.66	-32.04	-94
Asia	Ahmadabad	253	20.20	269	18.68	242	23.90	3.70	11
Asia	Almaty	128	56.28	137	58.24	118	64.40	8.11	10
Asia	Amman	126	56.59	100	77.67	117	64.98	8.39	9
Asia	Ankara	272	14.43	252	27.77	215	30.00	15.57	57
Asia	Baku	212	32.12	239	31.67	205	32.30	0.18	7
Asia	Bandar Seri Begawan	207	33.00	281	10.94	262	17.02	-15.97	-55
Asia	Bandung	250	22.07	224	36.37	282	9.12	-12.94	-32
Asia	Bangalore	88	74.67	81	89.41	64	113.17	38.51	24
Asia	Bangkok	26	145.85	36	156.10	27	182.84	36.99	-1
Asia	Beijing	30	140.62	20	179.42	10	229.68	89.05	20
Asia	Beirut	67	95.31	65	116.93	74	97.00	1.68	-7
Asia	Calcutta	87	75.33	102	76.57	104	71.35	-3.98	-17
Asia	Chennai	101	67.17	76	96.89	87	87.09	19.92	14
Asia	Colombo	136	52.96	98	79.00	122	61.45	8.50	14
Asia	Dalian	211	32.30	262	21.80	207	32.16	-0.14	4

Asia	Damascus	262	17.88	241	31.36	278	11.98	-5.91	-16
Asia	Dhaka	152	48.55	167	49.08	136	55.59	7.04	16
Asia	Doha	177	40.41	147	55.22	115	67.14	26.73	62
Asia	Dubai	62	109.02	53	139.14	48	139.06	30.03	14
Asia	Guangzhou	95	70.13	103	75.28	68	107.60	37.46	27
Asia	Hanoi	122	58.00	121	68.31	129	57.48	-0.52	-7
Asia	Ho Chi Minh City	79	80.36	111	71.51	80	92.59	12.23	-1
Asia	Hong Kong	3	237.36	3	257.83	3	286.66	49.29	0
Asia	Hyderabad (India)	232	27.45	171	48.83	137	55.24	27.79	95
Asia	Islamabad	159	47.06	233	33.59	133	56.26	9.21	26
Asia	Istanbul	35	135.25	40	153.72	30	173.00	37.75	5
Asia	Jakarta	19	158.29	21	176.07	28	180.16	21.87	-9
Asia	Jeddah	92	71.91	115	70.52	79	93.91	22.00	13
Asia	Jerusalem	281	10.88	258	24.36	201	32.57	21.69	80
Asia	Karachi	85	77.05	86	86.73	73	100.73	23.68	12
Asia	Kiev	114	63.18	119	69.01	75	96.99	33.81	39
Asia	Kobe	252	20.87	235	32.00	264	16.62	-4.26	-12
Asia	Kuala Lumpur	25	145.85	32	162.94	18	198.06	52.21	7
Asia	Kuwait	123	57.54	142	55.99	76	95.15	37.61	47
Asia	Kyoto	248	22.49	230	33.83	217	29.73	7.24	31
Asia	Labuan	132	54.69	131	60.95	177	38.72	-15.96	-45
Asia	Lahore	153	48.12	178	47.43	140	54.04	5.92	13
Asia	Macao	243	23.32	193	44.28	173	39.64	16.32	70
Asia	Malacca	284	10.04	261	22.10	285	1.89	-8.15	-1
Asia	Manama	76	82.25	94	81.83	84	89.05	6.80	-8
Asia	Manila	40	132.19	62	124.92	45	140.04	7.85	-5
Asia	Medan	271	14.51	255	25.08	279	10.76	-3.74	-8
Asia	Minsk	277	12.40	277	15.66	238	24.35	11.94	39
Asia	Moscow	39	134.19	34	160.35	13	213.48	79.29	26

Asia	Mumbai	23	151.28	23	171.33	16	203.58	52.30	7
Asia	Muscat	121	58.25	179	47.30	196	32.99	-25.26	-75
Asia	Nagoya	214	31.68	219	38.23	188	34.31	2.63	26
Asia	Nanjing	279	11.96	284	6.92	202	32.54	20.58	77
Asia	New Delhi	56	114.47	60	127.20	52	122.36	7.88	4
Asia	Osaka	113	63.37	106	73.52	145	51.68	-11.69	-32
Asia	Penang	240	24.86	253	27.67	219	29.30	4.44	21
Asia	Pusan	258	19.23	266	19.24	270	15.37	-3.87	-12
Asia	Riyadh	91	71.99	104	75.06	66	109.99	38.00	25
Asia	Sanaa	275	13.18	229	34.03	277	12.06	-1.12	-2
Asia	Seoul	32	138.89	24	170.06	12	215.34	76.45	20
Asia	Shanghai	28	142.63	22	173.56	8	235.77	93.13	20
Asia	Shenzhen	187	38.21	206	41.74	95	77.86	39.65	92
Asia	Singapore	6	218.69	6	239.55	5	259.05	40.35	1
Asia	St Petersburg	137	52.56	156	51.47	126	58.58	6.02	11
Asia	Taipei	20	157.33	29	166.80	21	191.31	33.98	-1
Asia	Tashkent	221	30.27	221	37.53	187	34.74	4.47	34
Asia	Tbilisi	283	10.23	275	16.23	231	26.33	16.10	52
Asia	Tehran	179	39.99	209	41.38	240	24.22	-15.77	-61
Asia	Tel Aviv	98	69.40	68	111.51	54	121.96	52.56	44
Asia	Tianjin	233	27.21	208	41.50	176	38.76	11.55	57
Asia	Tokyo	4	231.68	5	246.77	6	253.30	21.61	-2
Asia	Xiamen	274	13.31	274	16.72	250	20.46	7.16	24
Asia	Yangon	238	25.97	280	11.64	284	6.73	-19.24	-46
Asia	Yokohama	225	29.56	217	38.52	258	17.78	-11.78	-33
Africa	Abidjan	125	57.09	200	42.74	265	16.53	-40.56	-140
Africa	Accra	148	49.38	182	46.96	156	46.19	-3.19	-8
Africa	Addis Ababa	254	20.04	283	7.10	280	10.32	-9.72	-26
Africa	Alexandria	270	15.08	259	24.16	267	15.95	0.87	3

Africa	Algiers	265	17.53	237	31.74	210	31.51	13.98	55
Africa	Bulawayo	263	17.88	279	12.08	281	9.28	-8.60	-18
Africa	Cairo	61	109.46	51	141.35	61	116.66	7.20	0
Africa	Cape Town	107	64.57	84	87.85	100	72.90	8.33	7
Africa	Casablanca	112	63.68	110	72.65	94	79.74	16.06	18
Africa	Dakar	202	35.42	184	46.07	221	28.90	-6.51	-19
Africa	Dar es Salaam	184	38.36	176	48.17	182	36.91	-1.45	2
Africa	Douala	224	29.65	214	39.53	246	21.19	-8.46	-22
Africa	Durban	182	38.85	157	51.25	198	32.87	-5.98	-16
Africa	Gaborone	231	28.43	175	48.19	203	32.51	4.08	28
Africa	Harare	131	54.71	168	49.08	189	34.11	-20.60	-58
Africa	Johannesburg	34	135.99	37	154.92	47	139.06	3.07	-13
Africa	Kampala	168	44.29	207	41.70	229	26.41	-17.89	-61
Africa	Kinshasa	266	17.00	260	23.68	274	13.50	-3.50	-8
Africa	Lagos	130	56.25	117	69.46	116	65.26	9.01	14
Africa	Luanda	222	30.13	226	34.98	276	12.09	-18.04	-54
Africa	Lusaka	147	49.65	198	43.65	183	36.78	-12.86	-36
Africa	Maputu	201	35.72	248	29.76	247	21.01	-14.71	-46
Africa	Mombasa	269	15.20	263	21.52	251	20.40	5.20	18
Africa	Nairobi	102	67.06	129	62.74	91	83.61	16.54	11
Africa	Port Louis	118	60.87	88	85.67	125	58.70	-2.16	-7
Africa	Pretoria	245	22.97	234	32.62	254	19.26	-3.71	-9
Africa	Tunis	157	47.47	139	56.81	149	50.37	2.90	8
Africa	Windhoek	164	45.26	192	44.89	255	18.79	-26.48	-91
North America	Atlanta	36	134.87	47	147.01	46	140.02	5.15	-10
North America	Baltimore	133	54.41	133	59.08	160	45.57	-8.84	-27
North America	Birmingham	115	62.25	83	88.10	113	67.85	5.61	2
North America	Boston	52	116.36	67	111.66	56	119.12	2.76	-4
North America	Buffalo	160	46.53	158	51.21	226	26.78	-19.75	-66

North America	Calgary	96	69.79	85	87.52	114	67.64	-2.15	-18
North America	Charlotte	105	65.29	123	67.07	146	51.54	-13.75	-41
North America	Chicago	7	202.29	15	190.13	19	197.40	-4.89	-12
North America	Cincinnati	142	50.78	134	58.83	193	33.40	-17.38	-51
North America	Cleveland	108	64.35	113	71.39	130	57.13	-7.22	-22
North America	Columbus	165	45.13	245	30.34	119	62.67	17.54	46
North America	Dallas	54	114.91	58	130.50	57	118.24	3.33	-3
North America	Denver	71	86.87	95	80.79	86	87.91	1.03	-15
North America	Detroit	89	74.47	96	79.79	107	69.97	-4.50	-18
North America	Edmonton	178	40.37	186	45.86	216	29.74	-10.63	-38
North America	Hartford	167	44.60	220	37.90	161	45.49	0.89	6
North America	Honolulu	185	38.29	159	50.78	175	38.77	0.49	10
North America	Houston	60	109.63	64	118.41	69	107.21	-2.42	-9
North America	Indianapolis	117	61.90	148	55.11	151	47.72	-14.18	-34
North America	Kansas City	119	60.14	191	45.04	141	53.31	-6.83	-22
North America	Las Vegas	197	36.48	202	42.48	164	44.14	7.66	33
North America	Los Angeles	10	194.49	17	188.20	35	157.74	-36.75	-25
North America	Miami	27	144.32	46	147.99	67	109.08	-35.24	-40
North America	Minneapolis	72	84.50	91	82.66	92	82.23	-2.27	-20
North America	Montreal	48	123.00	49	143.59	72	101.43	-21.58	-24
North America	New Orleans	217	31.53	199	43.36	225	27.07	-4.46	-8
North America	New York	2	318.26	2	344.44	1	341.00	22.74	1
North America	Omaha	229	28.77	238	31.69	172	40.11	11.34	57
North America	Ottawa	181	38.89	212	40.37	169	41.93	3.05	12
North America	Palo Alto	158	47.28	240	31.42	252	20.30	-26.98	-94
North America	Philadelphia	70	88.41	77	96.57	98	73.99	-14.42	-28
North America	Phoenix	140	51.74	127	63.59	139	54.50	2.75	1
North America	Pittsburgh	111	63.98	130	61.32	144	52.15	-11.83	-33
North America	Portland	94	70.95	122	67.10	102	72.14	1.19	-8

North America	Quebec	236	26.02	249	29.69	222	28.74	2.71	14
North America	Richmond	174	41.56	203	42.08	168	42.30	0.74	6
North America	Rochester	154	48.08	195	44.03	204	32.34	-15.74	-50
North America	Sacramento	208	32.94	174	48.22	162	45.34	12.40	46
North America	San Diego	97	69.72	90	85.08	121	62.30	-7.42	-24
North America	San Francisco	17	167.86	27	167.69	44	141.88	-25.98	-27
North America	San Jose (CA)	162	45.50	187	45.71	165	43.27	-2.23	-3
North America	Seattle	65	98.20	74	103.05	93	81.74	-16.46	-28
North America	St Louis	84	77.24	140	56.59	155	46.96	-30.29	-71
North America	Tampa	146	49.79	153	52.03	134	56.09	6.30	12
North America	Toronto	11	190.00	9	214.01	14	212.69	22.69	-3
North America	Vancouver	66	96.22	59	130.22	88	86.71	-9.51	-22
North America	Washington	41	131.97	56	131.92	42	144.03	12.06	-1
North America	Winnipeg	188	38.07	267	19.03	209	31.71	-6.36	-21
South America	Asuncion	139	52.19	204	41.98	152	47.46	-4.73	-13
South America	Belo Horizonte	171	43.59	228	34.24	239	24.33	-19.26	-68
South America	Bogota	53	116.35	52	140.56	50	128.83	12.48	3
South America	Brazilia	234	26.98	165	49.23	271	13.91	-13.07	-37
South America	Buenos Aires	22	153.99	16	189.22	17	199.65	45.66	5
South America	Caracas	58	113.66	55	134.77	40	147.23	33.57	18
South America	Ciudad Juarez	267	16.99	276	16.08	249	20.55	3.56	18
South America	Curitiba	189	37.95	188	45.64	192	33.57	-4.38	-3
South America	Georgetown (Cayman)	264	17.83	223	36.91	157	45.88	28.06	107
South America	Guadalajara	186	38.27	161	50.65	127	57.61	19.34	59
South America	Guatemala City	155	47.98	92	82.37	103	71.57	23.59	52
South America	Guayaquil	134	53.58	132	59.99	135	56.08	2.50	-1
South America	Hamilton	104	66.50	118	69.20	170	41.59	-24.91	-66
South America	Kingston (Jamaica)	172	42.08	190	45.10	206	32.20	-9.88	-34
South America	La Paz	180	39.67	180	47.10	153	47.19	7.52	27

South America	Lima	90	73.00	71	104.70	70	104.94	31.94	20
South America	Managua	235	26.89	201	42.49	167	42.37	15.48	68
South America	Medellin	219	31.08	227	34.38	184	36.40	5.32	35
South America	Mexico City	21	155.01	18	185.34	26	183.05	28.04	-5
South America	Monterrey	138	52.54	243	30.85	143	52.74	0.20	-5
South America	Montevideo	73	83.28	69	107.12	78	94.83	11.55	-5
South America	Nassau	100	67.49	128	63.30	158	45.80	-21.69	-58
South America	Panama City	83	77.58	112	71.43	85	88.11	10.54	-2
South America	Port of Spain	226	29.43	250	29.20	236	25.54	-3.89	-10
South America	Porto Alegre	170	43.60	164	49.43	190	34.02	-9.58	-20
South America	Quito	109	64.21	99	78.00	97	74.41	10.20	12
South America	Recife	261	18.16	282	9.95	245	21.86	3.70	16
South America	Rio de Janeiro	68	92.26	63	120.70	81	92.48	0.22	-13
South America	Salvador	228	28.84	247	29.77	260	17.42	-11.42	-32
South America	San Jose (Costa Rica)	149	49.26	109	72.93	99	73.92	24.65	50
South America	San Salvador	156	47.49	107	73.45	123	60.47	12.98	33
South America	Santiago	57	113.85	31	163.73	39	150.07	36.23	18
South America	Santo Domingo	161	46.26	152	53.14	105	70.45	24.18	56
South America	Sao Paulo	16	179.68	13	199.87	23	187.61	7.93	-7
South America	Tegucigalpa	203	35.24	225	35.86	128	57.53	22.29	75
South America	Tijuana	244	23.29	216	39.06	227	26.56	3.27	17
Oceania	Adelaide	103	66.58	108	73.20	132	56.76	-9.82	-29
Oceania	Auckland	44	128.71	57	130.90	41	146.27	17.56	3
Oceania	Brisbane	78	80.86	79	94.95	89	85.10	4.25	-11
Oceania	Canberra	227	28.94	183	46.15	163	44.44	15.50	64
Oceania	Christchurch	196	37.20	163	49.55	179	37.35	0.15	17
Oceania	Hobart	206	33.33	278	14.73	263	16.86	-16.47	-57
Oceania	Melbourne	24	147.64	33	161.07	43	143.49	-4.15	-19
Oceania	Perth	82	77.60	89	85.19	101	72.20	-5.40	-19



Oceania	Port Moresby	255	19.88	285	5.83	275	12.64	-7.23	-20
Oceania	Suva	259	18.72	166	49.18	283	8.99	-9.74	-24
Oceania	Sydney	12	189.84	19	181.65	7	241.50	51.67	5
Oceania	Wellington	81	77.72	125	66.08	108	69.82	-7.90	-27

**Table 4.** ACC - standardized connectivity indices per year (2000,2004, 2008)

2000			2004		2008	
rank	city	ACC st. connectivity 2000	city	ACC st. connectivity2004	city	ACC st. connectivity 2008
1	London	82.22	London	95.70	London	100.71
2	New York	72.88	New York	83.07	New York	79.26
3	Paris	55.73	Paris	70.77	Hong Kong	73.88
4	Los Angeles	53.90	Hong Kong	69.74	Sydney	69.46
5	Toronto	53.67	Tokyo	63.63	Singapore	67.74
6	Amsterdam	52.98	Amsterdam	62.47	Milan	67.44
7	Chicago	52.44	Brussels	60.32	Paris	66.55
8	Tokyo	51.22	Frankfurt	59.43	Buenos Aires	64.03
9	Copenhagen	48.10	Toronto	59.40	Beijing	63.93
10	Hong Kong	47.72	Buenos Aires	57.37	Kuala Lumpur	62.09
11	Vienna	47.55	Los Angeles	56.80	Toronto	61.44
12	Mexico City	47.28	Singapore	55.91	Tel Aviv	61.00
13	Milan	46.58	Dublin	55.27	Shanghai	60.61
14	Madrid	45.20	Chicago	55.01	Tokyo	60.36
15	Mumbai	44.76	Munich	54.67	Brussels	60.11
16	Stockholm	44.05	Sao Paulo	53.78	Jakarta	59.99
17	Auckland	43.52	Melbourne	53.57	Moscow	59.90
18	Washington	43.50	Vienna	52.76	Auckland	59.06
19	Sydney	43.43	Atlanta	52.70	Seoul	58.80
20	Dubai	43.40	Milan	52.69	Lisbon	57.30
21	Miami	43.24	Mumbai	52.39	Mexico City	57.26
22	Atlanta	42.78	Madrid	51.99	Mumbai	56.92
23	Melbourne	42.43	Mexico City	51.93	Rome	56.91
24	Munich	42.28	Hamburg	51.52	Sao Paulo	56.70
25	Singapore	42.25	Seoul	51.15	Istanbul	56.36
26	Oslo	42.13	Vancouver	51.01	Madrid	56.08
27	Frankfurt	42.03	Zurich	50.99	Berlin	55.63
28	Sao Paulo	41.55	Berlin	50.92	Caracas	55.47
29	Montreal	41.43	Jakarta	50.79	Barcelona	55.35
30	San Francisco	41.28	Sydney	50.71	Oslo	55.33

31	Hamburg	41.19
32	Buenos Aires	40.85
33	Vancouver	40.43
34	Lyon	39.98
35	Beirut	39.88
36	Barcelona	39.80
37	Zurich	39.47
38	Brisbane	39.25
39	Perth	39.15
40	Berlin	39.12
41	Budapest	39.06
42	Moscow	39.02
43	Prague	38.97
44	Brussels	38.37
45	Jakarta	38.12
46	Cairo	38.02
47	Lisbon	37.82
48	Dublin	37.70
49	Rotterdam	37.61
50	Istanbul	37.37
51	Cape Town	37.30
52	Stuttgart	37.11
53	Rome	36.93
54	Taipei	36.92
55	Adelaide	36.78
56	Luxembourg	35.94
57	Geneva	35.88
58	Kuala Lumpur	35.55
59	Boston	35.22
60	Lima	34.83
61	Manila	34.14
62	Houston	34.11
63	Helsinki	34.06
64	Dusseldorf	33.96
65	Warsaw	33.73
66	Santiago	33.69

San Francisco	50.69
Moscow	50.59
Taipei	50.53
Dubai	50.18
Budapest	49.89
Perth	49.33
Luxembourg	48.96
Copenhagen	48.94
Washington	48.88
Stockholm	48.57
Lisbon	48.26
Cairo	47.74
Nicosia	47.71
Beirut	47.70
Montreal	47.69
Brisbane	47.38
Santiago	47.38
Cape Town	47.28
Adelaide	47.07
Barcelona	47.03
Istanbul	46.70
Caracas	46.46
Lima	46.17
Oslo	46.01
Athens	45.80
Johannesburg	45.79
Dallas	45.67
New Delhi	45.50
Boston	45.48
Port Louis	45.23
Helsinki	44.90
Prague	44.44
Beijing	44.32
Warsaw	44.31
Rome	44.16
Kuala Lumpur	44.06

New Delhi	55.19
Kuwait	55.19
Bogota	54.82
Vienna	53.89
Santiago	53.05
Jeddah	52.98
Dublin	52.27
Johannesburg	51.27
Guadalajara	50.97
Warsaw	50.91
Riyadh	50.76
Zurich	50.36
Athens	50.27
Chicago	50.23
Hamburg	49.81
Washington	48.91
Bucharest	48.72
Prague	48.43
Luxembourg	47.83
Geneva	47.48
Budapest	47.37
Quito	47.23
Kiev	46.92
Bangkok	46.88
Melbourne	46.83
Nicosia	46.58
Amsterdam	46.46
Atlanta	46.13
Helsinki	45.27
Brisbane	44.26
Nairobi	43.99
Cairo	43.76
Rio de Janeiro	43.47
Copenhagen	42.40
Beirut	41.67
Los Angeles	41.61

67	New Delhi	33.60	Bangkok	44.01	Taipei	41.56
68	St Louis	33.43	Geneva	43.34	Lima	41.49
69	Indianapolis	33.35	Montevideo	43.03	Bangalore	41.20
70	Bangkok	33.32	Miami	43.02	Montevideo	40.92
71	Montevideo	33.21	Bogota	42.63	Casablanca	40.78
72	Manchester	33.16	Auckland	41.73	Stockholm	40.65
73	Bogota	32.91	Quito	41.45	Houston	40.65
74	Hamilton	32.42	Guatemala City	41.42	Sofia	40.62
75	Port Louis	32.34	Dusseldorf	40.77	Boston	39.51
76	Monterrey	32.25	Christchurch	40.69	Manila	39.48
77	Birmingham	32.00	Antwerp	40.26	San Francisco	39.08
78	Johannesburg	31.79	Tel Aviv	40.08	Guayaquil	39.08
79	Guadalajara	31.54	Guadalajara	40.02	Frankfurt	38.95
80	Charlotte	31.46	Rio de Janeiro	39.63	Cape Town	38.83
81	Minneapolis	31.45	Seattle	39.47	Guatemala City	38.35
82	Denver	31.38	San Salvador	39.29	San Jose (Costa Rica)	37.25
83	Leeds	31.33	Stuttgart	39.14	Antwerp	36.75
84	Caracas	31.29	Tunis	38.99	Miami	36.65
85	Antwerp	31.05	Houston	38.85	Perth	36.56
86	Shanghai	31.02	Lyon	38.83	Santo Domingo	36.45
87	Nicosia	30.92	Denver	38.65	Rotterdam	36.33
88	Tel Aviv	30.73	San Diego	38.22	Dallas	36.21
89	Athens	30.72	Dresden	37.97	Amman	36.15
90	Panama City	30.61	Riyadh	37.55	Stuttgart	36.13
91	Seoul	30.06	Charlotte	37.42	Bratislava	35.38
92	Durban	29.42	Shanghai	37.25	Port Louis	35.00
93	Rio de Janeiro	29.18	Manchester	37.14	Dubai	34.87
94	Seattle	29.10	Bucharest	37.11	Vancouver	34.70
95	Kansas City	28.90	Durban	37.05	St Petersburg	34.61
96	Riyadh	28.89	Indianapolis	36.77	Panama City	34.56
97	Jeddah	28.87	Rotterdam	35.75	Munich	34.42
98	Quito	28.50	Marseille	35.24	Montreal	34.31
99	Cologne	28.24	Belfast	35.23	Ljubljana	34.24
100	Nassau	28.17	Minneapolis	35.00	Karachi	33.99
101	San Diego	28.10	Phoenix	34.97	Islamabad	33.86
102	Bangalore	28.00	Amman	34.59	Lagos	33.42

103	Abu Dhabi	27.97
104	Beijing	27.66
105	Marseille	27.55
106	Kuwait	27.19
107	Detroit	27.15
108	Bristol	27.15
109	Tunis	26.97
110	Valencia	26.94
111	Zagreb	26.80
112	Baltimore	26.70
113	Cleveland	26.69
114	Columbus	26.68
115	Dallas	26.65
116	Glasgow	26.48
117	Amman	26.10
118	Christchurch	26.05
119	Nairobi	25.90
120	Wellington	25.77
121	Tampa	25.73
122	Philadelphia	25.57
123	Muscat	25.46
124	Calcutta	25.37
125	Pittsburgh	25.17
126	Lagos	25.12
127	Guatemala City	24.88
128	Dresden	24.74
129	Leipzig	24.68
130	Bratislava	24.58
131	Karachi	24.55
132	Edinburgh	24.44
133	Phoenix	24.20
134	Cincinnati	24.16
135	San Jose (Costa Rica)	24.12
136	Gothenburg	24.01
137	Hobart	23.97
138	Bilbao	23.88

Bristol	34.36
Cleveland	34.34
Chennai	34.31
San Jose (Costa Rica)	34.04
Colombo	33.86
Bratislava	33.29
Philadelphia	32.68
Nairobi	32.65
Portland	32.50
Abu Dhabi	32.35
Edinburgh	32.30
Karachi	32.28
Guayaquil	32.25
Hamilton	32.22
Lahore	32.00
Leeds	31.87
Detroit	31.44
Nassau	31.38
St Petersburg	31.30
Lagos	31.21
Casablanca	31.14
Calgary	30.67
Bangalore	30.54
Jeddah	30.53
Southampton	30.46
Lille	29.98
Birmingham	29.83
Canberra	29.38
Wellington	29.29
Cincinnati	29.04
Muscat	28.85
La Paz	28.72
Gaborone	28.67
Tijuana	28.40
Bordeaux	27.82
St Louis	27.62

Ho Chi Minh City	33.16
Adelaide	33.08
Zagreb	32.90
Shenzhen	32.60
Calcutta	32.40
San Salvador	31.76
Philadelphia	31.70
Chennai	31.62
Denver	31.41
Dusseldorf	31.07
Tunis	30.70
La Paz	30.63
Manchester	30.44
Monterrey	30.14
Seattle	29.98
San Diego	29.70
Phoenix	29.34
Jerusalem	29.04
Hyderabad (India)	28.79
Georgetown (Cayman)	28.67
Lahore	28.23
Lyon	28.04
Medellin	27.93
Glasgow	27.87
Edinburgh	27.84
Columbus	27.77
Canberra	27.74
Guangzhou	27.69
Riga	27.59
Lausanne	27.27
Christchurch	27.10
Portland	26.88
Cleveland	26.67
Doha	26.44
Birmingham	26.38
Detroit	26.22

139	Casablanca	23.88
140	Lille	23.78
141	Curitiba	23.75
142	Belo Horizonte	23.63
143	Guayaquil	23.55
144	Honolulu	23.19
145	St Petersburg	23.05
146	Portland	22.85
147	Bucharest	22.65
148	Asuncion	22.44
149	Nottingham	22.43
150	Manama	22.42
151	Winnipeg	22.08
152	Chennai	22.08
153	La Paz	22.05
154	Belfast	21.99
155	Richmond	21.93
156	Tijuana	21.86
157	San Jose (CA)	21.75
158	Calgary	21.75
159	Riga	21.67
160	Kiev	21.65
161	Canberra	21.57
162	Dhaka	21.49
163	Doha	21.40
164	Porto Alegre	21.32
165	Edmonton	20.59
166	Basel	20.48
167	Bordeaux	20.48
168	Strasbourg	20.23
169	New Orleans	20.06
170	Liverpool	19.94
171	Sofia	19.47
172	Salvador	19.43
173	Hartford	19.30
174	Omaha	19.20

Sofia	27.61
Edmonton	27.54
Manila	27.32
Leipzig	27.05
Honolulu	27.02
Glasgow	26.88
Islamabad	26.88
Zagreb	26.83
Kansas City	26.65
Baltimore	26.43
Ho Chi Minh City	26.42
Liverpool	26.32
Kuwait	26.32
Malmo	26.09
Tallin	25.82
Riga	25.37
New Orleans	25.26
Valencia	25.15
Vilnius	24.62
Dar es Salaam	24.21
Ottawa	24.02
Pretoria	23.94
Medellin	23.89
Kiev	23.89
Accra	23.84
Bilbao	23.73
Lusaka	23.51
Strasbourg	23.46
Kingston (Jamaica)	23.46
Ljubljana	22.75
Calcutta	22.65
Porto Alegre	22.55
Pittsburgh	22.50
Harare	22.39
Sacramento	22.26
Osaka	22.21

Ottawa	25.33
Tallin	25.23
Nassau	25.22
Minneapolis	25.17
Calgary	25.08
Wellington	24.96
Porto Alegre	24.77
Leeds	24.47
Bologna	24.46
Hanoi	24.39
Indianapolis	24.27
Dhaka	24.17
Tegucigalpa	23.97
Hamilton	23.27
Tampa	23.24
Curitiba	23.17
Managua	22.97
Penang	22.97
Bristol	22.74
Asuncion	22.69
Durban	22.57
Krakow	22.43
Dresden	22.40
Richmond	22.25
Ankara	22.19
Tijuana	22.14
Charlotte	21.97
Vilnius	21.84
Osaka	21.74
Leipzig	21.62
Valencia	21.58
Kansas City	21.23
St Louis	21.03
Baltimore	20.84
San Jose (CA)	20.78
Colombo	20.54

175	Vilnius	19.15
176	Tallin	19.14
177	Seville	19.05
178	Santo Domingo	18.91
179	Aberdeen	18.90
180	Las Vegas	18.78
181	Pretoria	18.75
182	The Hague	18.65
183	San Salvador	18.64
184	Bologna	18.60
185	Lahore	18.55
186	Accra	18.48
187	Tegucigalpa	18.45
188	Norwich	18.40
189	Newcastle	18.26
190	Shenzhen	18.09
191	Abidjan	17.68
192	Southampton	17.58
193	Utrecht	17.56
194	Medellin	17.48
195	Malmo	17.33
196	Lausanne	17.31
197	Bergen	17.18
198	Port Moresby	17.17
199	Ho Chi Minh City	16.99
200	Ottawa	16.98
201	Rochester	16.95
202	Suva	16.87
203	Gaborone	16.45
204	Colombo	16.45
205	Baku	16.39
206	Arhus	16.27
207	Lusaka	15.78
208	Harare	15.78
209	Turin	15.76
210	Douala	15.68

Richmond	22.07
Lausanne	22.01
Doha	21.92
Tampa	21.75
Cologne	21.73
Hanoi	21.61
Rochester	21.29
Tehran	21.27
Santo Domingo	21.20
Hannover	21.10
Manama	20.61
Windhoek	20.54
Linz	20.21
Salvador	20.04
Cardiff	19.92
Brazilia	19.63
Dakar	19.50
Gothenburg	19.14
San Jose (CA)	19.03
Hyderabad (India)	18.97
Panama City	18.97
Newcastle	18.84
Aberdeen	18.82
Seville	18.73
Omaha	18.63
Las Vegas	18.37
Asuncion	18.05
Norwich	18.03
Curitiba	17.79
Dhaka	17.74
Jerusalem	17.71
Nottingham	17.60
Tegucigalpa	17.50
Mombasa	17.13
Sanaa	17.05
Buffalo	16.51

Manama	20.51
Belgrade	20.40
Belfast	20.34
Pittsburgh	20.19
Baku	19.97
Newcastle	19.83
Almaty	19.83
Reykjavik	19.35
Pretoria	19.26
Winnipeg	19.07
Marseille	18.91
Las Vegas	18.83
Accra	18.74
Arhus	18.27
Muscat	18.12
Recife	17.63
Omaha	17.47
Honolulu	17.42
Ahmadabad	17.35
Gaborone	17.33
Edmonton	17.18
Liverpool	17.03
Belo Horizonte	16.89
Dar es Salaam	16.77
Southampton	16.58
Sacramento	16.54
Hannover	16.49
New Orleans	16.45
Macao	16.40
Strasbourg	16.24
Cologne	16.10
Genoa	16.01
Salvador	15.94
Linz	15.89
Bergen	15.86
Gothenburg	15.71

211	Osaka	15.68
212	Ciudad Juarez	15.56
213	Hannover	15.50
214	Almaty	15.49
215	Cardiff	15.28
216	Ljubljana	15.13
217	Islamabad	15.13
218	Buffalo	15.05
219	Penang	14.77
220	Nuremberg	14.19
221	Bandar Seri Begawan	14.17
222	Bern	14.17
223	Sacramento	14.17
224	Yokohama	14.09
225	Sheffield	14.08
226	Naples	13.93
227	Recife	13.75
228	Windhoek	13.67
229	Palo Alto	13.42
230	Dakar	13.24
231	Alexandria	13.22
232	Georgetown (Cayman)	13.01
233	Kingston (Jamaica)	13.01
234	Bulawayo	12.91
235	Reykjavik	12.55
236	Hanoi	12.32
237	Maputu	11.77
238	Guangzhou	11.71
239	Kyoto	11.71
240	Labuan	11.71
241	Tashkent	11.71
242	Managua	11.56
243	Tehran	11.52
244	Dar es Salaam	11.44
245	Kampala	11.44
246	Linz	11.20

Douala	16.39
Turin	16.38
Kampala	16.21
Reykjavik	16.07
Hartford	15.87
Macao	15.84
Genoa	15.81
Guangzhou	15.66
Baku	15.57
Shenzhen	15.57
Belgrade	15.47
Managua	15.35
Naples	14.98
Ankara	14.88
Damascus	14.80
Utrecht	14.74
Trieste	14.50
Bergen	14.23
Bologna	14.21
Sheffield	14.01
Belo Horizonte	13.88
Penang	13.43
Columbus	13.28
Almaty	13.07
Port of Spain	13.07
Tashkent	13.07
Monterrey	12.77
Liege	11.61
Maputu	11.61
The Hague	11.53
Bern	11.37
Basel	11.32
Essen	10.87
Georgetown (Cayman)	10.75
Winnipeg	10.17
Suva	10.04

Rochester	15.60
Nanjing	15.60
Dalian	15.38
Nagoya	15.29
Lusaka	15.18
Tirana	15.16
Ciudad Juarez	15.11
Aberdeen	14.97
Basel	14.96
Tehran	14.91
Tbilisi	14.76
Hartford	14.64
Utrecht	14.48
Liege	14.37
Buffalo	14.28
Seville	14.10
Bilbao	13.87
Harare	13.83
Dortmund	13.60
Cardiff	13.47
Bordeaux	13.23
Tashkent	12.87
Quebec	12.85
Malmo	12.83
Nottingham	12.82
Sheffield	12.54
Norwich	12.37
Kingston (Jamaica)	12.31
Essen	12.17
Tianjin	11.90
Turin	11.88
Abu Dhabi	11.47
Mombasa	11.37
Xiamen	11.36
Hobart	11.31
Dakar	11.22





283					Yangon	2.12
284					Malacca	1.89

**Table 5.** ACC - Connectivity and rank changes over the years 2000, 2004 and 2008

world region	city	rank 2000	acc st conn 2000	rank 2004	acc st conn 2004	rank 2008	acc st conn 2008	conn jump	rank jump
Europe	Aberdeen	179	18.90	197	18.82	218	14.97	-3.93	-39
Europe	Amsterdam	6	52.98	6	62.47	57	46.46	-6.53	-51
Europe	Antwerp	85	31.05	77	40.26	83	36.75	5.70	2
Europe	Arhus	206	16.27	265	6.41	188	18.27	2.00	18
Europe	Athens	89	30.72	55	45.80	43	50.27	19.55	46
Europe	Barcelona	36	39.80	50	47.03	29	55.35	15.55	7
Europe	Basel	166	20.48	242	11.32	219	14.96	-5.53	-53
Europe	Belfast	154	21.99	99	35.23	177	20.34	-1.65	-23
Europe	Belgrade	259	8.74	221	15.47	176	20.40	11.66	83
Europe	Bergen	197	17.18	228	14.23	209	15.86	-1.32	-12
Europe	Berlin	40	39.12	28	50.92	27	55.63	16.51	13
Europe	Bern	222	14.17	241	11.37	265	7.30	-6.87	-43
Europe	Bilbao	138	23.88	164	23.73	227	13.87	-10.02	-89
Europe	Bologna	184	18.60	229	14.21	147	24.46	5.86	37
Europe	Bordeaux	167	20.48	137	27.82	231	13.23	-7.24	-64
Europe	Bratislava	130	24.58	108	33.29	91	35.38	10.80	39
Europe	Bristol	108	27.15	103	34.36	157	22.74	-4.41	-49
Europe	Brussels	44	38.37	7	60.32	15	60.11	21.75	29
Europe	Bucharest	147	22.65	94	37.11	47	48.72	26.07	100
Europe	Budapest	41	39.06	35	49.89	51	47.37	8.31	-10
Europe	Cardiff	215	15.28	189	19.92	230	13.47	-1.81	-15
Europe	Cologne	99	28.24	179	21.73	205	16.10	-12.14	-106
Europe	Copenhagen	9	48.10	38	48.94	64	42.40	-5.70	-55
Europe	Dortmund	272	6.38	273	3.87	229	13.60	7.21	43
Europe	Dresden	128	24.74	89	37.97	161	22.40	-2.34	-33

Europe	Dublin	48	37.70	13	55.27	37	52.27	14.57	11
Europe	Dusseldorf	64	33.96	75	40.77	112	31.07	-2.89	-48
Europe	Edinburgh	132	24.44	113	32.30	127	27.84	3.40	5
Europe	Essen	260	8.74	243	10.87	239	12.17	3.43	21
Europe	Frankfurt	27	42.03	8	59.43	79	38.95	-3.08	-52
Europe	Geneva	57	35.88	68	43.34	50	47.48	11.60	7
Europe	Genoa	248	10.84	217	15.81	206	16.01	5.17	42
Europe	Glasgow	116	26.48	144	26.88	126	27.87	1.39	-10
Europe	Gothenburg	136	24.01	192	19.14	210	15.71	-8.30	-74
Europe	Hamburg	31	41.19	24	51.52	45	49.81	8.62	-14
Europe	Hannover	213	15.50	184	21.10	201	16.49	0.99	12
Europe	Helsinki	63	34.06	61	44.90	59	45.27	11.21	4
Europe	Krakow	274	4.58	249	9.21	160	22.43	17.85	114
Europe	Lausanne	196	17.31	176	22.01	132	27.27	9.96	64
Europe	Leeds	83	31.33	118	31.87	146	24.47	-6.87	-63
Europe	Leipzig	129	24.68	142	27.05	168	21.62	-3.05	-39
Europe	Liege	277	4.16	238	11.61	224	14.37	10.21	53
Europe	Lille	140	23.78	128	29.98	252	10.03	-13.75	-112
Europe	Linz	246	11.20	187	20.21	208	15.89	4.69	38
Europe	Lisbon	47	37.82	41	48.26	20	57.30	19.48	27
Europe	Liverpool	170	19.94	150	26.32	196	17.03	-2.91	-26
Europe	Ljubljana	216	15.13	168	22.75	99	34.24	19.10	117
Europe	London	1	82.22	1	95.70	1	100.71	18.49	0
Europe	Luxembourg	56	35.94	37	48.96	49	47.83	11.89	7
Europe	Lyon	34	39.98	86	38.83	124	28.04	-11.94	-90
Europe	Madrid	14	45.20	22	51.99	26	56.08	10.87	-12
Europe	Malmo	195	17.33	152	26.09	234	12.83	-4.50	-39
Europe	Manchester	72	33.16	93	37.14	115	30.44	-2.72	-43
Europe	Marseille	105	27.55	98	35.24	185	18.91	-8.64	-80

Europe	Milan	13	46.58	20	52.69	6	67.44	20.86	7
Europe	Munich	24	42.28	15	54.67	97	34.42	-7.86	-73
Europe	Naples	226	13.93	223	14.98	278	4.94	-8.99	-52
Europe	Newcastle	189	18.26	196	18.84	180	19.83	1.57	9
Europe	Nicosia	87	30.92	43	47.71	56	46.58	15.66	31
Europe	Norwich	188	18.40	202	18.03	237	12.37	-6.03	-49
Europe	Nottingham	149	22.43	206	17.60	235	12.82	-9.61	-86
Europe	Nuremberg	220	14.19			250	10.77	-3.42	-30
Europe	Oslo	26	42.13	54	46.01	30	55.33	13.20	-4
Europe	Palermo	262	8.74	253	9.21	254	8.83	0.09	8
Europe	Paris	3	55.73	3	70.77	7	66.55	10.82	-4
Europe	Plymouth	263	8.74	269	4.71	271	5.42	-3.31	-8
Europe	Prague	43	38.97	62	44.44	48	48.43	9.46	-5
Europe	Reykjavik	235	12.55	214	16.07	182	19.35	6.81	53
Europe	Riga	159	21.67	154	25.37	131	27.59	5.92	28
Europe	Rome	53	36.93	65	44.16	23	56.91	19.99	30
Europe	Rotterdam	49	37.61	97	35.75	87	36.33	-1.28	-38
Europe	Sarajevo	273	5.00	254	9.21	272	5.32	0.32	1
Europe	Seville	177	19.05	198	18.73	226	14.10	-4.95	-49
Europe	Sheffield	225	14.08	230	14.01	236	12.54	-1.54	-11
Europe	Sofia	171	19.47	139	27.61	74	40.62	21.15	97
Europe	Southampton	192	17.58	127	30.46	199	16.58	-1.00	-7
Europe	Stockholm	16	44.05	40	48.57	72	40.65	-3.40	-56
Europe	Strasbourg	168	20.23	166	23.46	204	16.24	-3.99	-36
Europe	Stuttgart	52	37.11	83	39.14	90	36.13	-0.98	-38
Europe	Tallin	176	19.14	153	25.82	140	25.23	6.09	36
Europe	The Hague	182	18.65	240	11.53	276	5.11	-13.54	-94
Europe	Tirana	269	7.04	257	8.37	216	15.16	8.12	53
Europe	Trieste	275	4.58	227	14.50	264	7.30	2.73	11

Europe	Turin	209	15.76	212	16.38	241	11.88	-3.87	-32
Europe	Utrecht	193	17.56	226	14.74	223	14.48	-3.08	-30
Europe	Valencia	110	26.94	156	25.15	169	21.58	-5.36	-59
Europe	Vilnius	175	19.15	157	24.62	166	21.84	2.69	9
Europe	Warsaw	65	33.73	64	44.31	40	50.91	17.18	25
Europe	Zagreb	111	26.80	146	26.83	105	32.90	6.09	6
Europe	Vienna	11	47.55	18	52.76	34	53.89	6.34	-23
Europe	Zurich	37	39.47	27	50.99	42	50.36	10.90	-5
Asia	Abu Dhabi	103	27.97	112	32.35	242	11.47	-16.50	-139
Asia	Ahmadabad	251	10.48	274	3.29	193	17.35	6.86	58
Asia	Almaty	214	15.49	234	13.07	181	19.83	4.33	33
Asia	Amman	117	26.10	102	34.59	89	36.15	10.05	28
Asia	Ankara	255	9.91	224	14.88	163	22.19	12.28	92
Asia	Baku	205	16.39	219	15.57	179	19.97	3.58	26
Asia	Bandar Seri Begawan	221	14.17			273	5.24	-8.93	-52
Asia	Bandung	266	7.55			281	2.83	-4.72	-15
Asia	Bangalore	102	28.00	125	30.54	69	41.20	13.20	33
Asia	Bangkok	70	33.32	67	44.01	54	46.88	13.56	16
Asia	Beijing	104	27.66	63	44.32	9	63.93	36.27	95
Asia	Beirut	35	39.88	44	47.70	65	41.67	1.78	-30
Asia	Calcutta	124	25.37	169	22.65	107	32.40	7.03	17
Asia	Chennai	152	22.08	105	34.31	110	31.62	9.54	42
Asia	Colombo	204	16.45	107	33.86	174	20.54	4.09	30
Asia	Dalian	264	8.61	278	2.41	213	15.38	6.77	51
Asia	Damascus	257	9.02	225	14.80	256	8.31	-0.71	1
Asia	Dhaka	162	21.49	204	17.74	150	24.17	2.68	12
Asia	Doha	163	21.40	177	21.92	136	26.44	5.03	27
Asia	Dubai	20	43.40	34	50.18	93	34.87	-8.52	-73
Asia	Guangzhou	238	11.71	218	15.66	130	27.69	15.98	108

Asia	Hanoi	236	12.32	180	21.61	148	24.39	12.07	88
Asia	Ho Chi Minh City	199	16.99	149	26.42	103	33.16	16.17	96
Asia	Hong Kong	10	47.72	4	69.74	3	73.88	26.16	7
Asia	Hyderabad (India)	250	10.52	194	18.97	121	28.79	18.27	129
Asia	Islamabad	217	15.13	145	26.88	101	33.86	18.73	116
Asia	Istanbul	50	37.37	51	46.70	25	56.36	18.99	25
Asia	Jakarta	45	38.12	29	50.79	16	59.99	21.87	29
Asia	Jeddah	97	28.87	126	30.53	36	52.98	24.11	61
Asia	Jerusalem	252	10.25	205	17.71	120	29.04	18.80	132
Asia	Karachi	131	24.55	114	32.28	100	33.99	9.44	31
Asia	Kiev	160	21.65	162	23.89	53	46.92	25.26	107
Asia	Kobe	261	8.74	248	9.21	274	5.24	-3.50	-13
Asia	Kuala Lumpur	58	35.55	66	44.06	10	62.09	26.53	48
Asia	Kuwait	106	27.19	151	26.32	32	55.19	28.00	74
Asia	Kyoto	239	11.71	250	9.21	249	11.03	-0.68	-10
Asia	Labuan	240	11.71	268	4.71	251	10.14	-1.57	-11
Asia	Lahore	185	18.55	117	32.00	123	28.23	9.67	62
Asia	Macao	249	10.52	216	15.84	203	16.40	5.88	46
Asia	Malacca	281	2.22	256	8.37	284	1.89	-0.33	-3
Asia	Manama	150	22.42	185	20.61	175	20.51	-1.92	-25
Asia	Manila	61	34.14	141	27.32	76	39.48	5.34	-15
Asia	Medan	267	7.55	277	2.59	269	6.12	-1.42	-2
Asia	Minsk			262	7.01	247	11.20	11.20	-247
Asia	Moscow	42	39.02	32	50.59	17	59.90	20.88	25
Asia	Mumbai	15	44.76	21	52.39	22	56.92	12.16	-7
Asia	Muscat	123	25.46	133	28.85	189	18.12	-7.34	-66
Asia	Nagoya	268	7.55	252	9.21	214	15.29	7.74	54
Asia	Nanjing					212	15.60	15.60	-212
Asia	New Delhi	67	33.60	58	45.50	31	55.19	21.59	36

Asia	Osaka	211	15.68	174	22.21	167	21.74	6.06	44
Asia	Penang	219	14.77	232	13.43	156	22.97	8.20	63
Asia	Pusan	253	10.01	271	4.71	258	7.90	-2.11	-5
Asia	Riyadh	96	28.89	90	37.55	41	50.76	21.87	55
Asia	Sanaa	265	8.16	209	17.05	255	8.53	0.37	10
Asia	Seoul	91	30.06	25	51.15	19	58.80	28.74	72
Asia	Shanghai	86	31.02	92	37.25	13	60.61	29.59	73
Asia	Shenzhen	190	18.09	220	15.57	106	32.60	14.51	84
Asia	Singapore	25	42.25	12	55.91	5	67.74	25.50	20
Asia	St Petersburg	145	23.05	121	31.30	95	34.61	11.55	50
Asia	Taipei	54	36.92	33	50.53	67	41.56	4.64	-13
Asia	Tashkent	241	11.71	236	13.07	232	12.87	1.16	9
Asia	Tbilisi	279	2.46	261	7.27	221	14.76	12.29	58
Asia	Tehran	243	11.52	182	21.27	220	14.91	3.39	23
Asia	Tel Aviv	88	30.73	78	40.08	12	61.00	30.28	76
Asia	Tianjin	280	2.22	259	7.85	240	11.90	9.68	40
Asia	Tokyo	8	51.22	5	63.63	14	60.36	9.14	-6
Asia	Xiamen					244	11.36	11.36	-244
Asia	Yangon	278	4.16			283	2.12	-2.04	-5
Asia	Yokohama	224	14.09	263	6.74	263	7.52	-6.57	-39
Africa	Abidjan	191	17.68	266	5.79	277	5.06	-12.62	-86
Africa	Accra	186	18.48	163	23.84	187	18.74	0.25	-1
Africa	Addis Ababa	270	6.86	276	2.74	280	2.83	-4.04	-10
Africa	Alexandria	231	13.22	247	9.91	266	7.24	-5.98	-35
Africa	Algiers	282	1.52	258	8.08	275	5.23	3.72	7
Africa	Bulawayo	234	12.91	255	8.37	282	2.83	-10.08	-48
Africa	Cairo	46	38.02	42	47.74	62	43.76	5.75	-16
Africa	Cape Town	51	37.30	48	47.28	80	38.83	1.53	-29
Africa	Casablanca	139	23.88	123	31.14	71	40.78	16.90	68



Africa	Dakar	230	13.24	191	19.50	246	11.22	-2.02	-16
Africa	Dar es Salaam	244	11.44	158	24.21	198	16.77	5.33	46
Africa	Douala	210	15.68	211	16.39	270	5.97	-9.72	-60
Africa	Durban	92	29.42	95	37.05	159	22.57	-6.85	-67
Africa	Gaborone	203	16.45	135	28.67	194	17.33	0.88	9
Africa	Harare	208	15.78	172	22.39	228	13.83	-1.95	-20
Africa	Johannesburg	78	31.79	56	45.79	38	51.27	19.48	40
Africa	Kampala	245	11.44	213	16.21	257	8.25	-3.19	-12
Africa	Kinshasa	276	4.16	267	4.71			-4.16	276
Africa	Lagos	126	25.12	122	31.21	102	33.42	8.30	24
Africa	Luanda	254	9.97	251	9.21	268	6.58	-3.40	-14
Africa	Lusaka	207	15.78	165	23.51	215	15.18	-0.61	-8
Africa	Maputu	237	11.77	239	11.61	260	7.67	-4.10	-23
Africa	Mombasa	271	6.72	208	17.13	243	11.37	4.65	28
Africa	Nairobi	119	25.90	110	32.65	61	43.99	18.09	58
Africa	Port Louis	75	32.34	60	45.23	92	35.00	2.66	-17
Africa	Pretoria	181	18.75	160	23.94	183	19.26	0.50	-2
Africa	Tunis	109	26.97	84	38.99	113	30.70	3.73	-4
Africa	Windhoek	228	13.67	186	20.54	262	7.52	-6.15	-34
North America	Atlanta	22	42.78	19	52.70	58	46.13	3.35	-36
North America	Baltimore	112	26.70	148	26.43	172	20.84	-5.86	-60
North America	Birmingham	77	32.00	129	29.83	137	26.38	-5.62	-60
North America	Boston	59	35.22	59	45.48	75	39.51	4.30	-16
North America	Buffalo	218	15.05	210	16.51	225	14.28	-0.77	-7
North America	Calgary	158	21.75	124	30.67	143	25.08	3.34	15
North America	Charlotte	80	31.46	91	37.42	165	21.97	-9.49	-85
North America	Chicago	7	52.44	14	55.01	44	50.23	-2.21	-37
North America	Cincinnati	134	24.16	132	29.04	248	11.19	-12.97	-114
North America	Cleveland	113	26.69	104	34.34	135	26.67	-0.01	-22

North America	Columbus	114	26.68	233	13.28	128	27.77	1.09	-14
North America	Dallas	115	26.65	57	45.67	88	36.21	9.56	27
North America	Denver	82	31.38	87	38.65	111	31.41	0.03	-29
North America	Detroit	107	27.15	119	31.44	138	26.22	-0.93	-31
North America	Edmonton	165	20.59	140	27.54	195	17.18	-3.41	-30
North America	Hartford	173	19.30	215	15.87	222	14.64	-4.66	-49
North America	Honolulu	144	23.19	143	27.02	192	17.42	-5.77	-48
North America	Houston	62	34.11	85	38.85	73	40.65	6.54	-11
North America	Indianapolis	69	33.35	96	36.77	149	24.27	-9.08	-80
North America	Kansas City	95	28.90	147	26.65	170	21.23	-7.68	-75
North America	Las Vegas	180	18.78	200	18.37	186	18.83	0.04	-6
North America	Los Angeles	4	53.90	11	56.80	66	41.61	-12.29	-62
North America	Miami	21	43.24	70	43.02	84	36.65	-6.59	-63
North America	Minneapolis	81	31.45	100	35.00	142	25.17	-6.28	-61
North America	Montreal	29	41.43	45	47.69	98	34.31	-7.12	-69
North America	New Orleans	169	20.06	155	25.26	202	16.45	-3.61	-33
North America	New York	2	72.88	2	83.07	2	79.26	6.38	0
North America	Omaha	174	19.20	199	18.63	191	17.47	-1.73	-17
North America	Ottawa	200	16.98	159	24.02	139	25.33	8.35	61
North America	Palo Alto	229	13.42	275	2.77	279	4.84	-8.58	-50
North America	Philadelphia	122	25.57	109	32.68	109	31.70	6.13	13
North America	Phoenix	133	24.20	101	34.97	119	29.34	5.14	14
North America	Pittsburgh	125	25.17	171	22.50	178	20.19	-4.98	-53
North America	Portland	146	22.85	111	32.50	134	26.88	4.03	12
North America	Quebec	247	11.20	264	6.66	233	12.85	1.65	14
North America	Richmond	155	21.93	175	22.07	162	22.25	0.32	-7
North America	Rochester	201	16.95	181	21.29	211	15.60	-1.34	-10
North America	Sacramento	223	14.17	173	22.26	200	16.54	2.37	23
North America	San Diego	101	28.10	88	38.22	118	29.70	1.60	-17

North America	San Francisco	30	41.28	31	50.69	77	39.08	-2.20	-47
North America	San Jose (CA)	157	21.75	193	19.03	173	20.78	-0.97	-16
North America	Seattle	94	29.10	81	39.47	117	29.98	0.88	-23
North America	St Louis	68	33.43	138	27.62	171	21.03	-12.41	-103
North America	Tampa	121	25.73	178	21.75	153	23.24	-2.50	-32
North America	Toronto	5	53.67	9	59.40	11	61.44	7.77	-6
North America	Vancouver	33	40.43	26	51.01	94	34.70	-5.73	-61
North America	Washington	18	43.50	39	48.88	46	48.91	5.41	-28
North America	Winnipeg	151	22.08	245	10.17	184	19.07	-3.01	-33
South America	Asuncion	148	22.44	201	18.05	158	22.69	0.25	-10
South America	Belo Horizonte	142	23.63	231	13.88	197	16.89	-6.74	-55
South America	Bogota	73	32.91	71	42.63	33	54.82	21.91	40
South America	Brazilia	258	8.96	190	19.63	253	9.84	0.88	5
South America	Buenos Aires	32	40.85	10	57.37	8	64.03	23.18	24
South America	Caracas	84	31.29	52	46.46	28	55.47	24.18	56
South America	Ciudad Juarez	212	15.56	260	7.50	217	15.11	-0.45	-5
South America	Curitiba	141	23.75	203	17.79	154	23.17	-0.58	-13
South America	Georgetown (Cayman)	232	13.01	244	10.75	122	28.67	15.67	110
South America	Guadalajara	79	31.54	79	40.02	39	50.97	19.43	40
South America	Guatemala City	127	24.88	74	41.42	81	38.35	13.47	46
South America	Guayaquil	143	23.55	115	32.25	78	39.08	15.52	65
South America	Hamilton	74	32.42	116	32.22	152	23.27	-9.15	-78
South America	Kingston (Jamaica)	233	13.01	167	23.46	238	12.31	-0.70	-5
South America	La Paz	153	22.05	134	28.72	114	30.63	8.58	39
South America	Lima	60	34.83	53	46.17	68	41.49	6.66	-8
South America	Managua	242	11.56	222	15.35	155	22.97	11.41	87
South America	Medellin	194	17.48	161	23.89	125	27.93	10.44	69
South America	Mexico City	12	47.28	23	51.93	21	57.26	9.97	-9
South America	Monterrey	76	32.25	237	12.77	116	30.14	-2.11	-40

South America	Montevideo	71	33.21	69	43.03	70	40.92	7.72	1
South America	Nassau	100	28.17	120	31.38	141	25.22	-2.95	-41
South America	Panama City	90	30.61	195	18.97	96	34.56	3.96	-6
South America	Port of Spain	256	9.60	235	13.07	261	7.58	-2.02	-5
South America	Porto Alegre	164	21.32	170	22.55	145	24.77	3.45	19
South America	Quito	98	28.50	73	41.45	52	47.23	18.73	46
South America	Recife	227	13.75			190	17.63	3.88	37
South America	Rio de Janeiro	93	29.18	80	39.63	63	43.47	14.28	30
South America	Salvador	172	19.43	188	20.04	207	15.94	-3.49	-35
South America	San Jose (Costa Rica)	135	24.12	106	34.04	82	37.25	13.12	53
South America	San Salvador	183	18.64	82	39.29	108	31.76	13.12	75
South America	Santiago	66	33.69	47	47.38	35	53.05	19.36	31
South America	Santo Domingo	178	18.91	183	21.20	86	36.45	17.54	92
South America	Sao Paulo	28	41.55	16	53.78	24	56.70	15.16	4
South America	Tegucigalpa	187	18.45	207	17.50	151	23.97	5.52	36
South America	Tijuana	156	21.86	136	28.40	164	22.14	0.28	-8
Oceania	Adelaide	55	36.78	49	47.07	104	33.08	-3.70	-49
Oceania	Auckland	17	43.52	72	41.73	18	59.06	15.54	-1
Oceania	Brisbane	38	39.25	46	47.38	60	44.26	5.01	-22
Oceania	Canberra	161	21.57	130	29.38	129	27.74	6.17	32
Oceania	Christchurch	118	26.05	76	40.69	133	27.10	1.04	-15
Oceania	Hobart	137	23.97	272	4.50	245	11.31	-12.66	-108
Oceania	Melbourne	23	42.43	17	53.57	55	46.83	4.40	-32
Oceania	Perth	39	39.15	36	49.33	85	36.56	-2.60	-46
Oceania	Port Moresby	198	17.17	270	4.71	267	7.09	-10.08	-69
Oceania	Suva	202	16.87	246	10.04	259	7.89	-8.98	-57
Oceania	Sydney	19	43.43	30	50.71	4	69.46	26.02	15
Oceania	Wellington	120	25.77	131	29.29	144	24.96	-0.81	-24



**Table 6.** ADV - standardized connectivity indices per year (2000, 2004, 2008)

2000			2004		2008	
rank	city	ADV st. connectivity 2000	city	ADV st. connectivity 2004	city	ADV st. connectivity 2008
1	New York	51.41	New York	57.78	New York	67.18
2	London	40.43	London	42.79	London	50.31
3	Hong Kong	30.74	Sydney	36.81	Paris	50.05
4	Toronto	29.61	Hong Kong	35.69	Hong Kong	49.01
5	Sydney	29.50	Toronto	34.71	Tokyo	47.43
6	Amsterdam	29.01	Amsterdam	33.52	Singapore	46.85
7	Miami	28.00	Madrid	32.61	Moscow	43.95
8	Singapore	27.30	Paris	31.69	Shanghai	42.76
9	Milan	27.15	Tokyo	31.18	Warsaw	42.52
10	Madrid	26.78	Mumbai	31.13	Brussels	41.90
11	Frankfurt	26.45	Lisbon	30.64	Sydney	41.80
12	Melbourne	25.83	Milan	30.59	Buenos Aires	41.47
13	Tokyo	25.77	Sao Paulo	30.51	Taipei	41.12
14	Paris	25.12	Singapore	30.48	Athens	40.85
15	Brussels	24.96	Brussels	30.44	Stockholm	40.71
16	Copenhagen	24.38	Buenos Aires	30.01	Toronto	40.65
17	Mumbai	24.05	Barcelona	29.71	Mumbai	40.54
18	Lisbon	23.87	Bangkok	29.38	Bangkok	40.31
19	Sao Paulo	22.85	Warsaw	29.17	Milan	40.29
20	Taipei	22.54	Frankfurt	28.38	Beijing	40.29
21	Auckland	22.44	Budapest	27.98	Madrid	40.17
22	Los Angeles	22.44	Athens	27.84	Seoul	39.50
23	Buenos Aires	22.42	Mexico City	27.55	Budapest	38.67
24	Barcelona	22.18	Beijing	27.47	Vienna	37.87
25	Chicago	22.12	Shanghai	27.45	Istanbul	37.52
26	Athens	21.84	New Delhi	27.38	Helsinki	37.14
27	Kuala Lumpur	21.65	Miami	27.04	Kuala Lumpur	36.84
28	Johannesburg	21.02	Kuala Lumpur	27.03	Lisbon	36.73
29	Vienna	20.95	Istanbul	26.51	Dubai	36.67

30	Warsaw	20.94
31	Beijing	20.74
32	Manila	20.68
33	Montreal	20.49
34	New Delhi	20.26
35	Istanbul	20.25
36	Prague	19.91
37	Helsinki	19.87
38	Zurich	19.60
39	San Francisco	19.43
40	Mexico City	19.15
41	Shanghai	19.14
42	Seoul	19.09
43	Jakarta	18.67
44	Budapest	18.62
45	Stockholm	18.44
46	Bangalore	18.29
47	Caracas	17.92
48	Bucharest	17.88
49	Chennai	17.65
50	Guangzhou	17.61
51	Karachi	17.54
52	Atlanta	17.37
53	Moscow	17.26
54	Bangkok	17.11
55	Tel Aviv	17.02
56	Beirut	16.63
57	Cairo	16.63
58	Dubai	16.63
59	Sofia	16.63
60	Ho Chi Minh City	16.59
61	Panama City	16.58
62	Calcutta	16.58
63	Hamburg	16.56
64	Guatemala City	16.33
65	Santo Domingo	16.26

Copenhagen	26.02
Jakarta	25.73
Stockholm	25.72
Manila	25.72
Johannesburg	25.62
Melbourne	25.51
Chennai	25.45
Vienna	25.42
Taipei	25.39
Helsinki	24.85
Zurich	24.71
Bangalore	24.62
Seoul	24.52
Moscow	24.22
Santiago	24.16
Tel Aviv	23.79
Prague	23.71
Bogota	23.45
Los Angeles	23.22
Chicago	22.33
Auckland	21.60
Dubai	21.49
Dublin	21.45
Guangzhou	21.21
Detroit	21.02
Hamburg	20.95
San Francisco	20.89
Lima	20.63
Dusseldorf	20.62
Calcutta	20.39
Beirut	19.11
Montreal	18.40
Panama City	18.31
Caracas	18.20
Belgrade	18.16
San Jose (Costa Rica)	18.16

Mexico City	35.69
Amsterdam	35.58
Jeddah	35.28
Copenhagen	35.14
Bucharest	34.67
Rome	34.46
Chicago	34.37
Prague	34.04
Caracas	33.36
Dublin	33.35
Sao Paulo	31.73
Jakarta	30.84
Zurich	30.62
Johannesburg	29.96
Kuwait	29.47
New Delhi	28.77
Sofia	28.19
Tel Aviv	27.85
Santiago	27.34
Manila	27.21
Riyadh	27.18
Los Angeles	26.55
Ljubljana	26.07
Barcelona	26.05
San Francisco	25.94
Kiev	25.83
Melbourne	25.32
Tallin	25.29
Bangalore	24.97
Auckland	24.78
Zagreb	24.78
Beirut	24.74
Ho Chi Minh City	24.64
Karachi	24.34
Frankfurt	24.01
Cairo	23.78

66	Bogota	16.22	Guatemala City	18.03	Montevideo	23.68
67	Detroit	15.97	Rome	17.85	Oslo	23.65
68	Jeddah	15.80	Oslo	17.68	Riga	23.51
69	Rome	15.73	Harare	17.03	Lima	22.45
70	Santiago	15.61	Bucharest	16.68	Chennai	22.41
71	Kuwait	15.11	Cairo	16.68	Casablanca	22.40
72	Montevideo	15.11	Sofia	16.68	Santo Domingo	22.03
73	Quito	14.98	Jeddah	16.51	Panama City	21.93
74	Oslo	14.76	Kiev	16.51	Vilnius	21.80
75	Lima	14.56	San Salvador	16.49	Guatemala City	21.70
76	Guayaquil	14.55	Santo Domingo	16.49	Belgrade	21.70
77	Dublin	14.50	Zagreb	16.49	Cape Town	21.42
78	Nairobi	14.47	Managua	16.45	Atlanta	21.39
79	Harare	14.17	Seattle	16.34	Bogota	20.82
80	San Salvador	13.74	Atlanta	15.96	Bratislava	20.79
81	Cape Town	12.73	Abidjan	15.49	Nairobi	20.59
82	Kiev	12.71	Minneapolis	15.28	Guangzhou	20.21
83	Ljubljana	12.71	Ljubljana	15.09	Miami	19.44
84	Calgary	12.64	Bratislava	14.97	Manama	19.36
85	Lagos	12.63	Kuwait	14.97	San Salvador	19.08
86	Dallas	12.50	Montevideo	14.68	Colombo	18.92
87	Vancouver	12.43	Cape Town	14.57	Dusseldorf	18.77
88	Casablanca	12.38	Ho Chi Minh City	14.28	Hamburg	18.59
89	Wellington	11.37	Guayaquil	14.12	Almaty	17.99
90	Belgrade	11.33	Colombo	14.05	San Jose (Costa Rica)	17.05
91	Tallin	11.33	Kampala	13.97	Nicosia	16.74
92	Vilnius	11.33	Accra	13.97	Denver	16.24
93	Zagreb	11.33	Maputu	13.97	Amman	16.03
94	Accra	11.26	Nairobi	13.97	Guayaquil	15.96
95	Dar es Salaam	11.26	Rio de Janeiro	13.78	Managua	15.88
96	Port of Spain	11.26	Asuncion	13.69	Berlin	15.34
97	Kampala	11.26	Manchester	13.45	Tegucigalpa	15.20
98	Maputu	11.26	Tallin	13.44	Accra	15.14
99	Bratislava	11.22	Brisbane	13.41	Minneapolis	14.95
100	Riga	11.11	Vilnius	13.23	Washington	14.75
101	Seattle	10.98	Munich	12.97	Quito	14.74



102	Rio de Janeiro	10.77
103	Managua	10.77
104	Lusaka	10.58
105	Washington	10.49
106	Dusseldorf	9.82
107	San Jose (Costa Rica)	9.78
108	Colombo	9.74
109	Kingston (Jamaica)	9.74
110	Brisbane	9.51
111	Lahore	9.49
112	Hyderabad (India)	9.38
113	Tegucigalpa	9.16
114	Islamabad	9.14
115	Amman	9.09
116	Asuncion	9.02
117	Windhoek	8.74
118	Nicosia	8.68
119	Brazilia	8.60
120	Abidjan	8.41
121	Portland	8.25
122	Manchester	8.20
123	Houston	8.20
124	Tunis	8.03
125	Riyadh	7.96
126	Dhaka	7.65
127	Malmo	7.56
128	San Diego	7.46
129	Birmingham	7.33
130	Philadelphia	6.63
131	Antwerp	6.61
132	Adelaide	6.56
133	Geneva	6.32
134	Munich	6.20
135	Cleveland	6.08
136	Denver	6.08
137	St Louis	6.08

Calgary	12.63
Amman	12.44
Dar es Salaam	12.44
Riyadh	12.37
Riga	11.89
Sarajevo	11.89
Wellington	11.80
Manama	11.49
Lagos	11.40
Vancouver	11.37
Gaborone	10.98
Lusaka	10.98
Windhoek	10.98
Quito	10.89
La Paz	10.66
Karachi	9.98
Dallas	9.87
Berlin	9.56
Nicosia	9.41
Geneva	9.31
Dakar	9.27
Luanda	9.27
Birmingham	9.27
Washington	8.46
Port Louis	8.41
Port of Spain	8.41
Casablanca	8.33
Almaty	8.24
Bristol	8.09
Portland	7.60
Seville	7.35
Malmo	7.13
Denver	6.97
San Jose (CA)	6.83
Tunis	6.70
Damascus	6.62

Lagos	14.49
Munich	14.33
Rio de Janeiro	14.33
Sarajevo	13.76
Dhaka	13.42
Dallas	12.99
Geneva	12.26
Detroit	12.21
Minsk	11.91
Harare	11.91
Algiers	11.49
Asuncion	11.36
Calcutta	11.35
Lahore	10.80
Islamabad	10.30
Abidjan	10.11
Seattle	9.93
Maputu	9.82
Montreal	9.08
Reykjavik	9.03
Kinshasa	8.89
Dar es Salaam	8.79
Stuttgart	8.78
Wellington	8.69
Portland	8.53
Port Louis	8.49
Port of Spain	8.46
Manchester	8.40
Doha	8.26
Lusaka	8.23
St Petersburg	8.20
La Paz	8.15
Hyderabad (India)	8.13
Brisbane	8.04
Gaborone	7.74
Turin	7.66

138	Port Louis	5.78
139	Edinburgh	5.77
140	Rochester	5.56
141	La Paz	5.48
142	Perth	5.48
143	Glasgow	5.17
144	Addis Ababa	5.14
145	Almaty	5.14
146	Dakar	5.14
147	Manama	5.14
148	Porto Alegre	5.14
149	Medellin	5.13
150	Nuremberg	5.13
151	Yangon	5.05
152	Bristol	5.00
153	Minneapolis	4.97
154	Berlin	4.94
155	San Jose (CA)	4.68
156	Phoenix	4.55
157	Boston	4.55
158	Douala	4.49
159	Hamilton	4.49
160	Minsk	4.49
161	Durban	4.26
162	Kansas City	3.99
163	Ottawa	3.99
164	Osaka	3.95
165	Hanoi	3.89
166	Bologna	3.76
167	Lyon	3.66
168	Hobart	3.64
169	Gaborone	3.61
170	Cologne	3.24
171	Baku	2.97
172	Belfast	2.97
173	Doha	2.97

Dhaka	6.62
Stuttgart	6.50
Nuremberg	6.34
Kingston (Jamaica)	6.19
Minsk	6.19
Reykjavik	6.19
Leeds	6.05
Basel	6.05
Houston	5.95
Hyderabad (India)	5.79
Brazilia	5.64
Kinshasa	5.64
Tegucigalpa	4.70
Cleveland	4.67
Cardiff	4.53
Glasgow	4.53
Douala	4.28
Cologne	4.26
Adelaide	4.05
Edinburgh	3.84
Philadelphia	3.84
San Diego	3.84
Doha	3.63
Muscat	3.63
Sanaa	3.63
Tashkent	3.63
Tbilisi	3.63
Algiers	3.63
Baku	3.63
Belfast	3.63
Baltimore	3.62
Lyon	3.62
Marseille	3.62
Arhus	3.07
Bergen	3.07
Honolulu	3.07

Vancouver	7.57
Boston	7.33
Douala	7.01
Kampala	6.93
Windhoek	6.77
Durban	6.76
Tunis	6.71
Cologne	6.54
Gothenburg	6.16
Tbilisi	6.01
Baltimore	5.98
Tashkent	5.54
Dakar	5.51
Luanda	5.51
Luxembourg	5.49
Monterrey	5.21
Edinburgh	5.01
Medellin	4.95
St Louis	4.93
Seville	4.86
Kingston (Jamaica)	4.78
Lyon	4.66
Kansas City	4.61
Abu Dhabi	4.61
Pittsburgh	4.43
Addis Ababa	4.11
Porto Alegre	4.11
Sacramento	4.11
Osaka	4.10
Marseille	4.03
Baku	4.03
Quebec	3.80
Muscat	3.70
Glasgow	3.68
Cardiff	3.68
Damascus	3.66

174	Dresden	2.97
175	Essen	2.97
176	Georgetown (Cayman)	2.97
177	Muscat	2.97
178	Nassau	2.97
179	Tashkent	2.97
180	Tbilisi	2.97
181	Tehran	2.97
182	Valencia	2.97
183	Stuttgart	2.79
184	Damascus	2.51
185	Las Vegas	2.51
186	Sacramento	2.51
187	Leeds	2.21
188	Ahmadabad	2.17
189	Arhus	2.17
190	Bergen	2.17
191	Honolulu	2.17
192	The Hague	2.16
193	Tirana	2.16
194	Gothenburg	2.09
195	Reykjavik	2.09
196	Seville	2.09
197	Turin	1.93
198	Abu Dhabi	1.84
199	Canberra	1.48
200	Cardiff	1.48
201	Christchurch	1.48
202	Cincinnati	1.48
203	Indianapolis	1.48
204	Lille	1.48
205	Marseille	1.48
206	Newcastle	1.48
207	Nottingham	1.48
208	Palo Alto	1.48
209	Strasbourg	1.48

Porto Alegre	3.07
Boston	3.04
Curitiba	2.99
Lahore	2.99
New Orleans	2.99
Canberra	2.71
Gothenburg	2.71
Hobart	2.71
Islamabad	2.71
Perth	2.71
The Hague	2.71
Tirana	2.71
Addis Ababa	2.56
Durban	2.56
Yangon	2.56
Lille	2.43
Norwich	2.43
Nottingham	2.43
Pittsburgh	2.43
Rotterdam	2.43
Indianapolis	2.11
Hamilton	1.71
Cincinnati	1.41
Luxembourg	1.41
Ottawa	1.41
Palo Alto	1.41
Phoenix	1.41
St Louis	1.41
Tampa	1.41
Nagoya	1.37
Jerusalem	0.71
Osaka	0.62
Turin	0.62

Adelaide	3.53
Perth	3.53
Brazilia	3.44
The Hague	3.32
Calgary	3.29
Lille	3.28
Nuremberg	3.26
Antwerp	3.22
Houston	3.03
Tirana	3.02
Malmo	3.01
Strasbourg	2.93
Ottawa	2.92
Canberra	2.83
Bordeaux	2.80
Indianapolis	2.78
Leeds	2.71
Rotterdam	2.57
Nagoya	2.55
Honolulu	2.47
San Diego	2.32
Guadalajara	2.22
Arhus	2.05
San Jose (CA)	2.04
Valencia	1.97
Aberdeen	1.95
Belfast	1.95
Hobart	1.89
Shenzhen	1.84
Basel	1.72
Birmingham	1.72
Norwich	1.72
Bologna	1.64
Nanjing	1.49
Palermo	1.49
Hamilton	1.41

210	Bilbao	1.38			Hanoi	1.38
211	Sanaa	1.38			Bern	1.37
212	St Petersburg	1.38			Genoa	1.37
213	Nagoya	0.98			Lausanne	1.37
214	Jerusalem	0.63			Linz	1.37
215	Leipzig	0.63			Naples	1.37
216	Kyoto	0.50			Utrecht	1.37
217					Cleveland	1.34
218					Columbus	1.34
219					New Orleans	1.34
220					Phoenix	1.34
221					Tampa	1.34
222					Yokohama	1.34
223					Edmonton	1.13
224					Bilbao	0.75
225					Kyoto	0.55

**Table 7.** ADV - Connectivity and rank changes over the years 2000, 2004 and 2008

world regions	city	rank 2000	adv st conn 2000	rank 2004	adv st conn 2004	rank 2008	adv st conn 2008	conn jump	rank jump
Europe	Aberdeen					199	1.95	1.95	-199
Europe	Amsterdam	6	29.01	6	33.52	31	35.58	6.57	-25
Europe	Antwerp	131	6.61			181	3.22	-3.39	-50
Europe	Arhus	189	2.17	171	3.07	196	2.05	-0.12	-7
Europe	Athens	26	21.84	22	27.84	14	40.85	19.02	12
Europe	Barcelona	24	22.18	17	29.71	53	26.05	3.87	-29
Europe	Basel			145	6.05	203	1.72	1.72	-203
Europe	Belfast	172	2.97	167	3.63	200	1.95	-1.01	-28
Europe	Belgrade	90	11.33	64	18.16	76	21.70	10.37	14
Europe	Berlin	154	4.94	119	9.56	96	15.34	10.40	58
Europe	Bern					211	1.37	1.37	-211
Europe	Bilbao	210	1.38			224	0.75	-0.63	-14
Europe	Bologna	166	3.76			206	1.64	-2.11	-40
Europe	Bordeaux					188	2.80	2.80	-188
Europe	Bratislava	99	11.22	84	14.97	80	20.79	9.57	19
Europe	Brussels	15	24.96	15	30.44	10	41.90	16.94	5
Europe	Bucharest	48	17.88	70	16.68	34	34.67	16.79	14
Europe	Budapest	44	18.62	21	27.98	23	38.67	20.05	21
Europe	Cardiff	200	1.48	152	4.53	172	3.68	2.20	28
Europe	Cologne	170	3.24	155	4.26	145	6.54	3.30	25
Europe	Copenhagen	16	24.38	30	26.02	33	35.14	10.76	-17
Europe	Dublin	77	14.50	52	21.45	39	33.35	18.85	38
Europe	Dusseldorf	106	9.82	58	20.62	87	18.77	8.95	19
Europe	Edinburgh	139	5.77	157	3.84	154	5.01	-0.76	-15
Europe	Frankfurt	11	26.45	20	28.38	64	24.01	-2.45	-53

Europe	Geneva	133	6.32	121	9.31	108	12.26	5.94	25
Europe	Genoa					212	1.37	1.37	-212
Europe	Glasgow	143	5.17	153	4.53	171	3.68	-1.50	-28
Europe	Gothenburg	194	2.09	180	2.71	146	6.16	4.07	48
Europe	Hamburg	63	16.56	55	20.95	88	18.59	2.03	-25
Europe	Helsinki	37	19.87	39	24.85	26	37.14	17.26	11
Europe	Lausanne					213	1.37	1.37	-213
Europe	Leeds	187	2.21	144	6.05	190	2.71	0.50	-3
Europe	Lille	204	1.48	189	2.43	179	3.28	1.81	25
Europe	Linz					214	1.37	1.37	-214
Europe	Lisbon	18	23.87	11	30.64	28	36.73	12.86	-10
Europe	Ljubljana	83	12.71	83	15.09	52	26.07	13.36	31
Europe	London	2	40.43	2	42.79	2	50.31	9.89	0
Europe	Luxembourg			197	1.41	152	5.49	5.49	-152
Europe	Lyon	167	3.66	169	3.62	159	4.66	1.00	8
Europe	Madrid	10	26.78	7	32.61	21	40.17	13.39	-11
Europe	Malmo	127	7.56	133	7.13	184	3.01	-4.55	-57
Europe	Manchester	122	8.20	97	13.45	129	8.40	0.20	-7
Europe	Marseille	205	1.48	170	3.62	167	4.03	2.56	38
Europe	Milan	9	27.15	12	30.59	19	40.29	13.15	-10
Europe	Munich	134	6.20	101	12.97	103	14.33	8.13	31
Europe	Naples					215	1.37	1.37	-215
Europe	Nicosia	118	8.68	120	9.41	91	16.74	8.06	27
Europe	Norwich			190	2.43	205	1.72	1.72	-205
Europe	Nuremberg	150	5.13	140	6.34	180	3.26	-1.86	-30
Europe	Oslo	74	14.76	68	17.68	67	23.65	8.89	7
Europe	Palermo					208	1.49	1.49	-208
Europe	Paris	14	25.12	8	31.69	3	50.05	24.93	11
Europe	Prague	36	19.91	46	23.71	37	34.04	14.13	-1

Europe	Reykjavik	195	2.09	143	6.19	121	9.03	6.94	74
Europe	Riga	100	11.11	106	11.89	68	23.51	12.40	32
Europe	Rome	69	15.73	67	17.85	35	34.46	18.73	34
Europe	Rotterdam			193	2.43	191	2.57	2.57	-191
Europe	Sarajevo			107	11.89	105	13.76	13.76	-105
Europe	Seville	196	2.09	132	7.35	157	4.86	2.78	39
Europe	Sofia	59	16.63	72	16.68	46	28.19	11.56	13
Europe	Stockholm	45	18.44	32	25.72	15	40.71	22.26	30
Europe	Strasbourg	209	1.48			185	2.93	1.45	24
Europe	Stuttgart	183	2.79	139	6.50	124	8.78	5.98	59
Europe	Tallin	91	11.33	98	13.44	57	25.29	13.96	34
Europe	The Hague	192	2.16	184	2.71	177	3.32	1.16	15
Europe	Tirana	193	2.16	185	2.71	183	3.02	0.86	10
Europe	Turin	197	1.93	206	0.62	137	7.66	5.72	60
Europe	Utrecht					216	1.37	1.37	-216
Europe	Valencia	182	2.97			198	1.97	-0.99	-16
Europe	Vienna	29	20.95	37	25.42	24	37.87	16.92	5
Europe	Vilnius	92	11.33	100	13.23	74	21.80	10.46	18
Europe	Warsaw	30	20.94	19	29.17	9	42.52	21.58	21
Europe	Zagreb	93	11.33	77	16.49	60	24.78	13.44	33
Europe	Zurich	38	19.60	40	24.71	42	30.62	11.02	-4
Asia	Abu Dhabi	198	1.84			161	4.61	2.77	37
Asia	Almaty	145	5.14	129	8.24	89	17.99	12.85	56
Asia	Amman	115	9.09	103	12.44	93	16.03	6.94	22
Asia	Baku	171	2.97	166	3.63	168	4.03	1.06	3
Asia	Bangalore	46	18.29	41	24.62	58	24.97	6.69	-12
Asia	Bangkok	54	17.11	18	29.38	18	40.31	23.20	36
Asia	Beijing	31	20.74	24	27.47	20	40.29	19.55	11
Asia	Beirut	56	16.63	60	19.11	61	24.74	8.10	-5

Asia	Calcutta	62	16.58	59	20.39	114	11.35	-5.23	-52
Asia	Chennai	49	17.65	36	25.45	70	22.41	4.75	-21
Asia	Colombo	108	9.74	90	14.05	86	18.92	9.18	22
Asia	Damascus	184	2.51	137	6.62	173	3.66	1.15	11
Asia	Dhaka	126	7.65	138	6.62	106	13.42	5.77	20
Asia	Doha	173	2.97	160	3.63	130	8.26	5.30	43
Asia	Dubai	58	16.63	51	21.49	29	36.67	20.03	29
Asia	Guangzhou	50	17.61	53	21.21	82	20.21	2.60	-32
Asia	Hanoi	165	3.89			210	1.38	-2.51	-45
Asia	Ho Chi Minh City	60	16.59	88	14.28	62	24.64	8.06	-2
Asia	Hong Kong	3	30.74	4	35.69	4	49.01	18.27	-1
Asia	Hyderabad (India)	112	9.38	147	5.79	134	8.13	-1.26	-22
Asia	Islamabad	114	9.14	182	2.71	116	10.30	1.16	-2
Asia	Istanbul	35	20.25	29	26.51	25	37.52	17.27	10
Asia	Jakarta	43	18.67	31	25.73	41	30.84	12.17	2
Asia	Jeddah	68	15.80	73	16.51	32	35.28	19.48	36
Asia	Karachi	51	17.54	117	9.98	63	24.34	6.81	-12
Asia	Kiev	82	12.71	74	16.51	55	25.83	13.12	27
Asia	Kuala Lumpur	27	21.65	28	27.03	27	36.84	15.20	0
Asia	Kuwait	71	15.11	85	14.97	44	29.47	14.36	27
Asia	Kyoto	216	0.50			225	0.55	0.04	-9
Asia	Lahore	111	9.49	177	2.99	115	10.80	1.32	-4
Asia	Manama	147	5.14	109	11.49	84	19.36	14.23	63
Asia	Manila	32	20.68	33	25.72	49	27.21	6.53	-17
Asia	Minsk	160	4.49	142	6.19	110	11.91	7.42	50
Asia	Moscow	53	17.26	43	24.22	7	43.95	26.69	46
Asia	Mumbai	17	24.05	10	31.13	17	40.54	16.49	0
Asia	Muscat	177	2.97	161	3.63	170	3.70	0.73	7
Asia	Nagoya	213	0.98	203	1.37	192	2.55	1.57	21



Asia	Nanjing					207	1.49	1.49	-207
Asia	New Delhi	34	20.26	26	27.38	45	28.77	8.51	-11
Asia	Osaka	164	3.95	205	0.62	166	4.10	0.15	-2
Asia	Riyadh	125	7.96	105	12.37	50	27.18	19.22	75
Asia	Seoul	42	19.09	42	24.52	22	39.50	20.40	20
Asia	Shanghai	41	19.14	25	27.45	8	42.76	23.62	33
Asia	Shenzhen					202	1.84	1.84	-202
Asia	Singapore	8	27.30	14	30.48	6	46.85	19.55	2
Asia	St Petersburg	212	1.38			132	8.20	6.82	80
Asia	Taipei	20	22.54	38	25.39	13	41.12	18.58	7
Asia	Tashkent	179	2.97	163	3.63	149	5.54	2.57	30
Asia	Tbilisi	180	2.97	164	3.63	147	6.01	3.04	33
Asia	Tel Aviv	55	17.02	45	23.79	47	27.85	10.83	8
Asia	Tokyo	13	25.77	9	31.18	5	47.43	21.66	8
Asia	Yokohama					222	1.34	1.34	-222
Africa	Abidjan	120	8.41	81	15.49	117	10.11	1.70	3
Africa	Accra	94	11.26	92	13.97	98	15.14	3.88	-4
Africa	Addis Ababa	144	5.14	186	2.56	163	4.11	-1.02	-19
Africa	Algiers			165	3.63	112	11.49	11.49	-112
Africa	Cairo	57	16.63	71	16.68	65	23.78	7.14	-8
Africa	Cape Town	81	12.73	87	14.57	77	21.42	8.69	4
Africa	Casablanca	88	12.38	128	8.33	71	22.40	10.01	17
Africa	Dakar	146	5.14	122	9.27	150	5.51	0.38	-4
Africa	Dar es Salaam	95	11.26	104	12.44	123	8.79	-2.47	-28
Africa	Douala	158	4.49	154	4.28	140	7.01	2.52	18
Africa	Durban	161	4.26	187	2.56	143	6.76	2.50	18
Africa	Gaborone	169	3.61	112	10.98	136	7.74	4.14	33
Africa	Harare	79	14.17	69	17.03	111	11.91	-2.27	-32
Africa	Johannesburg	28	21.02	34	25.62	43	29.96	8.94	-15

Africa	Kampala	97	11.26	91	13.97	141	6.93	-4.33	-44
Africa	Kinshasa			149	5.64	122	8.89	8.89	-122
Africa	Lagos	85	12.63	110	11.40	102	14.49	1.86	-17
Africa	Luanda			123	9.27	151	5.51	5.51	-151
Africa	Lusaka	104	10.58	113	10.98	131	8.23	-2.35	-27
Africa	Maputu	98	11.26	93	13.97	119	9.82	-1.44	-21
Africa	Nairobi	78	14.47	94	13.97	81	20.59	6.12	-3
Africa	Port Louis	138	5.78	126	8.41	127	8.49	2.71	11
Africa	Tunis	124	8.03	136	6.70	144	6.71	-1.32	-20
Africa	Windhoek	117	8.74	114	10.98	142	6.77	-1.97	-25
North America	Atlanta	52	17.37	80	15.96	78	21.39	4.02	-26
North America	Baltimore			168	3.62	148	5.98	5.98	-148
North America	Birmingham	129	7.33	124	9.27	204	1.72	-5.61	-75
North America	Boston	157	4.55	175	3.04	139	7.33	2.78	18
North America	Calgary	84	12.64	102	12.63	178	3.29	-9.35	-94
North America	Chicago	25	22.12	49	22.33	36	34.37	12.25	-11
North America	Cleveland	135	6.08	151	4.67	217	1.34	-4.74	-82
North America	Columbus					218	1.34	1.34	-218
North America	Dallas	86	12.50	118	9.87	107	12.99	0.50	-21
North America	Denver	136	6.08	134	6.97	92	16.24	10.16	44
North America	Detroit	67	15.97	54	21.02	109	12.21	-3.76	-42
North America	Edmonton					223	1.13	1.13	-223
North America	Honolulu	191	2.17	173	3.07	193	2.47	0.30	-2
North America	Houston	123	8.20	146	5.95	182	3.03	-5.16	-59
North America	Indianapolis	203	1.48	194	2.11	189	2.78	1.31	14
North America	Kansas City	162	3.99			160	4.61	0.62	2
North America	Los Angeles	22	22.44	48	23.22	51	26.55	4.12	-29
North America	Miami	7	28.00	27	27.04	83	19.44	-8.57	-76
North America	Minneapolis	153	4.97	82	15.28	99	14.95	9.99	54

North America	Montreal	33	20.49	61	18.40	120	9.08	-11.41	-87
North America	New Orleans			178	2.99	219	1.34	1.34	-219
North America	New York	1	51.41	1	57.78	1	67.18	15.78	0
North America	Ottawa	163	3.99	198	1.41	186	2.92	-1.07	-23
North America	Phoenix	156	4.55	200	1.41	220	1.34	-3.21	-64
North America	Pittsburgh			192	2.43	162	4.43	4.43	-162
North America	Portland	121	8.25	131	7.60	126	8.53	0.28	-5
North America	Quebec					169	3.80	3.80	-169
North America	Sacramento	186	2.51			165	4.11	1.60	21
North America	San Diego	128	7.46	159	3.84	194	2.32	-5.14	-66
North America	San Francisco	39	19.43	56	20.89	54	25.94	6.51	-15
North America	San Jose (CA)	155	4.68	135	6.83	197	2.04	-2.64	-42
North America	Seattle	101	10.98	79	16.34	118	9.93	-1.05	-17
North America	St Louis	137	6.08	201	1.41	156	4.93	-1.14	-19
North America	Tampa			202	1.41	221	1.34	1.34	-221
North America	Toronto	4	29.61	5	34.71	16	40.65	11.04	-12
North America	Vancouver	87	12.43	111	11.37	138	7.57	-4.85	-51
North America	Washington	105	10.49	125	8.46	100	14.75	4.27	5
South America	Asuncion	116	9.02	96	13.69	113	11.36	2.34	3
South America	Bogota	66	16.22	47	23.45	79	20.82	4.60	-13
South America	Brazilia	119	8.60	148	5.64	176	3.44	-5.16	-57
South America	Buenos Aires	23	22.42	16	30.01	12	41.47	19.05	11
South America	Caracas	47	17.92	63	18.20	38	33.36	15.44	9
South America	Guadalajara					195	2.22	2.22	-195
South America	Guatemala City	64	16.33	66	18.03	75	21.70	5.37	-11
South America	Guayaquil	76	14.55	89	14.12	94	15.96	1.41	-18
South America	Hamilton	159	4.49	195	1.71	209	1.41	-3.08	-50
South America	Kingston (Jamaica)	109	9.74	141	6.19	158	4.78	-4.95	-49
South America	La Paz	141	5.48	116	10.66	133	8.15	2.67	8

South America	Lima	75	14.56	57	20.63	69	22.45	7.88	6
South America	Managua	103	10.77	78	16.45	95	15.88	5.11	8
South America	Medellin	149	5.13			155	4.95	-0.18	-6
South America	Mexico City	40	19.15	23	27.55	30	35.69	16.54	10
South America	Monterrey					153	5.21	5.21	-153
South America	Montevideo	72	15.11	86	14.68	66	23.68	8.57	6
South America	Panama City	61	16.58	62	18.31	73	21.93	5.35	-12
South America	Port of Spain	96	11.26	127	8.41	128	8.46	-2.80	-32
South America	Porto Alegre	148	5.14	174	3.07	164	4.11	-1.02	-16
South America	Quito	73	14.98	115	10.89	101	14.74	-0.24	-28
South America	Rio de Janeiro	102	10.77	95	13.78	104	14.33	3.56	-2
South America	San Jose (Costa Rica)	107	9.78	65	18.16	90	17.05	7.28	17
South America	San Salvador	80	13.74	75	16.49	85	19.08	5.35	-5
South America	Santiago	70	15.61	44	24.16	48	27.34	11.73	22
South America	Santo Domingo	65	16.26	76	16.49	72	22.03	5.76	-7
South America	Sao Paulo	19	22.85	13	30.51	40	31.73	8.88	-21
South America	Tegucigalpa	113	9.16	150	4.70	97	15.20	6.04	16
Oceania	Adelaide	132	6.56	156	4.05	174	3.53	-3.02	-42
Oceania	Auckland	21	22.44	50	21.60	59	24.78	2.34	-38
Oceania	Brisbane	110	9.51	99	13.41	135	8.04	-1.47	-25
Oceania	Canberra	199	1.48	179	2.71	187	2.83	1.35	12
Oceania	Hobart	168	3.64	181	2.71	201	1.89	-1.75	-33
Oceania	Melbourne	12	25.83	35	25.51	56	25.32	-0.51	-44
Oceania	Perth	142	5.48	183	2.71	175	3.53	-1.94	-33
Oceania	Sydney	5	29.50	3	36.81	11	41.80	12.30	-6
Oceania	Wellington	89	11.37	108	11.80	125	8.69	-2.67	-36

**Table 8.** MAN CONS - standardized connectivity indices per year (2000, 2004, 2008)

2000			2004		2008	
rank	city	MAN CONS st. connectivity 2000	city	MAN CONS st. connectivity 2004	city	MAN CONS st. connectivity 2008
1	New York	43.22	New York	54.51	New York	52.78
2	London	37.75	London	47.39	London	35.22
3	Paris	32.65	Paris	36.79	Paris	34.95
4	Madrid	31.30	Madrid	33.07	Chicago	32.92
5	Stockholm	30.89	Sydney	32.56	Hong Kong	32.67
6	Toronto	29.72	Milan	32.15	Singapore	30.29
7	Milan	29.53	Chicago	31.94	Tokyo	29.86
8	Singapore	29.23	Toronto	31.89	Madrid	29.09
9	Chicago	28.31	Tokyo	31.21	Zurich	28.65
10	Washington	27.96	Brussels	29.93	Beijing	28.39
11	Sydney	27.06	Singapore	29.82	Mumbai	26.21
12	Hong Kong	26.89	Stockholm	29.51	Atlanta	26.18
13	Brussels	26.08	Amsterdam	28.18	Washington	25.45
14	Zurich	25.85	Hong Kong	28.10	Rome	25.44
15	Tokyo	25.11	Sao Paulo	27.82	Boston	25.22
16	Buenos Aires	24.63	Kuala Lumpur	27.80	Mexico City	25.19
17	Sao Paulo	24.47	Beijing	27.62	Amsterdam	25.14
18	Amsterdam	24.20	Melbourne	27.55	Frankfurt	25.00
19	Kuala Lumpur	22.53	Houston	27.40	Dublin	24.92
20	Boston	22.47	Boston	27.31	Milan	24.41
21	Lisbon	22.19	Mexico City	27.07	Seoul	24.25
22	Los Angeles	21.58	Washington	26.54	Shanghai	24.03
23	Seoul	21.42	Dallas	26.20	Sydney	23.54
24	Mexico City	20.26	Munich	25.69	Toronto	23.35
25	San Francisco	20.05	Zurich	25.69	Stockholm	23.16
26	Jakarta	20.00	Atlanta	25.33	Munich	23.06
27	Atlanta	19.52	Rome	24.87	Brussels	22.72
28	Vienna	19.09	Seoul	24.66	Buenos Aires	22.47
29	Frankfurt	17.96	Los Angeles	24.06	Kuala Lumpur	22.44

30	Melbourne	17.71
31	Bangkok	17.59
32	Dallas	17.42
33	Beijing	17.13
34	Montreal	16.70
35	Johannesburg	16.58
36	Moscow	16.54
37	Caracas	16.22
38	Dublin	16.06
39	Copenhagen	15.76
40	Munich	15.71
41	Helsinki	15.59
42	Dusseldorf	15.13
43	Bogota	15.04
44	Manila	14.84
45	Rome	14.78
46	Taipei	14.73
47	Budapest	14.35
48	Prague	14.13
49	Auckland	13.80
50	Cleveland	13.78
51	Miami	13.35
52	Houston	12.85
53	Wellington	12.81
54	Istanbul	12.80
55	Minneapolis	12.35
56	Mumbai	12.24
57	Barcelona	12.13
58	Santiago	12.13
59	New Delhi	11.99
60	Denver	11.68
61	Detroit	11.61
62	Pittsburgh	11.47
63	Philadelphia	11.33
64	Shanghai	10.96
65	Rotterdam	10.72

Buenos Aires	23.40
Dublin	23.33
Vienna	23.31
Frankfurt	22.75
Dusseldorf	22.43
Berlin	22.42
Prague	22.33
Warsaw	22.29
Budapest	21.89
Mumbai	21.58
Bangkok	21.41
Barcelona	21.04
Lisbon	20.63
Jakarta	20.47
Taipei	20.47
Seattle	20.36
San Francisco	20.33
Athens	20.18
Dubai	20.15
Montreal	19.83
Manila	19.71
Bogota	19.53
Stuttgart	19.25
Minneapolis	18.99
Vancouver	18.87
Caracas	18.77
Santiago	18.47
Oslo	18.43
Geneva	18.32
Luxembourg	18.17
Pittsburgh	17.98
Hamburg	17.44
Moscow	17.18
Phoenix	17.13
Detroit	16.90
Miami	16.83

Dallas	22.30
Sao Paulo	22.10
Budapest	21.44
Dusseldorf	21.23
Philadelphia	20.76
Warsaw	20.75
Lisbon	20.71
Los Angeles	20.67
Moscow	20.24
Houston	20.09
Taipei	19.86
Detroit	19.85
Bangkok	19.63
Prague	19.04
San Francisco	18.70
Melbourne	18.51
Helsinki	18.46
Minneapolis	18.30
Santiago	17.98
Wellington	17.70
Barcelona	17.39
Hamburg	17.28
Vienna	17.22
Oslo	17.03
Stuttgart	16.92
Miami	16.79
Cleveland	16.78
Auckland	16.07
Jakarta	15.96
Seattle	15.91
Calgary	15.78
Manila	15.72
Bogota	15.54
Copenhagen	15.42
Charlotte	15.30
Denver	14.45

66	St Louis	10.44
67	Charlotte	10.18
68	Warsaw	9.85
69	Oslo	9.80
70	Rio de Janeiro	9.17
71	Athens	9.16
72	San Diego	9.10
73	Bratislava	9.09
74	Gothenburg	8.67
75	Dubai	8.38
76	Kingston (Jamaica)	8.37
77	Hamburg	8.30
78	Berlin	8.24
79	Cologne	8.22
80	Vancouver	7.97
81	Doha	7.91
82	Riga	7.91
83	Ottawa	7.70
84	Tampa	7.67
85	Seattle	7.54
86	Harare	7.11
87	Calgary	7.04
88	Palo Alto	7.01
89	Abu Dhabi	6.92
90	Ljubljana	6.86
91	Beirut	6.81
92	Lima	6.81
93	Hartford	6.59
94	Amman	6.51
95	Tel Aviv	6.51
96	Geneva	6.46
97	Bangalore	6.38
98	Phoenix	6.37
99	Riyadh	6.34
100	Cincinnati	6.11
101	Bucharest	6.00

Tampa	16.80
Bratislava	16.71
Johannesburg	16.70
Cleveland	16.64
Bristol	16.33
Copenhagen	16.13
Philadelphia	16.09
Turin	15.29
Rio de Janeiro	14.97
Tel Aviv	14.96
Helsinki	14.96
Istanbul	14.94
Shanghai	14.94
Beirut	14.68
Birmingham	14.61
Abu Dhabi	14.48
Denver	14.18
San Diego	13.56
St Louis	13.45
Calgary	13.34
Hamilton	13.24
Rotterdam	13.06
Utrecht	12.67
Auckland	12.54
New Delhi	12.40
Malmo	12.34
Charlotte	12.27
Canberra	12.26
Wellington	12.20
Bergen	12.17
Ottawa	12.17
Manchester	11.98
Nagoya	11.92
Gothenburg	11.91
Casablanca	11.85
Macao	11.85

Montreal	14.10
Tampa	13.67
Pittsburgh	13.50
Birmingham	13.47
Berlin	13.45
San Diego	13.29
Columbus	13.21
Portland	13.08
Bangalore	12.94
Indianapolis	12.83
Phoenix	12.74
Chennai	12.65
St Louis	12.50
Cincinnati	12.39
Istanbul	12.22
Rotterdam	12.01
Shenzhen	12.01
Vancouver	12.01
Leeds	11.91
Guangzhou	11.82
Kansas City	11.61
Athens	11.42
Caracas	11.41
Johannesburg	11.19
Sacramento	11.14
San Jose (CA)	11.14
Aberdeen	11.01
Edinburgh	10.54
Belfast	10.52
Dalian	9.77
Honolulu	9.48
Canberra	9.39
Las Vegas	9.30
Zagreb	8.85
Brisbane	8.85
Bristol	8.83

102	Bristol	5.97
103	Manchester	5.87
104	Lagos	5.37
105	Abidjan	5.25
106	Accra	5.25
107	Asuncion	5.25
108	Bandar Seri Begawan	5.25
109	Cairo	5.25
110	Casablanca	5.25
111	Dar es Salaam	5.25
112	Gaborone	5.25
113	Kampala	5.25
114	Kuwait	5.25
115	Luanda	5.25
116	Lusaka	5.25
117	Macao	5.25
118	Manama	5.25
119	Montevideo	5.25
120	Muscat	5.25
121	Nassau	5.25
122	Quito	5.25
123	Reykjavik	5.25
124	Sofia	5.25
125	Tallin	5.25
126	Tunis	5.25
127	Vilnius	5.25
128	Windhoek	5.25
129	Birmingham	5.11
130	Bern	5.10
131	Lyon	4.91
132	Osaka	4.86
133	Colombo	4.84
134	Stuttgart	4.84
135	Columbus	4.52
136	Portland	4.52
137	Richmond	4.52

Montevideo	11.85
San Jose (Costa Rica)	11.85
Doha	11.82
Manama	11.82
Lagos	11.64
Sacramento	11.64
Hartford	11.64
Cologne	11.63
Cape Town	11.57
Edinburgh	11.42
Cincinnati	11.17
Bucharest	11.09
Hannover	11.09
Newcastle	10.88
Lille	10.80
Lyon	10.80
Bordeaux	10.80
Yokohama	10.74
Cairo	10.48
Osaka	10.47
Amman	10.36
Karachi	10.36
Reykjavik	10.36
Port Louis	10.36
Lima	10.36
Genoa	10.18
Bilbao	10.15
Columbus	10.15
Seville	10.15
Monterrey	10.13
Brisbane	10.06
Antwerp	9.99
Glasgow	9.60
Naples	9.60
Bangalore	9.46
Leeds	9.10

Manchester	8.77
Adelaide	8.71
Rio de Janeiro	8.58
Glasgow	8.53
New Delhi	8.47
Krakov	8.44
Geneva	8.18
Baltimore	8.06
Bilbao	8.06
Edmonton	8.06
Liverpool	8.06
Nanjing	8.06
Richmond	8.06
Rochester	8.06
Southampton	8.06
Winnipeg	8.06
Ottawa	7.61
Luxembourg	7.60
Monterrey	7.50
Hartford	7.46
Karachi	7.40
Bucharest	7.36
Manama	6.84
Kingston (Jamaica)	6.69
Utrecht	6.61
Ljubljana	6.51
Antwerp	6.13
Perth	5.91
Bratislava	5.85
Cairo	5.84
Quebec	5.34
Ankara	5.27
Bologna	5.27
Calcutta	5.27
Newcastle	5.23
Lagos	5.13



138	Canberra	4.51
139	Cape Town	4.51
140	Indianapolis	4.51
141	Santo Domingo	4.32
142	Brisbane	4.22
143	Kansas City	4.22
144	Pretoria	4.22
145	Sacramento	4.22
146	Bilbao	4.16
147	Seville	4.16
148	Turin	4.16
149	Utrecht	4.10
150	Dhaka	3.91
151	Malmo	3.81
152	Dakar	3.80
153	Luxembourg	3.68
154	Nagoya	3.63
155	Monterrey	3.41
156	San Jose (CA)	3.29
157	Antwerp	3.18
158	Almaty	2.71
159	Belgrade	2.71
160	Damascus	2.71
161	Douala	2.71
162	Hamilton	2.71
163	Hanoi	2.71
164	Islamabad	2.71
165	Kiev	2.71
166	Managua	2.71
167	Maputu	2.71
168	Minsk	2.71
169	Nairobi	2.71
170	Panama City	2.71
171	Port Louis	2.71
172	Port Moresby	2.71
173	San Jose (Costa Rica)	2.71

Honolulu	9.02
Riyadh	8.98
Douala	8.90
Dresden	8.90
Guatemala City	8.90
Hanoi	8.90
Jeddah	8.90
Kingston (Jamaica)	8.90
Kuwait	8.90
Leipzig	8.90
Managua	8.90
Nicosia	8.90
Nuremberg	8.90
Panama City	8.90
Quito	8.90
Riga	8.90
San Salvador	8.90
Santo Domingo	8.90
Sofia	8.90
Tallin	8.90
Tegucigalpa	8.90
Vilnius	8.90
Zagreb	8.90
Belgrade	8.90
Ankara	8.89
Bologna	8.89
Kyoto	8.89
Tashkent	8.89
Tijuana	8.89
Brazilia	8.69
Curitiba	8.69
Hyderabad (India)	8.69
Indianapolis	8.69
Pretoria	8.69
Aberdeen	8.29
Adelaide	8.13

Nairobi	5.13
Nassau	5.13
Casablanca	5.11
Lima	5.11
Basel	5.08
Bergen	5.08
Bordeaux	5.08
Hannover	5.08
Lausanne	5.08
Lille	5.08
Lyon	5.08
Marseille	5.08
Strasbourg	5.08
Montevideo	4.94
Port Louis	4.84
Nagoya	4.77
Beirut	4.76
Omaha	4.76
Riyadh	4.76
Ho Chi Minh City	4.61
Kinshasa	4.61
Nicosia	4.61
Reykjavik	4.61
San Jose (Costa Rica)	4.61
Santo Domingo	4.61
Tegucigalpa	4.61
Ciudad Juarez	4.54
Liege	4.54
Seville	4.54
Hamilton	4.53
Dubai	4.42
Riga	4.17
Georgetown (Cayman)	4.07
Cologne	4.05
Accra	3.52
Almaty	3.52

174	San Salvador	2.71
175	Tegucigalpa	2.71
176	Tirana	2.71
177	Nottingham	2.68
178	Newcastle	2.66
179	Valencia	2.66
180	Addis Ababa	2.54
181	Algiers	2.54
182	Ho Chi Minh City	2.54
183	Jeddah	2.54
184	Karachi	2.54
185	La Paz	2.54
186	Nicosia	2.54
187	Zagreb	2.54
188	Aberdeen	2.48
189	Honolulu	1.86
190	Glasgow	1.75
191	Baltimore	1.56
192	Bordeaux	1.51
193	Calcutta	1.51
194	Lille	1.51
195	Liverpool	1.51
196	Marseille	1.51
197	Naples	1.51
198	Palermo	1.51
199	Strasbourg	1.51
200	Kinshasa	1.28
201	Tbilisi	1.28
202	Plymouth	1.18
203	Quebec	1.18
204	Edinburgh	0.97
205	St Petersburg	0.75
206		
207		
208		
209		

Arhus	8.13
Basel	8.13
Kansas City	8.13
Krakow	8.13
Lausanne	8.13
Marseille	8.13
Strasbourg	8.13
Calcutta	7.64
Alexandria	7.53
Hobart	7.52
Cardiff	7.52
Nottingham	7.52
Perth	7.52
Belfast	7.40
Chennai	7.40
Las Vegas	7.31
Baltimore	7.31
Omaha	7.31
Labuan	7.23
Malacca	7.23
Palo Alto	6.72
Almaty	5.94
Baku	5.94
Belo Horizonte	5.94
Buffalo	5.94
Christchurch	5.94
Ciudad Juarez	5.94
Damascus	5.94
Durban	5.94
Gaborone	5.94
Guadalajara	5.94
Guayaquil	5.94
Harare	5.94
Jerusalem	5.94
Kiev	5.94
Kobe	5.94

Asuncion	3.52
Buffalo	3.52
Bulawayo	3.52
Cardiff	3.52
Christchurch	3.52
Dar es Salaam	3.52
Doha	3.52
Dresden	3.52
Essen	3.52
Genoa	3.52
Guadalajara	3.52
Guatemala City	3.52
Islamabad	3.52
Jerusalem	3.52
Kobe	3.52
Kuwait	3.52
Kyoto	3.52
Lahore	3.52
Leipzig	3.52
Lusaka	3.52
Macao	3.52
Managua	3.52
Maputu	3.52
Medellin	3.52
Mombasa	3.52
Muscat	3.52
Nottingham	3.52
Osaka	3.52
Panama City	3.52
Penang	3.52
Quito	3.52
Sanaa	3.52
Sarajevo	3.52
St Petersburg	3.52
Tallin	3.52
Tashkent	3.52

210		Liege	5.94	Tbilisi	3.52
211		Liverpool	5.94	Tianjin	3.52
212		Luanda	5.94	Tijuana	3.52
213		Medan	5.94	Vilnius	3.52
214		Medellin	5.94	Windhoek	3.52
215		Muscat	5.94	Tel Aviv	3.29
216		New Orleans	5.94	Sofia	2.67
217		Palermo	5.94	Dakar	2.13
218		Penang	5.94	Kiev	1.90
219		Porto Alegre	5.94	Gaborone	1.71
220		Quebec	5.94	Douala	1.61
221		Recife	5.94	Arhus	1.56
222		Richmond	5.94	Valencia	1.56
223		Rochester	5.94	Hyderabad (India)	1.56
224		San Jose (CA)	5.94	Palo Alto	1.28
225		Sanaa	5.94	Baku	1.24
226		Sarajevo	5.94	New Orleans	1.24
227		Southampton	5.94	Bern	1.21
228		St Petersburg	5.94	Algiers	1.08
229		Tirana	5.94	Amman	1.08
230		Valencia	5.94	Dhaka	1.08
231		Windhoek	5.94	Hanoi	1.08
232		Winnipeg	5.94	Port of Spain	1.08
233		Essen	5.15	Salvador	1.08
234		Shenzhen	4.76		
235		Dakar	4.42		
236		Kinshasa	4.42		
237		Abidjan	4.42		
238		Guangzhou	4.21		
239		Algiers	2.96		
240		Asuncion	2.96		
241		Colombo	2.96		
242		Dhaka	2.96		
243		Dortmund	2.96		
244		Ho Chi Minh City	2.96		
245		La Paz	2.96		

246		Lahore	2.96		
247		Ljubljana	2.96		
248		Nairobi	2.96		
249		Nassau	2.96		
250		Port of Spain	2.96		
251		Tbilisi	2.96		
252		Tunis	2.96		
253		Dalian	2.75		
254		Portland	1.71		
255		Bern	1.60		
256		The Hague	1.58		
257		Linz	1.46		
258		Nanjing	1.46		
259		Georgetown (Cayman)	1.29		
260		Tianjin	1.29		

**Table 9.** MAN CONS - Connectivity and rank changes over the years 2000, 2004 and 2008

world regions	city	rank 2000	man cons st conn 2000	rank 2004	man cons st conn 2004	rank 2008	man cons st conn 2008	conn jump	rank jump
Europe	Aberdeen	188	2.48	172	8.29	92	11.01	8.53	96
Europe	Amsterdam	18	24.20	13	28.18	17	25.14	0.94	1
Europe	Antwerp	157	3.18	133	9.99	128	6.13	2.95	29
Europe	Arhus			174	8.13	221	1.56	1.56	-221
Europe	Athens	71	9.16	47	20.18	87	11.42	2.26	-16
Europe	Barcelona	57	12.13	41	21.04	50	17.39	5.27	7
Europe	Basel			175	8.13	142	5.08	5.08	-142
Europe	Belfast			187	7.40	94	10.52	10.52	-94
Europe	Belgrade	159	2.71	161	8.90			-2.71	159
Europe	Bergen			95	12.17	143	5.08	5.08	-143
Europe	Berlin	78	8.24	35	22.42	70	13.45	5.21	8
Europe	Bern	130	5.10	255	1.60	227	1.21	-3.89	-97
Europe	Bilbao	146	4.16	128	10.15	110	8.06	3.90	36
Europe	Bologna			163	8.89	134	5.27	5.27	-134
Europe	Bordeaux	192	1.51	118	10.80	144	5.08	3.58	48
Europe	Bratislava	73	9.09	67	16.71	130	5.85	-3.24	-57
Europe	Bristol	102	5.97	70	16.33	101	8.83	2.86	1
Europe	Brussels	13	26.08	10	29.93	27	22.72	-3.36	-14
Europe	Bucharest	101	6.00	113	11.09	123	7.36	1.36	-22
Europe	Budapest	47	14.35	38	21.89	32	21.44	7.08	15
Europe	Cardiff			184	7.52	177	3.52	3.52	-177
Europe	Cologne	79	8.22	109	11.63	171	4.05	-4.17	-92
Europe	Copenhagen	39	15.76	71	16.13	63	15.42	-0.34	-24
Europe	Dortmund			243	2.96			0.00	0
Europe	Dresden			141	8.90	181	3.52	3.52	-181

Europe	Dublin	38	16.06	31	23.33	19	24.92	8.86	19
Europe	Dusseldorf	42	15.13	34	22.43	33	21.23	6.10	9
Europe	Edinburgh	204	0.97	111	11.42	93	10.54	9.57	111
Europe	Essen			233	5.15	182	3.52	3.52	-182
Europe	Frankfurt	29	17.96	33	22.75	18	25.00	7.05	11
Europe	Geneva	96	6.46	58	18.32	108	8.18	1.72	-12
Europe	Genoa			127	10.18	183	3.52	3.52	-183
Europe	Glasgow	190	1.75	134	9.60	105	8.53	6.79	85
Europe	Gothenburg	74	8.67	99	11.91			-8.67	74
Europe	Hamburg	77	8.30	61	17.44	51	17.28	8.98	26
Europe	Hannover			114	11.09	145	5.08	5.08	-145
Europe	Helsinki	41	15.59	76	14.96	46	18.46	2.87	-5
Europe	Krakow			177	8.13	107	8.44	8.44	-107
Europe	Lausanne			178	8.13	146	5.08	5.08	-146
Europe	Leeds			137	9.10	84	11.91	11.91	-84
Europe	Leipzig			147	8.90	192	3.52	3.52	-192
Europe	Liege			210	5.94	165	4.54	4.54	-165
Europe	Lille	194	1.51	116	10.80	147	5.08	3.58	47
Europe	Linz			257	1.46			0.00	0
Europe	Lisbon	21	22.19	42	20.63	36	20.71	-1.48	-15
Europe	Liverpool	195	1.51	211	5.94	112	8.06	6.56	83
Europe	Ljubljana	90	6.86	247	2.96	127	6.51	-0.35	-37
Europe	London	2	37.75	2	47.39	2	35.22	-2.53	0
Europe	Luxembourg	153	3.68	59	18.17	119	7.60	3.91	34
Europe	Lyon	131	4.91	117	10.80	148	5.08	0.17	-17
Europe	Madrid	4	31.30	4	33.07	8	29.09	-2.22	-4
Europe	Malmo	151	3.81	91	12.34			-3.81	151
Europe	Manchester	103	5.87	97	11.98	102	8.77	2.90	1
Europe	Marseille	196	1.51	179	8.13	149	5.08	3.58	47

Europe	Milan	7	29.53	6	32.15	20	24.41	-5.12	-13
Europe	Munich	40	15.71	24	25.69	26	23.06	7.35	14
Europe	Naples	197	1.51	135	9.60			-1.51	197
Europe	Newcastle	178	2.66	115	10.88	136	5.23	2.57	42
Europe	Nicosia	186	2.54	149	8.90	159	4.61	2.06	27
Europe	Nottingham	177	2.68	185	7.52	200	3.52	0.84	-23
Europe	Nuremberg			150	8.90			0.00	0
Europe	Oslo	69	9.80	57	18.43	53	17.03	7.23	16
Europe	Palermo	198	1.51	217	5.94			-1.51	198
Europe	Paris	3	32.65	3	36.79	3	34.95	2.30	0
Europe	Plymouth	202	1.18					-1.18	202
Europe	Prague	48	14.13	36	22.33	43	19.04	4.91	5
Europe	Reykjavik	123	5.25	124	10.36	160	4.61	-0.65	-37
Europe	Riga	82	7.91	153	8.90	169	4.17	-3.74	-87
Europe	Rome	45	14.78	27	24.87	14	25.44	10.66	31
Europe	Rotterdam	65	10.72	87	13.06	81	12.01	1.29	-16
Europe	Sarajevo			226	5.94	206	3.52	3.52	-206
Europe	Seville	147	4.16	130	10.15	166	4.54	0.38	-19
Europe	Sofia	124	5.25	156	8.90	216	2.67	-2.58	-92
Europe	Southampton			227	5.94	116	8.06	8.06	-116
Europe	Stockholm	5	30.89	12	29.51	25	23.16	-7.74	-20
Europe	Strasbourg	199	1.51	180	8.13	150	5.08	3.58	49
Europe	Stuttgart	134	4.84	52	19.25	54	16.92	12.08	80
Europe	Tallin	125	5.25	157	8.90	208	3.52	-1.73	-83
Europe	The Hague			256	1.58			0.00	0
Europe	Tirana	176	2.71	229	5.94			-2.71	176
Europe	Turin	148	4.16	73	15.29			-4.16	148
Europe	Utrecht	149	4.10	88	12.67	126	6.61	2.50	23
Europe	Valencia	179	2.66	230	5.94	222	1.56	-1.10	-43

Europe	Vienna	28	19.09	32	23.31	52	17.22	-1.86	-24
Europe	Vilnius	127	5.25	159	8.90	213	3.52	-1.73	-86
Europe	Warsaw	68	9.85	37	22.29	35	20.75	10.90	33
Europe	Zagreb	187	2.54	160	8.90	99	8.85	6.31	88
Europe	Zurich	14	25.85	25	25.69	9	28.65	2.79	5
Asia	Abu Dhabi	89	6.92	81	14.48			-6.92	89
Asia	Almaty	158	2.71	195	5.94	173	3.52	0.81	-15
Asia	Amman	94	6.51	122	10.36	229	1.08	-5.42	-135
Asia	Ankara			162	8.89	133	5.27	5.27	-133
Asia	Baku			196	5.94	225	1.24	1.24	-225
Asia	Bandar Seri Begawan	108	5.25					-5.25	108
Asia	Bangalore	97	6.38	136	9.46	74	12.94	6.57	23
Asia	Bangkok	31	17.59	40	21.41	42	19.63	2.04	-11
Asia	Beijing	33	17.13	17	27.62	10	28.39	11.26	23
Asia	Beirut	91	6.81	79	14.68	154	4.76	-2.05	-63
Asia	Calcutta	193	1.51	181	7.64	135	5.27	3.76	58
Asia	Chennai			188	7.40	77	12.65	12.65	-77
Asia	Colombo	133	4.84	241	2.96			-4.84	133
Asia	Dalian			253	2.75	95	9.77	9.77	-95
Asia	Damascus	160	2.71	201	5.94			-2.71	160
Asia	Dhaka	150	3.91	242	2.96	230	1.08	-2.82	-80
Asia	Doha	81	7.91	104	11.82	180	3.52	-4.39	-99
Asia	Dubai	75	8.38	48	20.15	168	4.42	-3.96	-93
Asia	Guangzhou			238	4.21	85	11.82	11.82	-85
Asia	Hanoi	163	2.71	143	8.90	231	1.08	-1.63	-68
Asia	Ho Chi Minh City	182	2.54	244	2.96	157	4.61	2.06	25
Asia	Hong Kong	12	26.89	14	28.10	5	32.67	5.78	7
Asia	Hyderabad (India)			169	8.69	223	1.56	1.56	-223
Asia	Islamabad	164	2.71			186	3.52	0.81	-22



Asia	Istanbul	54	12.80	77	14.94	80	12.22	-0.58	-26
Asia	Jakarta	26	20.00	43	20.47	58	15.96	-4.04	-32
Asia	Jeddah	183	2.54	144	8.90			-2.54	183
Asia	Jerusalem			207	5.94	187	3.52	3.52	-187
Asia	Karachi	184	2.54	123	10.36	122	7.40	4.85	62
Asia	Kiev	165	2.71	208	5.94	218	1.90	-0.81	-53
Asia	Kobe			209	5.94	188	3.52	3.52	-188
Asia	Kuala Lumpur	19	22.53	16	27.80	29	22.44	-0.10	-10
Asia	Kuwait	114	5.25	146	8.90	189	3.52	-1.73	-75
Asia	Kyoto			164	8.89	190	3.52	3.52	-190
Asia	Labuan			192	7.23			0.00	0
Asia	Lahore			246	2.96	191	3.52	3.52	-191
Asia	Macao	117	5.25	101	11.85	194	3.52	-1.73	-77
Asia	Malacca			193	7.23			0.00	0
Asia	Manama	118	5.25	105	11.82	124	6.84	1.59	-6
Asia	Manila	44	14.84	50	19.71	61	15.72	0.88	-17
Asia	Medan			213	5.94			0.00	0
Asia	Minsk	168	2.71					-2.71	168
Asia	Moscow	36	16.54	62	17.18	38	20.24	3.69	-2
Asia	Mumbai	56	12.24	39	21.58	11	26.21	13.97	45
Asia	Muscat	120	5.25	215	5.94	199	3.52	-1.73	-79
Asia	Nagoya	154	3.63	98	11.92	153	4.77	1.14	1
Asia	Nanjing			258	1.46	113	8.06	8.06	-113
Asia	New Delhi	59	11.99	90	12.40	106	8.47	-3.51	-47
Asia	Osaka	132	4.86	121	10.47	201	3.52	-1.34	-69
Asia	Penang			218	5.94	203	3.52	3.52	-203
Asia	Riyadh	99	6.34	139	8.98	156	4.76	-1.58	-57
Asia	Sanaa			225	5.94	205	3.52	3.52	-205
Asia	Seoul	23	21.42	28	24.66	21	24.25	2.83	2

Asia	Shanghai	64	10.96	78	14.94	22	24.03	13.07	42
Asia	Shenzhen			234	4.76	82	12.01	12.01	-82
Asia	Singapore	8	29.23	11	29.82	6	30.29	1.06	2
Asia	St Petersburg	205	0.75	228	5.94	207	3.52	2.78	-2
Asia	Taipei	46	14.73	44	20.47	40	19.86	5.12	6
Asia	Tashkent			165	8.89	209	3.52	3.52	-209
Asia	Tbilisi	201	1.28	251	2.96	210	3.52	2.24	-9
Asia	Tel Aviv	95	6.51	75	14.96	215	3.29	-3.21	-120
Asia	Tianjin			260	1.29	211	3.52	3.52	-211
Asia	Tokyo	15	25.11	9	31.21	7	29.86	4.75	8
Asia	Yokohama			119	10.74			0.00	0
Africa	Abidjan	105	5.25	237	4.42			-5.25	105
Africa	Accra	106	5.25			172	3.52	-1.73	-66
Africa	Addis Ababa	180	2.54					-2.54	180
Africa	Alexandria			182	7.53			0.00	0
Africa	Algiers	181	2.54	239	2.96	228	1.08	-1.46	-47
Africa	Bulawayo					176	3.52	3.52	-176
Africa	Cairo	109	5.25	120	10.48	131	5.84	0.59	-22
Africa	Cape Town	139	4.51	110	11.57			-4.51	139
Africa	Casablanca	110	5.25	100	11.85	140	5.11	-0.14	-30
Africa	Dakar	152	3.80	235	4.42	217	2.13	-1.67	-65
Africa	Dar es Salaam	111	5.25			179	3.52	-1.73	-68
Africa	Douala	161	2.71	140	8.90	220	1.61	-1.10	-59
Africa	Durban			202	5.94			0.00	0
Africa	Gaborone	112	5.25	203	5.94	219	1.71	-3.55	-107
Africa	Harare	86	7.11	206	5.94			-7.11	86
Africa	Johannesburg	35	16.58	68	16.70	89	11.19	-5.39	-54
Africa	Kampala	113	5.25					-5.25	113
Africa	Kinshasa	200	1.28	236	4.42	158	4.61	3.33	42

Africa	Lagos	104	5.37	106	11.64	137	5.13	-0.23	-33
Africa	Luanda	115	5.25	212	5.94			-5.25	115
Africa	Lusaka	116	5.25			193	3.52	-1.73	-77
Africa	Maputu	167	2.71			196	3.52	0.81	-29
Africa	Mombasa					198	3.52	3.52	-198
Africa	Nairobi	169	2.71	248	2.96	138	5.13	2.42	31
Africa	Port Louis	171	2.71	125	10.36	152	4.84	2.14	19
Africa	Pretoria	144	4.22	171	8.69			-4.22	144
Africa	Tunis	126	5.25	252	2.96			-5.25	126
Africa	Windhoek	128	5.25	231	5.94	214	3.52	-1.73	-86
North America	Atlanta	27	19.52	26	25.33	12	26.18	6.66	15
North America	Baltimore	191	1.56	190	7.31	109	8.06	6.51	82
North America	Birmingham	129	5.11	80	14.61	69	13.47	8.35	60
North America	Boston	20	22.47	20	27.31	15	25.22	2.75	5
North America	Buffalo			198	5.94	175	3.52	3.52	-175
North America	Calgary	87	7.04	85	13.34	60	15.78	8.74	27
North America	Charlotte	67	10.18	92	12.27	64	15.30	5.13	3
North America	Chicago	9	28.31	7	31.94	4	32.92	4.61	5
North America	Cincinnati	100	6.11	112	11.17	79	12.39	6.28	21
North America	Cleveland	50	13.78	69	16.64	56	16.78	3.00	-6
North America	Columbus	135	4.52	129	10.15	72	13.21	8.69	63
North America	Dallas	32	17.42	23	26.20	30	22.30	4.87	2
North America	Denver	60	11.68	82	14.18	65	14.45	2.77	-5
North America	Detroit	61	11.61	64	16.90	41	19.85	8.25	20
North America	Edmonton					111	8.06	8.06	-111
North America	Hartford	93	6.59	108	11.64	121	7.46	0.87	-28
North America	Honolulu	189	1.86	138	9.02	96	9.48	7.62	93
North America	Houston	52	12.85	19	27.40	39	20.09	7.24	13
North America	Indianapolis	140	4.51	170	8.69	75	12.83	8.32	65

North America	Kansas City	143	4.22	176	8.13	86	11.61	7.40	57
North America	Las Vegas			189	7.31	98	9.30	9.30	-98
North America	Los Angeles	22	21.58	29	24.06	37	20.67	-0.91	-15
North America	Miami	51	13.35	65	16.83	55	16.79	3.43	-4
North America	Minneapolis	55	12.35	53	18.99	47	18.30	5.95	8
North America	Montreal	34	16.70	49	19.83	66	14.10	-2.60	-32
North America	New Orleans			216	5.94	226	1.24	1.24	-226
North America	New York	1	43.22	1	54.51	1	52.78	9.57	0
North America	Omaha			191	7.31	155	4.76	4.76	-155
North America	Ottawa	83	7.70	96	12.17	118	7.61	-0.08	-35
North America	Palo Alto	88	7.01	194	6.72	224	1.28	-5.73	-136
North America	Philadelphia	63	11.33	72	16.09	34	20.76	9.43	29
North America	Phoenix	98	6.37	63	17.13	76	12.74	6.38	22
North America	Pittsburgh	62	11.47	60	17.98	68	13.50	2.03	-6
North America	Portland	136	4.52	254	1.71	73	13.08	8.56	63
North America	Quebec	203	1.18	220	5.94	132	5.34	4.16	71
North America	Richmond	137	4.52	222	5.94	114	8.06	3.55	23
North America	Rochester			223	5.94	115	8.06	8.06	-115
North America	Sacramento	145	4.22	107	11.64	90	11.14	6.92	55
North America	San Diego	72	9.10	83	13.56	71	13.29	4.19	1
North America	San Francisco	25	20.05	46	20.33	44	18.70	-1.35	-19
North America	San Jose (CA)	156	3.29	224	5.94	91	11.14	7.85	65
North America	Seattle	85	7.54	45	20.36	59	15.91	8.37	26
North America	St Louis	66	10.44	84	13.45	78	12.50	2.07	-12
North America	Tampa	84	7.67	66	16.80	67	13.67	6.00	17
North America	Toronto	6	29.72	8	31.89	24	23.35	-6.37	-18
North America	Vancouver	80	7.97	54	18.87	83	12.01	4.03	-3
North America	Washington	10	27.96	22	26.54	13	25.45	-2.51	-3
North America	Winnipeg			232	5.94	117	8.06	8.06	-117

South America	Asuncion	107	5.25	240	2.96	174	3.52	-1.73	-67
South America	Belo Horizonte			197	5.94			0.00	0
South America	Bogota	43	15.04	51	19.53	62	15.54	0.50	-19
South America	Brazilia			167	8.69			0.00	0
South America	Buenos Aires	16	24.63	30	23.40	28	22.47	-2.16	-12
South America	Caracas	37	16.22	55	18.77	88	11.41	-4.80	-51
South America	Ciudad Juarez			200	5.94	164	4.54	4.54	-164
South America	Curitiba			168	8.69			0.00	0
South America	Georgetown (Cayman)			259	1.29	170	4.07	4.07	-170
South America	Guadalajara			204	5.94	184	3.52	3.52	-184
South America	Guatemala City			142	8.90	185	3.52	3.52	-185
South America	Guayaquil			205	5.94			0.00	0
South America	Hamilton	162	2.71	86	13.24	167	4.53	1.82	-5
South America	Kingston (Jamaica)	76	8.37	145	8.90	125	6.69	-1.67	-49
South America	La Paz	185	2.54	245	2.96			-2.54	185
South America	Lima	92	6.81	126	10.36	141	5.11	-1.70	-49
South America	Managua	166	2.71	148	8.90	195	3.52	0.81	-29
South America	Medellin			214	5.94	197	3.52	3.52	-197
South America	Mexico City	24	20.26	21	27.07	16	25.19	4.93	8
South America	Monterrey	155	3.41	131	10.13	120	7.50	4.09	35
South America	Montevideo	119	5.25	102	11.85	151	4.94	-0.32	-32
South America	Nassau	121	5.25	249	2.96	139	5.13	-0.12	-18
South America	Panama City	170	2.71	151	8.90	202	3.52	0.81	-32
South America	Port of Spain			250	2.96	232	1.08	1.08	-232
South America	Porto Alegre			219	5.94			0.00	0
South America	Quito	122	5.25	152	8.90	204	3.52	-1.73	-82
South America	Recife			221	5.94			0.00	0
South America	Rio de Janeiro	70	9.17	74	14.97	104	8.58	-0.59	-34
South America	Salvador					233	1.08	1.08	-233

South America	San Jose (Costa Rica)	173	2.71	103	11.85	161	4.61	1.90	12
South America	San Salvador	174	2.71	154	8.90			-2.71	174
South America	Santiago	58	12.13	56	18.47	48	17.98	5.85	10
South America	Santo Domingo	141	4.32	155	8.90	162	4.61	0.29	-21
South America	Sao Paulo	17	24.47	15	27.82	31	22.10	-2.37	-14
South America	Tegucigalpa	175	2.71	158	8.90	163	4.61	1.90	12
South America	Tijuana			166	8.89	212	3.52	3.52	-212
Oceania	Adelaide			173	8.13	103	8.71	8.71	-103
Oceania	Auckland	49	13.80	89	12.54	57	16.07	2.28	-8
Oceania	Brisbane	142	4.22	132	10.06	100	8.85	4.64	42
Oceania	Canberra	138	4.51	93	12.26	97	9.39	4.89	41
Oceania	Christchurch			199	5.94	178	3.52	3.52	-178
Oceania	Hobart			183	7.52			0.00	0
Oceania	Melbourne	30	17.71	18	27.55	45	18.51	0.80	-15
Oceania	Perth			186	7.52	129	5.91	5.91	-129
Oceania	Port Moresby	172	2.71					-2.71	172
Oceania	Sydney	11	27.06	5	32.56	23	23.54	-3.53	-12
Oceania	Wellington	53	12.81	94	12.20	49	17.70	4.89	4

**Table 10. LAW - standardized connectivity indices per year (2000, 2004, 2008)**

2000			2004		2008	
rank	city	LAW st. connectivity 2000	city	LAW st. connectivity 2004	city	LAW st. connectivity 2008
1	London	18.87	London	19.98	London	14.99
2	New York	16.68	New York	17.67	New York	13.25
3	Frankfurt	12.85	Hong Kong	14.11	Paris	10.46
4	Hong Kong	12.68	Frankfurt	14.10	Frankfurt	8.90
5	Washington	12.44	Paris	13.87	Washington	8.62
6	Brussels	11.67	Brussels	13.40	Brussels	8.04
7	Paris	10.43	Washington	12.38	Hong Kong	7.92
8	Singapore	9.97	Tokyo	11.87	Moscow	7.52
9	Tokyo	9.16	Singapore	11.63	Tokyo	7.17
10	Moscow	7.99	Milan	9.80	Beijing	6.76
11	Amsterdam	7.91	Chicago	9.68	Shanghai	6.28
12	Berlin	7.50	Moscow	9.54	Amsterdam	5.94
13	Budapest	7.28	Beijing	9.33	Munich	5.91
14	Prague	7.15	Shanghai	9.15	Milan	5.81
15	Chicago	7.11	San Francisco	9.06	Chicago	5.64
16	Los Angeles	6.33	Rome	8.93	Madrid	5.57
17	Munich	6.26	Budapest	8.06	Singapore	5.27
18	Dusseldorf	6.04	Madrid	7.66	Warsaw	5.01
19	Bangkok	5.84	Warsaw	7.50	Dusseldorf	4.83
20	Milan	5.64	Berlin	7.41	Budapest	4.64
21	Warsaw	5.43	Los Angeles	7.33	Prague	4.64
22	Sydney	5.32	Palo Alto	7.22	Rome	4.46
23	Beijing	5.24	Dusseldorf	7.18	Palo Alto	4.14
24	San Francisco	5.17	Munich	7.10	Los Angeles	4.06
25	Palo Alto	5.03	Prague	6.88	Hamburg	3.80
26	Sao Paulo	4.65	Bangkok	6.67	San Francisco	3.79
27	Rome	4.61	Amsterdam	6.53	Bangkok	3.78
28	Stockholm	4.38	Sydney	6.07	Sydney	3.66
29	Shanghai	4.18	Stockholm	5.03	Vienna	3.54

30	Hamburg	3.93
31	Almaty	3.80
32	Ho Chi Minh City	3.60
33	Bratislava	3.47
34	St Petersburg	3.44
35	Madrid	3.40
36	Barcelona	3.29
37	Miami	3.18
38	Taipei	3.16
39	Leipzig	3.12
40	Mexico City	3.07
41	Hanoi	3.07
42	Dallas	3.02
43	Riyadh	2.89
44	Buenos Aires	2.52
45	Atlanta	2.49
46	Luxembourg	2.42
47	San Diego	2.41
48	Vienna	2.37
49	Jakarta	2.19
50	Zurich	2.16
51	Dresden	2.14
52	Caracas	2.13
53	Manila	2.13
54	Melbourne	2.13
55	Cologne	2.07
56	Geneva	2.01
57	Houston	1.87
58	Baku	1.80
59	Kiev	1.80
60	Johannesburg	1.65
61	Antwerp	1.64
62	Denver	1.61
63	Rio de Janeiro	1.43
64	Tijuana	1.43
65	Valencia	1.43

Hamburg	4.96
Vienna	4.93
Sao Paulo	4.69
Dallas	4.52
Toronto	4.36
San Diego	4.11
Barcelona	4.07
Mexico City	4.05
Ho Chi Minh City	3.93
Jakarta	3.67
Antwerp	3.62
Monterrey	3.50
Buenos Aires	3.49
Zurich	3.49
Houston	3.45
Taipei	3.42
Almaty	3.18
Miami	3.14
Manila	2.91
Bratislava	2.74
Caracas	2.64
Ciudad Juarez	2.64
Melbourne	2.64
Bogota	2.64
Rio de Janeiro	2.62
Hanoi	2.56
Baku	2.52
Riyadh	2.52
St Petersburg	2.42
Cologne	2.16
Geneva	2.12
Cleveland	1.88
Luxembourg	1.83
Guadalajara	1.77
Kiev	1.77
Kuala Lumpur	1.77

Antwerp	3.46
Stockholm	3.45
San Diego	3.21
Sao Paulo	3.09
Berlin	2.99
Dubai	2.90
Bratislava	2.87
Dallas	2.81
Cologne	2.51
Melbourne	2.49
Baltimore	2.38
Riyadh	2.09
Boston	1.98
Barcelona	1.95
Miami	1.89
St Petersburg	1.87
Cairo	1.87
Houston	1.85
Taipei	1.76
Bucharest	1.62
Atlanta	1.59
Edinburgh	1.53
Sofia	1.53
Zagreb	1.53
Toronto	1.48
Buenos Aires	1.47
Zurich	1.47
Oslo	1.44
Philadelphia	1.44
Luxembourg	1.42
Almaty	1.42
Mexico City	1.42
Monterrey	1.42
Caracas	1.34
Abu Dhabi	1.20
Hanoi	1.15



66	Bogota	1.43
67	Brazilia	1.43
68	Cairo	1.43
69	Ciudad Juarez	1.43
70	Guadalajara	1.43
71	Manama	1.43
72	Monterrey	1.43
73	Cleveland	1.37
74	Rotterdam	1.31
75	The Hague	1.31
76	Toronto	1.17
77	Pittsburgh	1.16
78	Montreal	1.12
79	Bristol	1.07
80	Dubai	0.97
81	Seattle	0.92
82	Gothenburg	0.88
83	Malmo	0.88
84	Ankara	0.88
85	Helsinki	0.88
86	Istanbul	0.88
87	Jeddah	0.88
88	Columbus	0.85
89	Boston	0.84
90	San Jose (CA)	0.76
91	Aberdeen	0.73
92	Bucharest	0.73
93	Stuttgart	0.73
94	Tashkent	0.73
95	Utrecht	0.73
96	Minneapolis	0.71
97	Philadelphia	0.68
98	Mumbai	0.45
99	Seoul	0.45
100	Sacramento	0.39
101	Cape Town	0.37

Bologna	1.77
Brazilia	1.77
Cairo	1.77
Calgary	1.77
Porto Alegre	1.77
Santiago	1.77
Tijuana	1.77
Valencia	1.77
Boston	1.69
Dresden	1.61
Pittsburgh	1.58
Atlanta	1.53
Bucharest	1.52
Zagreb	1.47
Bristol	1.27
Dubai	1.17
Columbus	1.16
Philadelphia	0.98
Denver	0.90
Aberdeen	0.85
Belgrade	0.85
Casablanca	0.85
Leipzig	0.85
Lyon	0.85
Montevideo	0.85
Stuttgart	0.85
Minneapolis	0.78
Helsinki	0.75
Istanbul	0.75
Johannesburg	0.75
Mumbai	0.75
Lisbon	0.66
Seattle	0.64
Turin	0.53
Sacramento	0.40
Vancouver	0.34

Ho Chi Minh City	1.15
Stuttgart	1.10
Dresden	1.08
Jakarta	1.07
Cleveland	1.00
Accra	0.97
Adelaide	0.97
Auckland	0.97
Bergen	0.97
Birmingham	0.97
Brisbane	0.97
Canberra	0.97
Cape Town	0.97
Glasgow	0.97
Las Vegas	0.97
Leeds	0.97
Liverpool	0.97
Lusaka	0.97
Manchester	0.97
Minneapolis	0.97
Perth	0.97
Phoenix	0.97
Sacramento	0.97
Sarajevo	0.97
Seattle	0.97
Sheffield	0.97
Tampa	0.97
Tbilisi	0.97
Wellington	0.97
Baku	0.90
Bogota	0.90
Bologna	0.90
Ciudad Juarez	0.90
Geneva	0.90
Guadalajara	0.90
Kuala Lumpur	0.90

102	Minsk	0.37			Manila	0.90
103	Rochester	0.32			Porto Alegre	0.90
104	Vancouver	0.32			Rio de Janeiro	0.90
105					Santiago	0.90
106					Tijuana	0.90
107					Casablanca	0.82
108					Istanbul	0.77
109					Columbus	0.62
110					Aberdeen	0.56
111					Bristol	0.56
112					Leipzig	0.56
113					Lyon	0.56
114					Montevideo	0.56
115					Seville	0.56
116					Strasbourg	0.56
117					Utrecht	0.56
118					Ankara	0.52
119					Helsinki	0.52
120					Pittsburgh	0.42
121					Turin	0.42
122					Lisbon	0.40
123					Quebec	0.40
124					Algiers	0.25
125					Tunis	0.25
126					New Delhi	0.19

**Table 11. LAW - Connectivity and rank changes over the years 2000, 2004 and 2008**

world regions	city	rank 2000	law st conn 2000	rank 2004	law st conn 2004	rank 2008	law st conn 2008	conn jump	rank jump
Europe	Aberdeen	91	0.73	85	0.85	110	0.56	-0.16	-19
Europe	Amsterdam	11	7.91	27	6.53	12	5.94	-1.96	-1
Europe	Antwerp	61	1.64	40	3.62	30	3.46	1.81	31
Europe	Barcelona	36	3.29	36	4.07	43	1.95	-1.34	-7
Europe	Belgrade			86	0.85			0.00	0
Europe	Bergen					74	0.97	0.97	-74
Europe	Berlin	12	7.50	20	7.41	34	2.99	-4.51	-22
Europe	Bologna			66	1.77	97	0.90	0.90	-97
Europe	Bratislava	33	3.47	49	2.74	36	2.87	-0.60	-3
Europe	Bristol	79	1.07	80	1.27	111	0.56	-0.51	-32
Europe	Brussels	6	11.67	6	13.40	6	8.04	-3.64	0
Europe	Bucharest	92	0.73	78	1.52	49	1.62	0.89	43
Europe	Budapest	13	7.28	17	8.06	20	4.64	-2.64	-7
Europe	Cologne	55	2.07	59	2.16	38	2.51	0.44	17
Europe	Dresden	51	2.14	75	1.61	68	1.08	-1.06	-17
Europe	Dusseldorf	18	6.04	23	7.18	19	4.83	-1.22	-1
Europe	Edinburgh					51	1.53	1.53	-51
Europe	Frankfurt	3	12.85	4	14.10	4	8.90	-3.94	-1
Europe	Geneva	56	2.01	60	2.12	99	0.90	-1.11	-43
Europe	Glasgow					79	0.97	0.97	-79
Europe	Gothenburg	82	0.88					-0.88	82
Europe	Hamburg	30	3.93	30	4.96	25	3.80	-0.13	5
Europe	Helsinki	85	0.88	93	0.75	119	0.52	-0.37	-34
Europe	Leeds					81	0.97	0.97	-81
Europe	Leipzig	39	3.12	88	0.85	112	0.56	-2.55	-73

Europe	Lisbon			97	0.66	122	0.40	0.40	-122
Europe	Liverpool					82	0.97	0.97	-82
Europe	London	1	18.87	1	19.98	1	14.99	-3.88	0
Europe	Luxembourg	46	2.42	62	1.83	59	1.42	-1.00	-13
Europe	Lyon			89	0.85	113	0.56	0.56	-113
Europe	Madrid	35	3.40	18	7.66	16	5.57	2.17	19
Europe	Malmo	83	0.88					-0.88	83
Europe	Manchester					84	0.97	0.97	-84
Europe	Milan	20	5.64	10	9.80	14	5.81	0.18	6
Europe	Munich	17	6.26	24	7.10	13	5.91	-0.35	4
Europe	Oslo					57	1.44	1.44	-57
Europe	Paris	7	10.43	5	13.87	3	10.46	0.03	4
Europe	Prague	14	7.15	25	6.88	21	4.64	-2.50	-7
Europe	Rome	27	4.61	16	8.93	22	4.46	-0.15	5
Europe	Rotterdam	74	1.31					-1.31	74
Europe	Sarajevo					89	0.97	0.97	-89
Europe	Seville					115	0.56	0.56	-115
Europe	Sheffield					91	0.97	0.97	-91
Europe	Sofia					52	1.53	1.53	-52
Europe	Stockholm	28	4.38	29	5.03	31	3.45	-0.94	-3
Europe	Strasbourg					116	0.56	0.56	-116
Europe	Stuttgart	93	0.73	91	0.85	67	1.10	0.38	26
Europe	The Hague	75	1.31					-1.31	75
Europe	Turin			99	0.53	121	0.42	0.42	-121
Europe	Utrecht	95	0.73			117	0.56	-0.16	-22
Europe	Valencia	65	1.43	73	1.77			-1.43	65
Europe	Vienna	48	2.37	31	4.93	29	3.54	1.16	19
Europe	Warsaw	21	5.43	19	7.50	18	5.01	-0.42	3
Europe	Zagreb			79	1.47	53	1.53	1.53	-53

Europe	Zurich	50	2.16	43	3.49	56	1.47	-0.69	-6
Asia	Abu Dhabi					64	1.20	1.20	-64
Asia	Almaty	31	3.80	46	3.18	60	1.42	-2.38	-29
Asia	Ankara	84	0.88			118	0.52	-0.37	-34
Asia	Baku	58	1.80	56	2.52	95	0.90	-0.90	-37
Asia	Bangkok	19	5.84	26	6.67	27	3.78	-2.06	-8
Asia	Beijing	23	5.24	13	9.33	10	6.76	1.52	13
Asia	Dubai	80	0.97	81	1.17	35	2.90	1.93	45
Asia	Hanoi	41	3.07	55	2.56	65	1.15	-1.92	-24
Asia	Ho Chi Minh City	32	3.60	38	3.93	66	1.15	-2.45	-34
Asia	Hong Kong	4	12.68	3	14.11	7	7.92	-4.76	-3
Asia	Istanbul	86	0.88	94	0.75	108	0.77	-0.12	-22
Asia	Jakarta	49	2.19	39	3.67	69	1.07	-1.12	-20
Asia	Jeddah	87	0.88					-0.88	87
Asia	Kiev	59	1.80	64	1.77			-1.80	59
Asia	Kuala Lumpur			65	1.77	101	0.90	0.90	-101
Asia	Manama	71	1.43					-1.43	71
Asia	Manila	53	2.13	48	2.91	102	0.90	-1.23	-49
Asia	Minsk	102	0.37					-0.37	102
Asia	Moscow	10	7.99	12	9.54	8	7.52	-0.47	2
Asia	Mumbai	98	0.45	96	0.75			-0.45	98
Asia	New Delhi					126	0.19	0.19	-126
Asia	Riyadh	43	2.89	57	2.52	41	2.09	-0.81	2
Asia	Seoul	99	0.45					-0.45	99
Asia	Shanghai	29	4.18	14	9.15	11	6.28	2.10	18
Asia	Singapore	8	9.97	9	11.63	17	5.27	-4.70	-9
Asia	St Petersburg	34	3.44	58	2.42	45	1.87	-1.57	-11
Asia	Taipei	38	3.16	45	3.42	48	1.76	-1.40	-10
Asia	Tashkent	94	0.73					-0.73	94

Asia	Tbilisi					93	0.97	0.97	-93
Asia	Tokyo	9	9.16	8	11.87	9	7.17	-1.99	0
Africa	Accra					71	0.97	0.97	-71
Africa	Algiers					124	0.25	0.25	-124
Africa	Cairo	68	1.43	68	1.77	46	1.87	0.44	22
Africa	Cape Town	101	0.37			78	0.97	0.60	23
Africa	Casablanca			87	0.85	107	0.82	0.82	-107
Africa	Johannesburg	60	1.65	95	0.75			-1.65	60
Africa	Lusaka					83	0.97	0.97	-83
Africa	Tunis					125	0.25	0.25	-125
North America	Atlanta	45	2.49	77	1.53	50	1.59	-0.91	-5
North America	Baltimore					40	2.38	2.38	-40
North America	Birmingham					75	0.97	0.97	-75
North America	Boston	89	0.84	74	1.69	42	1.98	1.14	47
North America	Calgary			69	1.77			0.00	0
North America	Chicago	15	7.11	11	9.68	15	5.64	-1.47	0
North America	Cleveland	73	1.37	61	1.88	70	1.00	-0.37	3
North America	Columbus	88	0.85	82	1.16	109	0.62	-0.24	-21
North America	Dallas	42	3.02	33	4.52	37	2.81	-0.21	5
North America	Denver	62	1.61	84	0.90			-1.61	62
North America	Houston	57	1.87	44	3.45	47	1.85	-0.02	10
North America	Las Vegas					80	0.97	0.97	-80
North America	Los Angeles	16	6.33	21	7.33	24	4.06	-2.27	-8
North America	Miami	37	3.18	47	3.14	44	1.89	-1.30	-7
North America	Minneapolis	96	0.71	92	0.78	85	0.97	0.26	11
North America	Montreal	78	1.12					-1.12	78
North America	New York	2	16.68	2	17.67	2	13.25	-3.43	0
North America	Palo Alto	25	5.03	22	7.22	23	4.14	-0.89	2
North America	Philadelphia	97	0.68	83	0.98	58	1.44	0.76	39

North America	Phoenix					87	0.97	0.97	-87
North America	Pittsburgh	77	1.16	76	1.58	120	0.42	-0.74	-43
North America	Quebec					123	0.40	0.40	-123
North America	Rochester	103	0.32					-0.32	103
North America	Sacramento	100	0.39	100	0.40	88	0.97	0.58	12
North America	San Diego	47	2.41	35	4.11	32	3.21	0.80	15
North America	San Francisco	24	5.17	15	9.06	26	3.79	-1.39	-2
North America	San Jose (CA)	90	0.76					-0.76	90
North America	Seattle	81	0.92	98	0.64	90	0.97	0.05	-9
North America	Tampa					92	0.97	0.97	-92
North America	Toronto	76	1.17	34	4.36	54	1.48	0.32	22
North America	Vancouver	104	0.32	101	0.34			-0.32	104
North America	Washington	5	12.44	7	12.38	5	8.62	-3.83	0
South America	Bogota	66	1.43	53	2.64	96	0.90	-0.53	-30
South America	Brazilia	67	1.43	67	1.77			-1.43	67
South America	Buenos Aires	44	2.52	42	3.49	55	1.47	-1.05	-11
South America	Caracas	52	2.13	50	2.64	63	1.34	-0.79	-11
South America	Ciudad Juarez	69	1.43	51	2.64	98	0.90	-0.53	-29
South America	Guadalajara	70	1.43	63	1.77	100	0.90	-0.53	-30
South America	Mexico City	40	3.07	37	4.05	61	1.42	-1.66	-21
South America	Monterrey	72	1.43	41	3.50	62	1.42	-0.01	10
South America	Montevideo			90	0.85	114	0.56	0.56	-114
South America	Porto Alegre			70	1.77	103	0.90	0.90	-103
South America	Rio de Janeiro	63	1.43	54	2.62	104	0.90	-0.53	-41
South America	Santiago			71	1.77	105	0.90	0.90	-105
South America	Sao Paulo	26	4.65	32	4.69	33	3.09	-1.56	-7
South America	Tijuana	64	1.43	72	1.77	106	0.90	-0.53	-42
Oceania	Adelaide					72	0.97	0.97	-72
Oceania	Auckland					73	0.97	0.97	-73

Oceania	Brisbane					76	0.97	0.97	-76
Oceania	Canberra					77	0.97	0.97	-77
Oceania	Melbourne	54	2.13	52	2.64	39	2.49	0.36	15
Oceania	Perth					86	0.97	0.97	-86
Oceania	Sydney	22	5.32	28	6.07	28	3.66	-1.66	-6
Oceania	Wellington					94	0.97	0.97	-94

**Table 12.** FS - standardized connectivity indices per year (2000, 2004, 2008)

		2000		2004		2008	
rank	city	FS st. connectivity 2000		city	FS st. connectivity 2004	city	FS st. connectivity 2008
1	London	49.19		London	49.29	London	44.06
2	New York	44.69		New York	43.81	New York	42.84
3	Tokyo	40.14		Singapore	37.24	Hong Kong	41.06
4	Hong Kong	39.78		Hong Kong	36.74	Singapore	36.30
5	Singapore	36.65		Tokyo	36.29	Tokyo	36.16
6	Paris	35.80		Paris	32.94	Paris	35.59
7	Chicago	30.77		Zurich	30.18	Sydney	34.35
8	Los Angeles	30.08		Madrid	29.70	Shanghai	34.03
9	Madrid	30.08		Milan	28.61	Madrid	31.84
10	Milan	29.94		Shanghai	28.26	Milan	31.53
11	Frankfurt	28.81		Toronto	27.88	Seoul	30.93
12	Sao Paulo	28.72		Sao Paulo	27.69	Beijing	30.11
13	Sydney	28.18		Brussels	27.61	Taipei	29.00
14	Brussels	28.10		Los Angeles	25.59	Toronto	28.59
15	San Francisco	27.31		Frankfurt	25.28	Zurich	27.64
16	Taipei	26.66		Amsterdam	25.20	Moscow	27.29
17	Jakarta	26.44		Jakarta	25.14	Frankfurt	26.96
18	Shanghai	25.78		Buenos Aires	24.98	Mumbai	26.64
19	Toronto	25.28		Mexico City	24.91	Brussels	25.81
20	Dublin	24.53		Santiago	23.98	Kuala Lumpur	25.26
21	Amsterdam	24.37		Luxembourg	23.79	Dublin	25.26
22	Zurich	24.24		Chicago	23.72	Amsterdam	25.16
23	Bangkok	24.00		Beijing	23.56	Chicago	24.75



24	Beijing	23.29
25	Mumbai	23.26
26	Seoul	22.62
27	Kuala Lumpur	22.04
28	Luxembourg	21.79
29	Mexico City	21.75
30	Johannesburg	21.65
31	Warsaw	21.59
32	Istanbul	21.32
33	Buenos Aires	21.19
34	Durban	21.11
35	Manila	20.13
36	Melbourne	19.85
37	Prague	19.25
38	Barcelona	19.00
39	Berlin	18.98
40	Miami	18.85
41	Dallas	18.44
42	Moscow	17.79
43	Munich	17.78
44	Boston	17.76
45	Athens	17.71
46	Atlanta	17.57
47	Houston	17.53
48	Hamburg	17.50
49	Santiago	17.47
50	Bogota	16.92
51	Seattle	16.55
52	Budapest	16.53
53	Auckland	16.32
54	New Delhi	16.21
55	Cairo	16.04
56	Manama	16.00
57	Geneva	15.94
58	Lisbon	15.39
59	Caracas	15.37

Seoul	23.24
Munich	22.85
Dublin	22.46
Taipei	22.33
San Francisco	22.24
Warsaw	22.05
Johannesburg	22.02
Mumbai	21.83
Istanbul	21.61
Cairo	21.56
Kuala Lumpur	20.76
Berlin	20.15
Hamburg	19.74
Moscow	19.61
Miami	19.32
Montreal	19.22
Budapest	19.05
Athens	18.65
Prague	18.54
Sydney	18.50
Dusseldorf	18.49
Auckland	18.35
Bangkok	18.21
Geneva	17.66
Bogota	17.44
Barcelona	17.34
Melbourne	17.26
Atlanta	17.16
Lisbon	16.59
Rio de Janeiro	16.56
Manila	16.42
Labuan	16.34
Caracas	16.23
Vancouver	16.21
Stockholm	15.92
Dubai	15.39

Sao Paulo	24.66
Jakarta	24.10
Bangkok	24.08
Buenos Aires	23.41
Warsaw	22.33
Istanbul	22.05
Los Angeles	21.62
Mexico City	21.16
Dubai	20.07
Stockholm	20.01
Geneva	19.35
Manila	18.91
Luxembourg	18.30
San Francisco	18.12
Prague	17.98
Athens	17.85
Lisbon	17.75
Santiago	16.93
Melbourne	16.78
Rome	16.29
Guangzhou	15.96
Johannesburg	15.55
Washington	15.43
Caracas	15.21
Auckland	15.13
Boston	15.03
Atlanta	14.91
Budapest	14.85
Montreal	14.65
Dallas	14.64
Vienna	14.20
Manama	14.11
Houston	13.86
Cairo	13.80
Munich	13.23
Bogota	12.25

60	Philadelphia	14.73
61	Montreal	14.42
62	Labuan	14.33
63	Stockholm	13.99
64	Rio de Janeiro	13.90
65	Guangzhou	13.60
66	Rome	13.60
67	Ho Chi Minh City	13.55
68	Dubai	13.22
69	Osaka	12.96
70	Washington	12.53
71	Stuttgart	12.19
72	Denver	12.04
73	Hanoi	12.00
74	Portland	11.78
75	Cologne	11.69
76	Vancouver	11.69
77	Vienna	11.68
78	Minneapolis	11.68
79	Copenhagen	11.21
80	Rotterdam	11.07
81	Perth	10.99
82	Karachi	10.80
83	Beirut	10.66
84	Calcutta	10.63
85	Buffalo	10.49
86	Nassau	10.37
87	Bucharest	10.32
88	Montevideo	9.90
89	Almaty	9.72
90	Antwerp	9.60
91	Calgary	9.46
92	Abu Dhabi	9.32
93	Brisbane	9.29
94	Wellington	9.26
95	Panama City	9.23

Dallas	14.75
Vienna	14.68
Philadelphia	14.33
Houston	14.25
New Delhi	13.97
Abu Dhabi	13.88
Rome	13.52
Osaka	13.41
Suva	13.05
Manama	12.64
Stuttgart	12.44
Montevideo	12.24
Bandung	12.12
Washington	11.89
Beirut	11.82
Hanoi	11.75
Cologne	11.65
Edinburgh	11.48
Birmingham	11.46
Guangzhou	11.40
Boston	11.38
Karachi	11.37
Tel Aviv	10.89
Tianjin	10.79
Bucharest	10.60
Chennai	9.91
Calgary	9.71
Nassau	9.65
Buffalo	9.59
Colombo	9.38
Bratislava	9.34
Almaty	9.27
Manchester	9.22
Lima	9.18
Seattle	8.75
Calcutta	8.63

Lima	11.97
Karachi	11.67
Miami	11.44
Bangalore	11.35
Vancouver	10.81
Shenzhen	10.47
Berlin	10.16
Bucharest	9.95
Tel Aviv	9.94
New Delhi	9.91
Hanoi	9.82
Barcelona	9.82
Ho Chi Minh City	9.67
Doha	9.64
Labuan	9.53
Panama City	9.37
Bratislava	9.19
Dusseldorf	8.96
Beirut	8.61
Denver	8.60
Birmingham	8.44
Perth	8.41
Rio de Janeiro	8.40
Riyadh	8.40
Seattle	8.32
Montevideo	8.24
Edinburgh	7.92
Portland	7.88
Calgary	7.83
Hartford	7.80
Tianjin	7.78
Nicosia	7.72
Brisbane	7.66
Minneapolis	7.61
Kiev	7.45
Calcutta	7.44

96	Chennai	9.15
97	St Louis	9.10
98	Bilbao	9.05
99	Hamilton	8.96
100	Pittsburgh	8.73
101	Baltimore	8.72
102	Strasbourg	8.68
103	Riyadh	8.64
104	Abidjan	8.58
105	Tehran	8.50
106	Oslo	8.48
107	Rochester	8.42
108	Tianjin	8.33
109	Muscat	8.19
110	Kiev	8.10
111	Nairobi	8.00
112	St Petersburg	7.98
113	Jeddah	7.94
114	Dalian	7.90
115	Charlotte	7.88
116	Adelaide	7.75
117	Kansas City	7.68
118	San Diego	7.55
119	Indianapolis	7.52
120	Casablanca	7.39
121	Bangalore	7.33
122	Colombo	7.31
123	Palo Alto	6.78
124	Shenzhen	6.71
125	Islamabad	6.69
126	Lahore	6.69
127	Port Louis	6.68
128	Marseille	6.68
129	Belo Horizonte	6.65
130	Bordeaux	6.59
131	Edmonton	6.59

Rotterdam	8.56
Turin	8.56
Perth	8.54
San Diego	8.45
Portland	8.43
Panama City	8.42
Copenhagen	8.42
Basel	8.41
Georgetown (Cayman)	8.29
Bangalore	8.26
Brisbane	8.03
Ho Chi Minh City	7.97
Hamilton	7.34
Oslo	7.34
Dhaka	7.25
Baltimore	7.24
Port Louis	7.22
Shenzhen	7.14
Yokohama	7.01
Kiev	6.97
Helsinki	6.85
Casablanca	6.83
Amman	6.76
Nicosia	6.74
Tehran	6.70
Denver	6.70
Southampton	6.50
Bristol	6.47
Bologna	6.39
Seville	6.39
Norwich	6.30
Leeds	6.14
Edmonton	6.11
Genoa	6.03
Newcastle	6.02
Doha	5.95

Osaka	7.44
Sofia	7.38
Colombo	7.33
Almaty	7.22
Basel	7.16
Manchester	7.14
Stuttgart	7.11
Cologne	7.10
Hamburg	7.02
Copenhagen	7.01
Chennai	6.80
Philadelphia	6.70
Antwerp	6.59
Columbus	6.58
Macao	6.57
Oslo	6.37
Bristol	6.18
Rotterdam	6.04
Omaha	5.96
Helsinki	5.96
Wellington	5.83
Dhaka	5.64
Tampa	5.62
Hyderabad (India)	5.59
Kansas City	5.29
Glasgow	5.27
Nassau	5.15
Abu Dhabi	5.13
Las Vegas	5.01
San Jose (Costa Rica)	5.00
Kyoto	4.88
Charlotte	4.76
Nairobi	4.63
San Diego	4.59
Tegucigalpa	4.59
Newcastle	4.55

132	Detroit	6.58
133	Lyon	6.55
134	Nagoya	6.51
135	Essen	6.49
136	Turin	6.48
137	Valencia	6.36
138	Cincinnati	6.34
139	Hartford	6.24
140	Edinburgh	6.23
141	Hannover	6.16
142	Nuremberg	6.16
143	Lusaka	6.01
144	Birmingham	5.93
145	Harare	5.88
146	Windhoek	5.86
147	Sofia	5.86
148	Porto Alegre	5.72
149	Glasgow	5.71
150	Manchester	5.64
151	Lima	5.60
152	Yangon	5.59
153	Phoenix	5.54
154	Cleveland	5.48
155	Tampa	5.46
156	Kampala	5.45
157	Dortmund	5.44
158	Winnipeg	5.33
159	Basel	5.28
160	Leipzig	5.24
161	Zagreb	5.19
162	Dresden	5.19
163	Dhaka	5.17
164	Asuncion	5.16
165	Guayaquil	5.16
166	Quito	5.16
167	Yokohama	5.16

Charlotte	5.79
Valencia	5.79
Sheffield	5.77
Naples	5.77
Cincinnati	5.74
Quebec	5.70
Algiers	5.69
Abidjan	5.68
Bordeaux	5.68
Antwerp	5.67
Kobe	5.62
Pittsburgh	5.61
Sofia	5.61
Las Vegas	5.60
Rochester	5.60
Quito	5.59
Xiamen	5.57
Dalian	5.55
Liverpool	5.55
Cardiff	5.55
Macao	5.53
Medan	5.52
Curitiba	5.39
Porto Alegre	5.36
Kyoto	5.25
Nagoya	5.25
Glasgow	5.16
Ahmadabad	5.13
Hyderabad (India)	5.13
Strasbourg	5.13
Plymouth	5.08
Lagos	5.06
Leipzig	4.94
Jeddah	4.86
Nuremberg	4.85
Pusan	4.85

Pittsburgh	4.54
Algiers	4.48
Bologna	4.45
Georgetown (Cayman)	4.38
Nottingham	4.31
Leeds	4.29
Tashkent	4.27
Tunis	4.23
Sacramento	4.19
Norwich	4.13
Hamilton	4.13
Lagos	4.07
Nuremberg	4.07
Richmond	4.00
Essen	3.94
Bandar Seri Begawan	3.93
Amman	3.91
Nagoya	3.90
Detroit	3.90
Cape Town	3.89
Lahore	3.83
Cleveland	3.78
Kampala	3.74
Lyon	3.73
Sheffield	3.56
Casablanca	3.54
Adelaide	3.49
Plymouth	3.47
Curitiba	3.47
St Petersburg	3.46
Port Louis	3.46
Valencia	3.42
Phoenix	3.37
Dakar	3.35
The Hague	3.35
Palo Alto	3.34

168	Monterrey	5.15
169	Leeds	5.12
170	Nicosia	5.08
171	Las Vegas	5.06
172	Tel Aviv	5.05
173	Richmond	5.04
174	San Jose (CA)	5.00
175	Amman	4.97
176	Luanda	4.97
177	Tashkent	4.96
178	Lausanne	4.90
179	Bandung	4.84
180	Accra	4.80
181	Curitiba	4.73
182	Southampton	4.70
183	Utrecht	4.57
184	Lille	4.56
185	Quebec	4.55
186	Bratislava	4.53
187	Bandar Seri Begawan	4.52
188	Algiers	4.49
189	Xiamen	4.44
190	Dakar	4.41
191	Lagos	4.38
192	Columbus	4.36
193	Belfast	4.26
194	San Jose (Costa Rica)	4.22
195	Helsinki	4.17
196	San Salvador	4.14
197	Kobe	4.04
198	Nanjing	3.99
199	Genoa	3.94
200	Bristol	3.90
201	Sacramento	3.88
202	Kinshasa	3.85
203	New Orleans	3.82

Krakow	4.84
Belo Horizonte	4.81
Cape Town	4.81
Lyon	4.79
Belgrade	4.73
St Louis	4.70
Richmond	4.69
Guatemala City	4.67
Adelaide	4.65
Sacramento	4.64
San Jose (CA)	4.64
Cleveland	4.62
Lausanne	4.60
Riyadh	4.55
Brazilia	4.50
Nottingham	4.48
Palo Alto	4.43
Nairobi	4.39
Zagreb	4.36
Hannover	4.34
Dakar	4.30
Wellington	4.26
Essen	4.21
Minneapolis	4.21
Tampa	4.02
Dortmund	4.01
Aberdeen	4.01
Bern	4.01
Tashkent	3.98
St Petersburg	3.94
Honolulu	3.89
Dar es Salaam	3.84
Kampala	3.84
Lille	3.66
Bandar Seri Begawan	3.65
Utrecht	3.63

Asuncion	3.29
Cincinnati	3.27
San Salvador	3.21
Turin	3.21
Cardiff	3.20
Liverpool	3.18
Honolulu	3.14
San Jose (CA)	3.10
Tehran	3.10
Xiamen	3.03
Genoa	3.03
Buffalo	2.99
Quito	2.97
Yokohama	2.97
Lusaka	2.96
Alexandria	2.90
Southampton	2.89
Rochester	2.89
Seville	2.87
Islamabad	2.86
Aberdeen	2.85
St Louis	2.83
Monterrey	2.82
Kingston (Jamaica)	2.81
Port of Spain	2.81
La Paz	2.80
Harare	2.79
Baltimore	2.77
Trieste	2.72
Zagreb	2.69
New Orleans	2.68
Guatemala City	2.67
Leipzig	2.66
Vilnius	2.62
Kobe	2.62
Indianapolis	2.61

204	Bern	3.81
205	Honolulu	3.69
206	Kingston (Jamaica)	3.66
207	Baku	3.65
208	Liverpool	3.64
209	Newcastle	3.64
210	Nottingham	3.64
211	Naples	3.48
212	Seville	3.48
213	Dar es Salaam	3.47
214	Kyoto	3.43
215	Ottawa	3.40
216	Penang	3.36
217	Kuwait	3.33
218	Maputu	3.33
219	Cape Town	3.22
220	Christchurch	3.22
221	La Paz	3.20
222	Omaha	3.19
223	Aberdeen	3.16
224	Plymouth	3.16
225	Sheffield	3.16
226	Salvador	3.14
227	Pusan	3.08
228	Port of Spain	2.86
229	Mombasa	2.83
230	Medellin	2.82
231	Doha	2.71
232	Brazilia	2.66
233	Malacca	2.60
234	Bologna	2.58
235	Trieste	2.56
236	Norwich	2.54
237	Ahmadabad	2.52
238	Hyderabad (India)	2.52
239	Macao	2.52

Luanda	3.52
Detroit	3.48
Hartford	3.46
Dresden	3.42
Kansas City	3.42
Phoenix	3.35
Douala	3.32
Salvador	3.24
Lahore	3.16
New Orleans	3.06
Accra	3.05
Lusaka	3.05
Belfast	3.03
Yangon	3.03
Kinshasa	2.97
Muscat	2.96
San Jose (Costa Rica)	2.96
San Salvador	2.92
Penang	2.77
Tunis	2.72
Liege	2.66
Guayaquil	2.56
Indianapolis	2.52
Windhoek	2.48
Sanaa	2.47
Bilbao	2.43
Asuncion	2.43
Tallin	2.32
Marseille	2.29
Alexandria	2.24
Kingston (Jamaica)	2.19
Santo Domingo	2.19
Malacca	2.17
Malmo	2.00
Kuwait	1.94
Columbus	1.92

Utrecht	2.61
Accra	2.61
Dar es Salaam	2.61
Muscat	2.55
Bern	2.54
Pusan	2.49
Lille	2.48
Belo Horizonte	2.48
Nanjing	2.46
Naples	2.46
Santo Domingo	2.46
Riga	2.35
Dalian	2.34
Kuwait	2.32
Belfast	2.24
Christchurch	2.24
Douala	2.20
Ahmadabad	2.18
Lausanne	2.13
Krakow	2.12
Quebec	2.12
Bandung	2.10
Baku	2.05
Dortmund	2.05
Ottawa	2.02
Gaborone	1.91
Jeddah	1.88
Port Moresby	1.85
Mombasa	1.84
Tallin	1.80
Bordeaux	1.73
Marseille	1.73
Strasbourg	1.73
Belgrade	1.69
Dresden	1.59
Hannover	1.59



276	Tirana	0.62
277	Linz	0.51
278	Vilnius	0.51
279	Canberra	0.46

Managua	0.60
Vilnius	0.55
Port Moresby	0.37
Reykjavik	0.37




**Table 13.** FS - Connectivity and rank changes over the years 2000, 2004 and 2008

world regions	city	rank 2000	fs connectivities 2000	rank 2004	fs connectivities 2004	rank 2008	fs connectivities 2008	conn jump	rank jump
Europe	Aberdeen	223	3.16	194	4.01	188	2.85	-0.31	35
Europe	Amsterdam	21	24.37	16	25.20	22	25.16	0.78	-1
Europe	Antwerp	90	9.60	141	5.67	108	6.59	-3.01	-18
Europe	Arhus			257	1.30	246	1.37	1.37	-246
Europe	Athens	45	17.71	41	18.65	39	17.85	0.14	6
Europe	Barcelona	38	19.00	49	17.34	71	9.82	-9.17	-33
Europe	Basel	159	5.28	103	8.41	100	7.16	1.87	59
Europe	Belfast	193	4.26	216	3.03	218	2.24	-2.02	-25
Europe	Belgrade	270	0.62	172	4.73	237	1.69	1.08	33
Europe	Bergen	267	0.91	250	1.41	268	0.08	-0.83	-1
Europe	Berlin	39	18.98	35	20.15	66	10.16	-8.82	-27
Europe	Bern	204	3.81	195	4.01	208	2.54	-1.27	-4
Europe	Bilbao	98	9.05	229	2.43	240	1.59	-7.46	-142
Europe	Bologna	234	2.58	124	6.39	134	4.45	1.87	100
Europe	Bordeaux	130	6.59	140	5.68	234	1.73	-4.86	-104
Europe	Bratislava	186	4.53	90	9.34	76	9.19	4.65	110
Europe	Bristol	200	3.90	123	6.47	112	6.18	2.28	88
Europe	Brussels	14	28.10	13	27.61	19	25.81	-2.29	-5
Europe	Bucharest	87	10.32	84	10.60	67	9.95	-0.37	20
Europe	Budapest	52	16.53	40	19.05	51	14.85	-1.69	1
Europe	Cardiff	264	1.04	151	5.55	172	3.20	2.16	92
Europe	Cologne	75	11.69	76	11.65	103	7.10	-4.60	-28
Europe	Copenhagen	79	11.21	102	8.42	105	7.01	-4.20	-26
Europe	Dortmund	157	5.44	193	4.01	227	2.05	-3.39	-70

Europe	Dresden	162	5.19	207	3.42	238	1.59	-3.59	-76
Europe	Dublin	20	24.53	26	22.46	21	25.26	0.72	-1
Europe	Dusseldorf	251	1.72	44	18.49	77	8.96	7.23	174
Europe	Edinburgh	140	6.23	77	11.48	86	7.92	1.69	54
Europe	Essen	135	6.49	190	4.21	146	3.94	-2.55	-11
Europe	Frankfurt	11	28.81	15	25.28	17	26.96	-1.85	-6
Europe	Geneva	57	15.94	47	17.66	34	19.35	3.40	23
Europe	Genoa	199	3.94	129	6.03	178	3.03	-0.90	21
Europe	Glasgow	149	5.71	158	5.16	121	5.27	-0.44	28
Europe	Gothenburg	263	1.05	261	1.16			-1.05	263
Europe	Hamburg	48	17.50	36	19.74	104	7.02	-10.48	-56
Europe	Hannover	141	6.16	187	4.34	239	1.59	-4.57	-98
Europe	Helsinki	195	4.17	116	6.85	115	5.96	1.79	80
Europe	Krakow	258	1.41	168	4.84	223	2.12	0.71	35
Europe	Lausanne	178	4.90	180	4.60	222	2.13	-2.77	-44
Europe	Leeds	169	5.12	127	6.14	137	4.29	-0.83	32
Europe	Leipzig	160	5.24	164	4.94	200	2.66	-2.58	-40
Europe	Liege	247	2.07	224	2.66	257	0.61	-1.46	-10
Europe	Lille	184	4.56	201	3.66	210	2.48	-2.09	-26
Europe	Linz	277	0.51	269	0.92			-0.51	277
Europe	Lisbon	58	15.39	52	16.59	40	17.75	2.36	18
Europe	Liverpool	208	3.64	150	5.55	173	3.18	-0.47	35
Europe	Ljubljana	266	0.98	243	1.75	255	0.75	-0.23	11
Europe	London	1	49.19	1	49.29	1	44.06	-5.13	0
Europe	Luxembourg	28	21.79	21	23.79	36	18.30	-3.49	-8
Europe	Lyon	133	6.55	171	4.79	155	3.73	-2.82	-22
Europe	Madrid	9	30.08	8	29.70	9	31.84	1.77	0
Europe	Malmo	268	0.91	237	2.00	267	0.08	-0.83	1
Europe	Manchester	150	5.64	92	9.22	101	7.14	1.50	49

Europe	Marseille	128	6.68	232	2.29	235	1.73	-4.95	-107
Europe	Milan	10	29.94	9	28.61	10	31.53	1.59	0
Europe	Munich	43	17.78	25	22.85	58	13.23	-4.54	-15
Europe	Naples	211	3.48	135	5.77	213	2.46	-1.02	-2
Europe	Newcastle	209	3.64	130	6.02	131	4.55	0.90	78
Europe	Nicosia	170	5.08	119	6.74	91	7.72	2.64	79
Europe	Norwich	236	2.54	126	6.30	141	4.13	1.59	95
Europe	Nottingham	210	3.64	183	4.48	136	4.31	0.67	74
Europe	Nuremberg	142	6.16	166	4.85	144	4.07	-2.09	-2
Europe	Oslo	106	8.48	109	7.34	111	6.37	-2.11	-5
Europe	Palermo	252	1.72	264	0.97	249	1.18	-0.54	3
Europe	Paris	6	35.80	6	32.94	6	35.59	-0.21	0
Europe	Plymouth	224	3.16	162	5.08	159	3.47	0.32	65
Europe	Prague	37	19.25	42	18.54	38	17.98	-1.27	-1
Europe	Reykjavik	273	0.62	279	0.37			-0.62	273
Europe	Riga	257	1.45	267	0.95	215	2.35	0.89	42
Europe	Rome	66	13.60	66	13.52	43	16.29	2.69	23
Europe	Rotterdam	80	11.07	96	8.56	113	6.04	-5.02	-33
Europe	Sarajevo	245	2.26	260	1.18	260	0.40	-1.86	-15
Europe	Seville	212	3.48	125	6.39	186	2.87	-0.61	26
Europe	Sheffield	225	3.16	134	5.77	156	3.56	0.41	69
Europe	Sofia	147	5.86	144	5.61	97	7.38	1.52	50
Europe	Southampton	182	4.70	122	6.50	184	2.89	-1.80	-2
Europe	Stockholm	63	13.99	58	15.92	33	20.01	6.01	30
Europe	Strasbourg	102	8.68	161	5.13	236	1.73	-6.95	-134
Europe	Stuttgart	71	12.19	70	12.44	102	7.11	-5.09	-31
Europe	Tallin	275	0.62	231	2.32	233	1.80	1.18	42
Europe	The Hague	246	2.14	271	0.84	166	3.35	1.21	80
Europe	Tirana	276	0.62					-0.62	276

Europe	Trieste	235	2.56	265	0.97	196	2.72	0.16	39
Europe	Turin	136	6.48	97	8.56	171	3.21	-3.27	-35
Europe	Utrecht	183	4.57	203	3.63	204	2.61	-1.96	-21
Europe	Valencia	137	6.36	133	5.79	163	3.42	-2.94	-26
Europe	Vienna	77	11.68	61	14.68	54	14.20	2.52	23
Europe	Vilnius	278	0.51	277	0.55	201	2.62	2.11	77
Europe	Warsaw	31	21.59	29	22.05	28	22.33	0.74	3
Europe	Zagreb	161	5.19	186	4.36	197	2.69	-2.50	-36
Europe	Zurich	22	24.24	7	30.18	15	27.64	3.40	7
Asia	Abu Dhabi	92	9.32	65	13.88	123	5.13	-4.20	-31
Asia	Ahmadabad	237	2.52	159	5.13	221	2.18	-0.33	16
Asia	Almaty	89	9.72	91	9.27	99	7.22	-2.50	-10
Asia	Amman	175	4.97	118	6.76	148	3.91	-1.06	27
Asia	Ankara	259	1.21	252	1.34	256	0.67	-0.54	3
Asia	Baku	207	3.65	253	1.34	226	2.05	-1.60	-19
Asia	Bandar Seri Begawan	187	4.52	202	3.65	147	3.93	-0.60	40
Asia	Bandung	179	4.84	72	12.12	225	2.10	-2.74	-46
Asia	Bangalore	121	7.33	105	8.26	63	11.35	4.02	58
Asia	Bangkok	23	24.00	46	18.21	26	24.08	0.08	-3
Asia	Beijing	24	23.29	23	23.56	12	30.11	6.82	12
Asia	Beirut	83	10.66	74	11.82	78	8.61	-2.05	5
Asia	Calcutta	84	10.63	95	8.63	95	7.44	-3.18	-11
Asia	Chennai	96	9.15	85	9.91	106	6.80	-2.34	-10
Asia	Colombo	122	7.31	89	9.38	98	7.33	0.02	24
Asia	Dalian	114	7.90	149	5.55	216	2.34	-5.56	-102
Asia	Damascus	260	1.21	254	1.34			-1.21	260
Asia	Dhaka	163	5.17	110	7.25	117	5.64	0.47	46
Asia	Doha	231	2.71	131	5.95	73	9.64	6.93	158
Asia	Dubai	68	13.22	59	15.39	32	20.07	6.85	36

Asia	Guangzhou	65	13.60	79	11.40	44	15.96	2.36	21
Asia	Hanoi	73	12.00	75	11.75	70	9.82	-2.18	3
Asia	Ho Chi Minh City	67	13.55	107	7.97	72	9.67	-3.87	-5
Asia	Hong Kong	4	39.78	4	36.74	3	41.06	1.28	1
Asia	Hyderabad (India)	238	2.52	160	5.13	119	5.59	3.07	119
Asia	Islamabad	125	6.69	255	1.34	187	2.86	-3.83	-62
Asia	Istanbul	32	21.32	32	21.61	29	22.05	0.73	3
Asia	Jakarta	17	26.44	17	25.14	25	24.10	-2.34	-8
Asia	Jeddah	113	7.94	165	4.86	230	1.88	-6.05	-117
Asia	Karachi	82	10.80	81	11.37	61	11.67	0.86	21
Asia	Kiev	110	8.10	115	6.97	94	7.45	-0.65	16
Asia	Kobe	197	4.04	142	5.62	202	2.62	-1.43	-5
Asia	Kuala Lumpur	27	22.04	34	20.76	20	25.26	3.23	7
Asia	Kuwait	217	3.33	238	1.94	217	2.32	-1.01	0
Asia	Kyoto	214	3.43	156	5.25	126	4.88	1.45	88
Asia	Labuan	62	14.33	55	16.34	74	9.53	-4.80	-12
Asia	Lahore	126	6.69	212	3.16	152	3.83	-2.87	-26
Asia	Macao	239	2.52	152	5.53	110	6.57	4.06	129
Asia	Malacca	233	2.60	236	2.17			-2.60	233
Asia	Manama	56	16.00	69	12.64	55	14.11	-1.89	1
Asia	Manila	35	20.13	54	16.42	35	18.91	-1.22	0
Asia	Medan	241	2.32	153	5.52	241	1.55	-0.77	0
Asia	Minsk	255	1.61	272	0.82	259	0.41	-1.20	-4
Asia	Moscow	42	17.79	37	19.61	16	27.29	9.50	26
Asia	Mumbai	25	23.26	31	21.83	18	26.64	3.37	7
Asia	Muscat	109	8.19	219	2.96	207	2.55	-5.64	-98
Asia	Nagoya	134	6.51	157	5.25	149	3.90	-2.61	-15
Asia	Nanjing	198	3.99	242	1.82	212	2.46	-1.52	-14
Asia	New Delhi	54	16.21	64	13.97	69	9.91	-6.30	-15

Asia	Osaka	69	12.96	67	13.41	96	7.44	-5.52	-27
Asia	Penang	216	3.36	222	2.77	254	0.94	-2.43	-38
Asia	Pusan	227	3.08	167	4.85	209	2.49	-0.59	18
Asia	Riyadh	103	8.64	181	4.55	83	8.40	-0.23	20
Asia	Sanaa	261	1.21	228	2.47			-1.21	261
Asia	Seoul	26	22.62	24	23.24	11	30.93	8.31	15
Asia	Shanghai	18	25.78	10	28.26	8	34.03	8.25	10
Asia	Shenzhen	124	6.71	113	7.14	65	10.47	3.76	59
Asia	Singapore	5	36.65	3	37.24	4	36.30	-0.35	1
Asia	St Petersburg	112	7.98	197	3.94	161	3.46	-4.52	-49
Asia	Taipei	16	26.66	27	22.33	13	29.00	2.34	3
Asia	Tashkent	177	4.96	196	3.98	138	4.27	-0.68	39
Asia	Tbilisi	262	1.17	273	0.79	262	0.36	-0.82	0
Asia	Tehran	105	8.50	120	6.70	176	3.10	-5.40	-71
Asia	Tel Aviv	172	5.05	82	10.89	68	9.94	4.89	104
Asia	Tianjin	108	8.33	83	10.79	90	7.78	-0.55	18
Asia	Tokyo	3	40.14	5	36.29	5	36.16	-3.98	-2
Asia	Xiamen	189	4.44	148	5.57	177	3.03	-1.40	12
Asia	Yangon	152	5.59	217	3.03	242	1.54	-4.05	-90
Asia	Yokohama	167	5.16	114	7.01	181	2.97	-2.18	-14
Africa	Abidjan	104	8.58	139	5.68	258	0.45	-8.13	-154
Africa	Accra	180	4.80	214	3.05	205	2.61	-2.19	-25
Africa	Addis Ababa	249	1.83	274	0.60	251	1.13	-0.70	-2
Africa	Alexandria	269	0.62	233	2.24	183	2.90	2.29	86
Africa	Algiers	188	4.49	138	5.69	133	4.48	-0.01	55
Africa	Bulawayo	253	1.66	258	1.24	253	0.98	-0.68	0
Africa	Cairo	55	16.04	33	21.56	57	13.80	-2.24	-2
Africa	Cape Town	219	3.22	170	4.81	151	3.89	0.67	68
Africa	Casablanca	120	7.39	117	6.83	157	3.54	-3.84	-37

Africa	Dakar	190	4.41	188	4.30	165	3.35	-1.07	25
Africa	Dar es Salaam	213	3.47	199	3.84	206	2.61	-0.86	7
Africa	Douala	242	2.26	210	3.32	220	2.20	-0.06	22
Africa	Durban	34	21.11	241	1.90	248	1.18	-19.93	-214
Africa	Gaborone	265	1.04	270	0.86	229	1.91	0.87	36
Africa	Harare	145	5.88	259	1.24	194	2.79	-3.09	-49
Africa	Johannesburg	30	21.65	30	22.02	45	15.55	-6.10	-15
Africa	Kampala	156	5.45	200	3.84	154	3.74	-1.70	2
Africa	Kinshasa	202	3.85	218	2.97			-3.85	202
Africa	Lagos	191	4.38	163	5.06	143	4.07	-0.30	48
Africa	Luanda	176	4.97	204	3.52			-4.97	176
Africa	Lusaka	143	6.01	215	3.05	182	2.96	-3.05	-39
Africa	Maputu	218	3.33	251	1.39			-3.33	218
Africa	Mombasa	229	2.83	249	1.46	232	1.84	-0.99	-3
Africa	Nairobi	111	8.00	185	4.39	128	4.63	-3.36	-17
Africa	Port Louis	127	6.68	112	7.22	162	3.46	-3.22	-35
Africa	Tunis	240	2.40	223	2.72	139	4.23	1.83	101
Africa	Windhoek	146	5.86	227	2.48	264	0.32	-5.54	-118
North America	Atlanta	46	17.57	51	17.16	50	14.91	-2.66	-4
North America	Baltimore	101	8.72	111	7.24	195	2.77	-5.95	-94
North America	Birmingham	144	5.93	78	11.46	80	8.44	2.50	64
North America	Boston	44	17.76	80	11.38	49	15.03	-2.73	-5
North America	Buffalo	85	10.49	88	9.59	179	2.99	-7.50	-94
North America	Calgary	91	9.46	86	9.71	88	7.83	-1.63	3
North America	Charlotte	115	7.88	132	5.79	127	4.76	-3.13	-12
North America	Chicago	7	30.77	22	23.72	23	24.75	-6.02	-16
North America	Cincinnati	138	6.34	136	5.74	169	3.27	-3.07	-31
North America	Cleveland	154	5.48	179	4.62	153	3.78	-1.70	1
North America	Columbus	192	4.36	239	1.92	109	6.58	2.22	83

North America	Dallas	41	18.44	60	14.75	53	14.64	-3.80	-12
North America	Denver	72	12.04	121	6.70	79	8.60	-3.44	-7
North America	Detroit	132	6.58	205	3.48	150	3.90	-2.68	-18
North America	Edmonton	131	6.59	128	6.11	252	1.12	-5.47	-121
North America	Hartford	139	6.24	206	3.46	89	7.80	1.56	50
North America	Honolulu	205	3.69	198	3.89	174	3.14	-0.55	31
North America	Houston	47	17.53	63	14.25	56	13.86	-3.67	-9
North America	Indianapolis	119	7.52	226	2.52	203	2.61	-4.91	-84
North America	Kansas City	117	7.68	208	3.42	120	5.29	-2.39	-3
North America	Las Vegas	171	5.06	145	5.60	124	5.01	-0.05	47
North America	Los Angeles	8	30.08	14	25.59	30	21.62	-8.47	-22
North America	Miami	40	18.85	38	19.32	62	11.44	-7.41	-22
North America	Minneapolis	78	11.68	191	4.21	93	7.61	-4.06	-15
North America	Montreal	61	14.42	39	19.22	52	14.65	0.23	9
North America	New Orleans	203	3.82	213	3.06	198	2.68	-1.14	5
North America	New York	2	44.69	2	43.81	2	42.84	-1.85	0
North America	Omaha	222	3.19	240	1.92	114	5.96	2.77	108
North America	Ottawa	215	3.40	268	0.92	228	2.02	-1.38	-13
North America	Palo Alto	123	6.78	184	4.43	167	3.34	-3.43	-44
North America	Philadelphia	60	14.73	62	14.33	107	6.70	-8.04	-47
North America	Phoenix	153	5.54	209	3.35	164	3.37	-2.17	-11
North America	Pittsburgh	100	8.73	143	5.61	132	4.54	-4.19	-32
North America	Portland	74	11.78	100	8.43	87	7.88	-3.89	-13
North America	Quebec	185	4.55	137	5.70	224	2.12	-2.43	-39
North America	Richmond	173	5.04	174	4.69	145	4.00	-1.04	28
North America	Rochester	107	8.42	146	5.60	185	2.89	-5.53	-78
North America	Sacramento	201	3.88	177	4.64	140	4.19	0.31	61
North America	San Diego	118	7.55	99	8.45	129	4.59	-2.96	-11
North America	San Francisco	15	27.31	28	22.24	37	18.12	-9.18	-22



North America	San Jose (CA)	174	5.00	178	4.64	175	3.10	-1.90	-1
North America	Seattle	51	16.55	94	8.75	84	8.32	-8.24	-33
North America	St Louis	97	9.10	173	4.70	189	2.83	-6.27	-92
North America	Tampa	155	5.46	192	4.02	118	5.62	0.16	37
North America	Toronto	19	25.28	11	27.88	14	28.59	3.31	5
North America	Vancouver	76	11.69	57	16.21	64	10.81	-0.88	12
North America	Washington	70	12.53	73	11.89	46	15.43	2.90	24
North America	Winnipeg	158	5.33	266	0.97	243	1.52	-3.80	-85
South America	Asuncion	164	5.16	230	2.43	168	3.29	-1.87	-4
South America	Belo Horizonte	129	6.65	169	4.81	211	2.48	-4.17	-82
South America	Bogota	50	16.92	48	17.44	59	12.25	-4.67	-9
South America	Brazilia	232	2.66	182	4.50	265	0.21	-2.45	-33
South America	Buenos Aires	33	21.19	18	24.98	27	23.41	2.22	6
South America	Caracas	59	15.37	56	16.23	47	15.21	-0.15	12
South America	Curitiba	181	4.73	154	5.39	160	3.47	-1.27	21
South America	Georgetown (Cayman)	271	0.62	104	8.29	135	4.38	3.76	136
South America	Guadalajara	250	1.77	263	0.97			-1.77	250
South America	Guatemala City	243	2.26	175	4.67	199	2.67	0.41	44
South America	Guayaquil	165	5.16	225	2.56	263	0.35	-4.81	-98
South America	Hamilton	99	8.96	108	7.34	142	4.13	-4.84	-43
South America	Kingston (Jamaica)	206	3.66	234	2.19	191	2.81	-0.85	15
South America	La Paz	221	3.20	244	1.59	193	2.80	-0.40	28
South America	Lima	151	5.60	93	9.18	60	11.97	6.37	91
South America	Managua	272	0.62	276	0.60			-0.62	272
South America	Medellin	230	2.82	247	1.52			-2.82	230
South America	Mexico City	29	21.75	19	24.91	31	21.16	-0.58	-2
South America	Monterrey	168	5.15	248	1.48	190	2.82	-2.33	-22
South America	Montevideo	88	9.90	71	12.24	85	8.24	-1.66	3
South America	Nassau	86	10.37	87	9.65	122	5.15	-5.22	-36

South America	Panama City	95	9.23	101	8.42	75	9.37	0.14	20
South America	Port of Spain	228	2.86	245	1.59	192	2.81	-0.05	36
South America	Porto Alegre	148	5.72	155	5.36	244	1.41	-4.30	-96
South America	Quito	166	5.16	147	5.59	180	2.97	-2.19	-14
South America	Recife	256	1.47	256	1.34	245	1.41	-0.06	11
South America	Rio de Janeiro	64	13.90	53	16.56	82	8.40	-5.50	-18
South America	Salvador	226	3.14	211	3.24	266	0.13	-3.01	-40
South America	San Jose (Costa Rica)	194	4.22	220	2.96	125	5.00	0.79	69
South America	San Salvador	196	4.14	221	2.92	170	3.21	-0.93	26
South America	Santiago	49	17.47	20	23.98	41	16.93	-0.54	8
South America	Santo Domingo	244	2.26	235	2.19	214	2.46	0.20	30
South America	Sao Paulo	12	28.72	12	27.69	24	24.66	-4.06	-12
South America	Tegucigalpa	254	1.64	246	1.59	130	4.59	2.95	124
Oceania	Adelaide	116	7.75	176	4.65	158	3.49	-4.26	-42
Oceania	Auckland	53	16.32	45	18.35	48	15.13	-1.19	5
Oceania	Brisbane	93	9.29	106	8.03	92	7.66	-1.63	1
Oceania	Canberra	279	0.46	275	0.60	250	1.17	0.71	29
Oceania	Christchurch	220	3.22	262	0.97	219	2.24	-0.98	1
Oceania	Hobart	248	1.91			247	1.22	-0.69	1
Oceania	Melbourne	36	19.85	50	17.26	42	16.78	-3.07	-6
Oceania	Perth	81	10.99	98	8.54	81	8.41	-2.58	0
Oceania	Port Moresby			278	0.37	231	1.85	1.85	-231
Oceania	Suva	274	0.62	68	13.05	261	0.37	-0.25	13
Oceania	Sydney	13	28.18	43	18.50	7	34.35	6.18	6
Oceania	Wellington	94	9.26	189	4.26	116	5.83	-3.42	-22

**Table 14.** APS top 30 dyads per each year

rank	2000		st. dyad value
	city 1	city 2	
1	New York	London	100.00
2	London	Hong Kong	75.86
3	New York	Hong Kong	72.19
4	Tokyo	London	71.33
5	Tokyo	New York	71.09
6	Paris	London	70.48
7	Singapore	London	68.89
8	Singapore	New York	65.52
9	Paris	New York	65.16
10	London	Chicago	61.06
11	New York	Chicago	60.62
12	New York	Los Angeles	59.62
13	Los Angeles	London	58.01
14	London	Frankfurt	57.63
15	Milan	London	57.52
16	Tokyo	Hong Kong	54.96
17	London	Brussels	54.94
18	Sydney	London	54.53
19	Madrid	London	54.44
20	New York	Frankfurt	54.14
21	New York	Milan	53.97
22	Sydney	New York	53.65
23	London	Amsterdam	52.89
24	Toronto	London	52.82
25	New York	Madrid	52.08
26	New York	Brussels	51.63
27	Toronto	New York	51.43
28	Sao Paulo	London	50.81
29	Paris	Hong Kong	50.34
30	Singapore	Hong Kong	50.01

2004		
city 1	city 2	st. dyad value
New York	London	100.00
London	Hong Kong	75.89
Paris	London	72.80
New York	Hong Kong	72.11
Tokyo	London	71.74
Singapore	London	70.61
Tokyo	New York	68.09
Paris	New York	67.16
Singapore	New York	63.82
Milan	London	61.68
Madrid	London	61.16
London	Brussels	59.26
London	Chicago	58.71
New York	Brussels	57.86
London	Frankfurt	57.60
New York	Milan	56.01
New York	Madrid	55.77
Toronto	London	55.71
Toronto	New York	55.13
London	Amsterdam	55.09
New York	Chicago	54.94
Shanghai	London	53.99
Tokyo	Hong Kong	53.67
New York	Los Angeles	52.64
New York	Frankfurt	52.33
London	Beijing	51.00
Sydney	London	50.94
Paris	Hong Kong	50.90
Sao Paulo	London	50.89
Singapore	Paris	50.39

2008		
city 1	city 2	st. dyad value
New York	London	100.00
London	Hong Kong	82.25
New York	Hong Kong	81.52
Paris	New York	78.91
Paris	London	77.67
Tokyo	New York	74.06
Singapore	London	73.54
Singapore	New York	72.99
Tokyo	London	70.82
Shanghai	London	66.95
Tokyo	Hong Kong	66.11
New York	Beijing	66.01
Singapore	Hong Kong	65.92
London	Beijing	65.14
Paris	Hong Kong	64.62
Sydney	London	64.10
Sydney	New York	63.84
Shanghai	New York	63.52
New York	Milan	61.37
Milan	London	60.90
New York	Madrid	60.54
Madrid	London	60.03
Tokyo	Singapore	58.95
Shanghai	Hong Kong	58.85
Tokyo	Paris	58.63
Hong Kong	Beijing	58.49
New York	Chicago	58.32
New York	Moscow	58.06
Singapore	Paris	57.76
Sydney	Hong Kong	57.28

**Table 15.** FS top 30 dyads per each year

rank	2000		
	city 1	city 2	st. dyad value
1	New York	London	100
2	Tokyo	London	90.67
3	London	Hong Kong	89.56
4	Tokyo	New York	82.67
5	Singapore	London	80.67
6	New York	Hong Kong	80.22
7	Paris	London	76
8	Tokyo	Hong Kong	75.11
9	Singapore	New York	70.44
10	London	Chicago	70.44
11	Tokyo	Singapore	67.11
12	Los Angeles	London	66
13	New York	Chicago	65.78
14	Paris	New York	64.22
15	Singapore	Hong Kong	64.22
16	New York	Los Angeles	62.22
17	Tokyo	Paris	61.33
18	Tokyo	Chicago	60.89
19	Sydney	London	60.67
20	Milan	London	60.44
21	Paris	Hong Kong	60.22
22	Madrid	London	59.56
23	Sao Paulo	London	59.56
24	London	Frankfurt	59.33
25	Tokyo	Los Angeles	57.56
26	San Francisco	London	56.89
27	Taipei	London	56.89
28	Hong Kong	Chicago	56.67
29	Sao Paulo	New York	56

2004		
city 1	city 2	st. dyad value
New York	London	100
London	Hong Kong	81.94
Singapore	London	81.94
Tokyo	London	79.35
Paris	London	73.23
New York	Hong Kong	71.61
Tokyo	New York	70.32
Singapore	New York	69.35
Milan	London	67.42
Madrid	London	67.42
Shanghai	London	65.81
Tokyo	Hong Kong	61.94
Zurich	London	61.94
Paris	New York	61.61
Singapore	Hong Kong	60
Tokyo	Singapore	60
Toronto	London	59.03
London	Chicago	58.39
Sao Paulo	London	57.42
New York	Madrid	56.77
Shanghai	New York	56.13
London	Frankfurt	55.81
Singapore	Paris	55.48
London	Brussels	55.16
New York	Milan	54.84
Toronto	New York	53.87
Zurich	New York	53.87
Paris	Hong Kong	53.23
London	Buenos Aires	52.9

2008		
city 1	city 2	st. dyad value
New York	London	100.00
London	Hong Kong	98.72
New York	Hong Kong	88.85
Singapore	London	85.92
Singapore	Hong Kong	84.46
Tokyo	Hong Kong	84.28
Tokyo	London	82.45
Tokyo	New York	81.90
Singapore	New York	78.24
Shanghai	London	77.88
Sydney	London	77.70
Paris	London	77.51
Shanghai	Hong Kong	76.78
Sydney	Hong Kong	74.95
Sydney	New York	74.77
Paris	New York	74.41
Tokyo	Singapore	73.49
Hong Kong	Beijing	72.76
Paris	Hong Kong	72.21
Shanghai	New York	71.30
New York	Beijing	70.57
London	Beijing	70.57
Madrid	London	70.02
Sydney	Singapore	68.37
Madrid	Hong Kong	68.19
Singapore	Shanghai	67.64
Tokyo	Shanghai	67.09
Seoul	Hong Kong	66.91
Tokyo	Sydney	66.91

30	Singapore	Paris	55.33	Tokyo	Paris	52.58	Tokyo	Beijing	66.36
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**Table 16. ACC top 30 dyads per each year**

rank	2000		
	city 1	city 2	st. dyad value
1	New York	London	100
2	Toronto	London	73.46
3	Paris	London	72.31
4	Los Angeles	London	71.92
5	London	Chicago	70.77
6	Vienna	London	66.92
7	Tokyo	London	66.54
8	London	Copenhagen	65.77
9	New York	Chicago	65
10	London	Amsterdam	65
11	Toronto	New York	65
12	Mexico City	London	64.62
13	Paris	New York	64.23
14	Milan	London	64.23
15	New York	Los Angeles	63.46
16	London	Hong Kong	61.92
17	Sydney	London	61.54
18	Sao Paulo	London	60.38
19	Melbourne	London	60
20	Madrid	London	59.62
21	Stockholm	London	59.62
22	Miami	London	58.85
23	Vienna	New York	58.85
24	Tokyo	New York	58.46
25	Mumbai	London	58.46
26	London	Dubai	58.08
27	Singapore	London	57.69
28	Washington	London	57.69
29	San Francisco	London	56.92

2004		
city 1	city 2	st. dyad value
New York	London	100
London	Hong Kong	90.18
Paris	London	83.93
London	Amsterdam	79.91
Paris	New York	79.46
Tokyo	London	79.02
London	Brussels	76.79
New York	Hong Kong	76.34
London	Frankfurt	75.89
Toronto	London	75
Los Angeles	London	74.11
London	Buenos Aires	74.11
London	Chicago	72.32
Singapore	London	71.88
Munich	London	71.88
Sao Paulo	London	70.09
Melbourne	London	70.09
London	Dublin	68.75
London	Atlanta	68.75
Vienna	London	67.86
London	Hamburg	67.41
New York	Brussels	66.96
Sydney	London	66.96
Moscow	London	66.96
Seoul	London	66.96
Tokyo	New York	66.52
San Francisco	London	66.52
Mumbai	London	66.52
Milan	London	66.07

2008		
city 1	city 2	st. dyad value
New York	London	100
London	Hong Kong	97.67
Singapore	London	92.15
Sydney	London	91.86
Paris	London	88.95
Milan	London	88.08
London	Buenos Aires	87.79
London	Beijing	86.92
London	Jakarta	83.14
London	Kuala Lumpur	82.56
Shanghai	London	82.27
London	Brussels	81.98
London	Auckland	80.81
Tel Aviv	London	79.36
Toronto	London	78.49
Seoul	London	78.49
Sao Paulo	London	77.62
Moscow	London	77.33
Vienna	London	77.33
Tokyo	London	76.45
Mexico City	London	75.58
Mumbai	London	75
Rome	London	74.71
London	Istanbul	74.13
New York	Hong Kong	73.84
London	Kuwait	73.26
London	Lisbon	72.97
New Delhi	London	72.97
Santiago	London	72.38

30	Oslo	London	56.92	Mexico City	London	66.07	London	Johannesburg	71.8
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**Table 17. ADV top 30 dyads per each year**

rank	2000		
	city 1	city 2	st. dyad value
1	New York	London	100
2	New York	Hong Kong	73.93
3	New York	Amsterdam	69.66
4	Sydney	New York	67.52
5	Singapore	New York	66.67
6	Toronto	New York	66.24
7	Paris	New York	63.25
8	Tokyo	New York	62.82
9	New York	Miami	61.97
10	London	Hong Kong	61.54
11	New York	Frankfurt	61.54
12	New York	Milan	59.4
13	New York	Madrid	58.55
14	New York	Melbourne	57.69
15	London	Amsterdam	55.98
16	Taipei	New York	55.13
17	New York	Lisbon	55.13
18	New York	Mumbai	54.7
19	Singapore	London	54.27
20	Sydney	London	53.85
21	Toronto	London	53.42
22	New York	Brussels	53.42
23	New York	Copenhagen	53.42
24	New York	Chicago	52.99
25	Paris	London	51.71
26	Tokyo	London	51.28
27	Sao Paulo	New York	51.28
28	New York	Buenos Aires	50.85
29	New York	Beijing	50.85
30	London	Frankfurt	49.15

rank	2004		
	city 1	city 2	st. dyad value
1	New York	London	100
2	New York	Hong Kong	83.51
3	Sydney	New York	80.85
4	Toronto	New York	78.72
5	New York	Amsterdam	76.06
6	Tokyo	New York	72.87
7	New York	Madrid	72.87
8	Paris	New York	69.68
9	Singapore	New York	67.55
10	New York	Brussels	67.55
11	New York	Milan	67.02
12	New York	Mumbai	64.89
13	New York	Barcelona	64.89
14	Sao Paulo	New York	64.36
15	London	Hong Kong	63.83
16	New York	Bangkok	62.77
17	Sydney	London	62.23
18	New York	Buenos Aires	61.7
19	New York	Lisbon	61.17
20	New York	Kuala Lumpur	60.64
21	Tokyo	London	59.57
22	Toronto	London	59.04
23	Shanghai	New York	59.04
24	New York	Frankfurt	58.51
25	Warsaw	New York	58.51
26	New York	Miami	58.51
27	New York	Beijing	57.98
28	New York	Mexico City	57.98
29	London	Amsterdam	57.45
30	New York	Athens	56.38

rank	2008		
	city 1	city 2	st. dyad value
1	New York	London	100
2	Paris	New York	99.66
3	Tokyo	New York	95.27
4	New York	Hong Kong	94.93
5	Singapore	New York	91.22
6	New York	Moscow	86.15
7	Tokyo	Paris	81.42
8	Warsaw	New York	81.42
9	New York	Bangkok	80.74
10	Tokyo	Hong Kong	80.41
11	New York	Brussels	80.41
12	New York	Athens	80.41
13	Singapore	Paris	79.73
14	Shanghai	New York	79.05
15	Paris	Hong Kong	78.72
16	Taipei	New York	78.38
17	Stockholm	New York	78.04
18	New York	Beijing	77.36
19	Toronto	New York	77.36
20	New York	Madrid	77.03
21	New York	Buenos Aires	77.03
22	New York	Milan	76.69
23	Singapore	Hong Kong	76.35
24	Sydney	New York	76.01
25	Tokyo	Singapore	76.01
26	Vienna	New York	75.34
27	New York	Budapest	75
28	Paris	London	73.31
29	Seoul	New York	72.97
30	New York	Mumbai	72.97





**Table 18. LAW top 30 dyads per each year**

rank	2000		
	city 1	city 2	st. dyad value
1	New York	London	100
2	Washington	New York	90
3	London	Frankfurt	78.95
4	London	Hong Kong	76.84
5	Washington	London	73.68
6	New York	Hong Kong	70.53
7	London	Brussels	68.42
8	New York	Frankfurt	65.79
9	New York	Brussels	65.26
10	New York	Los Angeles	62.63
11	Singapore	London	60.53
12	Tokyo	New York	60
13	Paris	London	58.42
14	Tokyo	London	56.32
15	Washington	Los Angeles	54.21
16	Paris	New York	53.68
17	Singapore	New York	53.16
18	Hong Kong	Frankfurt	50.53
19	Washington	Hong Kong	50.53
20	London	Amsterdam	50
21	Frankfurt	Brussels	49.47
22	Moscow	London	48.42
23	Paris	Frankfurt	46.84
24	Hong Kong	Brussels	45.26
25	Washington	Brussels	45.26
26	Washington	Tokyo	44.74
27	Washington	Frankfurt	44.21
28	New York	Chicago	43.16
29	Prague	London	43.16
30	London	Budapest	43.16

2004		
city 1	city 2	st. dyad value
New York	London	100
Washington	New York	77.89
London	Hong Kong	77.39
London	Frankfurt	75.88
Paris	London	74.37
London	Brussels	69.85
New York	Hong Kong	69.35
Washington	London	66.83
Tokyo	London	64.82
Singapore	London	64.32
Tokyo	New York	64.32
New York	Frankfurt	62.81
New York	Brussels	62.31
Paris	New York	61.31
New York	Los Angeles	60.8
San Francisco	New York	60.3
Paris	Frankfurt	54.77
Singapore	New York	53.77
London	Beijing	51.26
Shanghai	London	50.25
Hong Kong	Frankfurt	50.25
Milan	London	49.75
New York	Chicago	49.75
Moscow	London	49.75
Paris	Hong Kong	49.25
Washington	Los Angeles	49.25
Washington	San Francisco	48.24
London	Chicago	47.74
Frankfurt	Brussels	47.24
Washington	Hong Kong	47.24

2008		
city 1	city 2	st. dyad value
New York	London	100
Paris	London	78.22
Paris	New York	67.79
London	Frankfurt	62.88
Washington	New York	62.27
London	Hong Kong	57.06
New York	Frankfurt	55.52
London	Brussels	52.15
New York	Hong Kong	51.84
Washington	London	51.84
Moscow	London	45.09
Tokyo	London	44.17
London	Beijing	43.87
Tokyo	New York	41.41
New York	Beijing	40.49
Paris	Hong Kong	39.57
Paris	Frankfurt	39.57
New York	Brussels	38.96
Shanghai	London	38.65
New York	Moscow	38.65
Washington	Paris	36.5
Paris	Brussels	36.2
Munich	London	34.97
Shanghai	New York	33.13
Milan	London	32.82
Paris	Moscow	32.52
London	Dusseldorf	32.52
Washington	Frankfurt	31.9
Madrid	London	31.6
Paris	Beijing	31.6



**Table 19.** MAN CONS top 30 dyads per each year

rank	2000		
	city 1	city 2	st. dyad value
1	New York	London	100
2	Paris	London	82.91
3	Paris	New York	82.28
4	New York	Milan	82.28
5	Singapore	New York	77.85
6	New York	Madrid	77.22
7	Washington	New York	77.22
8	Stockholm	London	75.95
9	Milan	London	75.32
10	Stockholm	New York	74.68
11	Washington	London	73.42
12	Toronto	London	72.15
13	Toronto	New York	71.52
14	Madrid	London	70.89
15	Zurich	New York	70.89
16	Sydney	New York	70.25
17	Tokyo	New York	68.35
18	Singapore	London	67.72
19	New York	Chicago	65.82
20	New York	Hong Kong	65.19
21	New York	Boston	65.19
22	Stockholm	Paris	63.92
23	London	Chicago	63.29
24	Sydney	London	63.29
25	Paris	Madrid	62.66
26	London	Boston	62.66
27	London	Hong Kong	62.03
28	Paris	Milan	60.13
29	New York	Brussels	58.86
30	London	Brussels	58.23

2004		
city 1	city 2	st. dyad value
New York	London	100
Paris	London	77.91
New York	Chicago	76.07
Paris	New York	74.85
London	Chicago	74.23
Sydney	New York	71.78
Toronto	New York	67.48
Milan	London	66.87
New York	Milan	66.87
Madrid	London	66.26
New York	Madrid	66.26
Sydney	London	65.03
Tokyo	New York	61.96
London	Amsterdam	61.96
New York	Beijing	61.35
Stockholm	London	61.35
Washington	New York	61.35
New York	Hong Kong	60.74
Tokyo	London	60.74
Toronto	London	60.74
Singapore	London	60.12
New York	Mexico City	60.12
New York	Boston	59.51
Singapore	New York	58.9
New York	Melbourne	58.9
Stockholm	New York	57.67
Seoul	New York	57.06
London	Beijing	56.44
Melbourne	London	56.44
Zurich	New York	55.83

2008		
city 1	city 2	st. dyad value
New York	London	100
New York	Chicago	98.62
Paris	New York	92.2
Singapore	New York	87.61
New York	Hong Kong	83.49
London	Boston	79.36
Tokyo	New York	76.15
London	Chicago	72.02
Zurich	New York	71.1
Paris	London	70.64
New York	Beijing	69.72
New York	Madrid	69.27
New York	Frankfurt	68.81
New York	Boston	68.81
Paris	Chicago	65.6
Singapore	London	64.68
New York	Milan	64.22
New York	Munich	64.22
New York	Atlanta	63.3
Sydney	New York	61.47
Shanghai	New York	61.01
Sao Paulo	New York	61.01
Seoul	New York	60.55
New York	Amsterdam	59.17
San Francisco	New York	59.17
Toronto	New York	58.26
New York	Mexico City	57.34
Rome	New York	57.34
Tokyo	Paris	56.42
Zurich	London	56.42

**Table 20.** Top 10 European dyads per every sector and per every year

2000			2004			2008			
	city 1	city 2	ALLSECTORS	city 1	city 2	ALLSECTORS	city 1	city 2	ALLSECTORS
1	Paris	London	4.9335	Paris	London	5.0962	Paris	London	5.4366
2	London	Frankfurt	4.0342	Milan	London	4.3176	Milan	London	4.2628
3	Milan	London	4.0262	Madrid	London	4.2811	Madrid	London	4.2023
4	London	Brussels	3.8461	London	Brussels	4.148	London	Brussels	3.9278
5	Madrid	London	3.8107	London	Frankfurt	4.0323	London	Frankfurt	3.7861
6	London	Amsterdam	3.7021	London	Amsterdam	3.8561	Paris	Milan	3.6089
7	Zurich	London	3.1593	Munich	London	3.4018	Paris	Madrid	3.5432
8	Paris	Milan	2.9603	Zurich	London	3.3601	Zurich	London	3.4505
9	Paris	Frankfurt	2.9197	Warsaw	London	3.2497	London	Amsterdam	3.3728
10	Paris	Madrid	2.782	London	Budapest	3.0423	Paris	Brussels	3.3126

	city 1	city 2	FS dyad(x3)	city 1	city 2	FS dyad(x3)	city 1	city 2	FS dyad(x3)
1	Paris	London	2.28	Paris	London	2.1969	Paris	London	2.3254
2	Milan	London	1.8132	Milan	London	2.0226	Madrid	London	2.1005
3	Madrid	London	1.7868	Madrid	London	2.0226	Milan	London	1.9744
4	London	Frankfurt	1.7799	Zurich	London	1.8582	Paris	Milan	1.7824
5	London	Brussels	1.6467	London	Frankfurt	1.6743	London	Frankfurt	1.777
6	Zurich	London	1.6401	London	Brussels	1.6548	Paris	Madrid	1.7715
7	London	Dublin	1.4799	London	Dublin	1.5582	Zurich	London	1.7495
8	London	Amsterdam	1.4733	Munich	London	1.5483	London	Brussels	1.6344
9	Paris	Milan	1.4466	Warsaw	London	1.5	London	Dublin	1.6289
10	Paris	Frankfurt	1.4268	London	Amsterdam	1.4709	London	Amsterdam	1.6234

	city 1	city 2	ACC dyad	city 1	city 2	ACC dyad	city 1	city 2	ACC dyad
1	Paris	London	0.7231	Paris	London	0.8393	Paris	London	0.8895
2	Vienna	London	0.6692	London	Amsterdam	0.7991	Milan	London	0.8808
3	London	Copenhagen	0.6577	London	Brussels	0.7679	London	Brussels	0.8198
4	London	Amsterdam	0.65	London	Frankfurt	0.7589	Vienna	London	0.7733
5	Milan	London	0.6423	Munich	London	0.7188	Rome	London	0.7471

6	Madrid	London	0.5962
7	Stockholm	London	0.5962
8	Oslo	London	0.5692
9	London	Barcelona	0.5346
10	Zurich	London	0.5231

London	Dublin	0.6875
Vienna	London	0.6786
London	Hamburg	0.6741
Milan	London	0.6607
London	Budapest	0.6607

London	Lisbon	0.7297
London	Barcelona	0.7151
Oslo	London	0.7151
Madrid	London	0.7064
London	Dublin	0.7064

	city 1	city 2	ADV dyad
1	London	Amsterdam	0.5598
2	Paris	London	0.5171
3	London	Frankfurt	0.4915
4	Madrid	London	0.4872
5	Milan	London	0.4701
6	London	Lisbon	0.4487
7	London	Brussels	0.4444
8	London	Copenhagen	0.4017
9	Vienna	London	0.3761
10	Zurich	London	0.3718

	city 1	city 2	ADV dyad
London	Amsterdam	0.5745	
Madrid	London	0.5426	
Paris	London	0.5372	
London	Brussels	0.5053	
London	Barcelona	0.5	
Milan	London	0.4681	
London	Frankfurt	0.4415	
London	Lisbon	0.4309	
Madrid	Amsterdam	0.4309	
London	Athens	0.4255	

	city 1	city 2	ADV dyad
Paris	London	0.7331	
Warsaw	London	0.6385	
Paris	Brussels	0.6182	
Milan	London	0.6115	
Madrid	London	0.6115	
Stockholm	London	0.6115	
London	Brussels	0.6081	
Paris	Madrid	0.5912	
Paris	Athens	0.5912	
London	Budapest	0.5777	

	city 1	city 2	LAW dyad
1	London	Frankfurt	0.7895
2	London	Brussels	0.6842
3	Paris	London	0.5842
4	London	Amsterdam	0.5
5	Frankfurt	Brussels	0.4947
6	Paris	Frankfurt	0.4684
7	Prague	London	0.4316
8	London	Budapest	0.4316
9	London	Berlin	0.4316
10	Paris	Brussels	0.3947

	city 1	city 2	LAW dyad
London	Frankfurt	0.7588	
Paris	London	0.7437	
London	Brussels	0.6985	
Paris	Frankfurt	0.5477	
Milan	London	0.4975	
Frankfurt	Brussels	0.4724	
Paris	Brussels	0.4573	
Rome	London	0.4523	
London	Budapest	0.4322	
Munich	London	0.407	

	city 1	city 2	LAW dyad
Paris	London	0.7822	
London	Frankfurt	0.6288	
London	Brussels	0.5215	
Paris	Frankfurt	0.3957	
Paris	Brussels	0.362	
Munich	London	0.3497	
Milan	London	0.3282	
London	Dusseldorf	0.3252	
Madrid	London	0.316	
Frankfurt	Brussels	0.3006	

	city 1	city 2	MC dyad
1	Paris	London	0.8291
2	Stockholm	London	0.7595
3	Milan	London	0.7532
4	Madrid	London	0.7089
5	Stockholm	Paris	0.6392

	city 1	city 2	MC dyad
Paris	London	0.7791	
Milan	London	0.6687	
Madrid	London	0.6626	
London	Amsterdam	0.6196	
Stockholm	London	0.6135	

	city 1	city 2	MC dyad
Paris	London	0.7064	
Zurich	London	0.5642	
London	Frankfurt	0.5183	
Paris	Frankfurt	0.5046	
Paris	Madrid	0.5046	

6	Paris	Madrid	0.6266	Paris	Madrid	0.5521	Munich	London	0.4908
7	Paris	Milan	0.6013	London	Brussels	0.5215	Paris	Milan	0.4771
8	London	Brussels	0.5823	Paris	Milan	0.5092	Zurich	Paris	0.4725
9	Stockholm	Madrid	0.5823	Stockholm	Paris	0.4969	Milan	London	0.4679
10	Milan	Madrid	0.5443	Munich	London	0.4724	Madrid	London	0.4679

**Table 21.** Dyad values between European regions per every year and per each sector

2000 APS

	210	220	230	240
210	23.381	16.659	37.202	108.484
220	16.659	9.775	20.357	60.560
230	37.202	20.357	38.903	139.285
240	108.484	60.560	139.285	397.030

2004 APS

	210	220	230	240
210	34.594	21.689	50.794	141.348
220	21.689	10.759	24.308	74.426
230	50.794	24.308	49.346	172.503
240	141.348	74.426	172.503	482.078

2008 APS

	210	220	230	240
210	44.622	25.479	58.931	135.832
220	25.479	10.506	24.917	67.580
230	58.931	24.917	45.005	144.527
240	135.832	67.580	144.527	371.045

2000 FS

	210	220	230	240
210	6.354	2.705	12.773	42.860
220	2.705	1.807	5.133	15.438
230	12.773	5.133	17.253	60.843
240	42.860	15.438	60.843	181.291

2004 FS

	210	220	230	240
210	9.532	3.890	15.637	42.751
220	3.890	2.381	5.622	17.177
230	15.637	5.622	20.440	68.182
240	42.751	17.177	68.182	196.616

2008 FS

	210	220	230	240
210	9.817	3.647	16.184	35.515
220	3.647	1.897	6.055	17.967
230	16.184	6.055	16.502	55.007
240	35.515	17.967	55.007	149.967

2000 ACC

	210	220	230	240
210	6.289	7.343	12.081	40.456
220	7.343	4.092	8.077	26.071
230	12.081	8.077	11.293	46.690
240	40.456	26.071	46.690	141.403

2004 ACC

	210	220	230	240
210	9.218	7.746	15.384	52.252
220	7.746	3.728	8.282	31.054
230	15.384	8.282	13.666	55.867
240	52.252	31.054	55.867	164.376

2000 ACC

	210	220	230	240
210	13.442	9.739	19.097	50.879
220	9.739	4.114	8.669	25.222
230	19.097	8.669	14.867	49.253
240	50.879	25.222	49.253	121.319

2000 ADV

2004 ADV

2008 ADV

	210	220	230	240
210	6.620	4.270	8.150	13.005
220	4.270	1.594	3.504	6.572
230	8.150	3.504	4.585	10.983
240	13.005	6.572	10.983	22.388

	210	220	230	240
210	9.851	5.761	10.989	18.471
220	5.761	1.968	4.611	9.171
230	10.989	4.611	5.324	13.586
240	18.471	9.171	13.586	31.757

	210	220	230	240
210	17.138	9.223	17.817	29.117
220	9.223	3.044	6.649	12.605
230	17.817	6.649	8.551	18.104
240	29.117	12.605	18.104	32.707

2000 LAW

	210	220	230	240
210	0.879	0.369	0.642	5.569
220	0.369	0.105	0.232	1.885
230	0.642	0.232	0.590	4.700
240	5.569	1.885	4.700	18.666

2004 LAW

	210	220	230	240
210	1.282	0.322	1.442	6.448
220	0.322	0.020	0.412	1.266
230	1.442	0.412	1.292	7.669
240	6.448	1.266	7.669	17.816

2008 LAW

	210	220	230	240
210	1.043	0.289	0.804	4.857
220	0.289	0.061	0.298	1.347
230	0.804	0.298	0.651	4.961
240	4.857	1.347	4.961	15.119

2000 MC

	210	220	230	240
210	3.239	2.215	3.556	6.594
220	2.215	2.177	4.139	10.594
230	3.556	4.139	5.183	16.068
240	6.594	10.594	16.068	33.282

2004 MC

	210	220	230	240
210	4.711	4.157	7.458	21.426
220	4.157	2.662	5.380	15.757
230	7.458	5.380	8.625	27.588
240	21.426	15.757	27.588	71.510

2008 MC

	210	220	230	240
210	3.182	2.581	5.029	15.464
220	2.581	1.390	3.247	10.438
230	5.029	3.247	4.434	17.202
240	15.464	10.438	17.202	51.932

**Table 22.** Top 10 dyads per year and per sector from EU cities to the rest of the world

2000			2004			2008					
	city 1	city 2	ALLSECTORS		city 1	city 2	ALLSECTORS		city 1	city 2	ALLSECTORS
1	London	New York	7	1	New York	London	7	1	New York	London	7
2	London	Hong Kong	5.3101	2	London	Hong Kong	5.3121	2	London	Hong Kong	5.7572
3	London	Tokyo	4.9931	3	Tokyo	London	5.022	3	Paris	New York	5.5235
4	London	Singapore	4.8222	4	Singapore	London	4.9427	4	Singapore	London	5.1481
5	Paris	New York	4.561	5	Paris	New York	4.7013	5	Tokyo	London	4.9577
6	London	Chicago	4.2739	6	London	Chicago	4.1095	6	Shanghai	London	4.6867
7	London	Los Angeles	4.061	7	New York	Brussels	4.0502	7	London	Beijing	4.5596
8	London	Sydney	3.8174	8	New York	Milan	3.9207	8	Paris	Hong Kong	4.5231
9	Frankfurt	New York	3.7896	9	New York	Madrid	3.9037	9	Sydney	London	4.4869
10	Milan	New York	3.778	10	Toronto	London	3.8996	10	New York	Milan	4.2959

2000			2004			2008					
	city 1	city 2	FS dyad(x3)		city 1	city 2	FS dyad(x3)		city 1	city 2	FS dyad(x3)
1	London	New York	3	1	New York	London	3	1	New York	London	3
2	London	Tokyo	2.7201	2	London	Hong Kong	2.4582	2	London	Hong Kong	2.9616
3	London	Hong Kong	2.6868	3	Singapore	London	2.4582	3	Singapore	London	2.5777
4	London	Singapore	2.4201	4	Tokyo	London	2.3805	4	Tokyo	London	2.4735
5	London	Chicago	2.1132	5	Shanghai	London	1.9743	5	Shanghai	London	2.3364
6	London	Los Angeles	1.98	6	Paris	New York	1.8483	6	Sydney	London	2.3309
7	Paris	New York	1.9266	7	Toronto	London	1.7709	7	Paris	New York	2.2322
8	Paris	Tokyo	1.8399	8	London	Chicago	1.7517	8	Paris	Hong Kong	2.1664
9	London	Sydney	1.8201	9	Sao Paulo	London	1.7226	9	London	Beijing	2.117
10	Paris	Hong Kong	1.8066	10	New York	Madrid	1.7031	10	Madrid	Hong Kong	2.0457



	city 1	city 2	ACC dyad
1	London	New York	1
2	London	Toronto	0.7346
3	London	Los Angeles	0.7192
4	London	Chicago	0.7077
5	London	Tokyo	0.6654
6	London	Mexico City	0.6462
7	Paris	New York	0.6423
8	London	Hong Kong	0.6192
9	London	Sydney	0.6154
10	London	Sao Paulo	0.6038

	city 1	city 2	ACC dyad
1	New York	London	1
2	London	Hong Kong	0.9018
3	Paris	New York	0.7946
4	Tokyo	London	0.7902
5	Toronto	London	0.75
6	London	Buenos Aires	0.7411
7	Los Angeles	London	0.7411
8	London	Chicago	0.7232
9	Singapore	London	0.7188
10	Sao Paulo	London	0.7009

	city 1	city 2	ACC dyad
1	New York	London	1
2	London	Hong Kong	0.9767
3	Singapore	London	0.9215
4	Sydney	London	0.9186
5	London	Buenos Aires	0.8779
6	London	Beijing	0.8692
7	London	Jakarta	0.8314
8	London	Kuala Lumpur	0.8256
9	Shanghai	London	0.8227
10	London	Auckland	0.8081

	city 1	city 2	ADV dyad
1	London	New York	1
2	Amsterdam	New York	0.6966
3	Paris	New York	0.6325
4	London	Hong Kong	0.6154
5	Frankfurt	New York	0.6154
6	Milan	New York	0.594
7	Madrid	New York	0.5855
8	Lisbon	New York	0.5513
9	London	Singapore	0.5427
10	London	Sydney	0.5385

	city 1	city 2	ADV dyad
1	New York	London	1
2	New York	Amsterdam	0.7606
3	New York	Madrid	0.7287
4	Paris	New York	0.6968
5	New York	Brussels	0.6755
6	New York	Milan	0.6702
7	New York	Barcelona	0.6489
8	London	Hong Kong	0.6383
9	Sydney	London	0.6223
10	New York	Lisbon	0.6117

	city 1	city 2	ADV dyad
1	New York	London	1
2	Paris	New York	0.9966
3	New York	Moscow	0.8615
4	Tokyo	Paris	0.8142
5	Warsaw	New York	0.8142
6	New York	Brussels	0.8041
7	New York	Athens	0.8041
8	Singapore	Paris	0.7973
9	Paris	Hong Kong	0.7872
10	Stockholm	New York	0.7804

	city 1	city 2	LAW dyad
1	London	New York	1
2	London	Hong Kong	0.7684
3	London	Washington	0.7368
4	Frankfurt	New York	0.6579
5	Brussels	New York	0.6526
6	London	Singapore	0.6053
7	London	Tokyo	0.5632
8	Paris	New York	0.5368
9	Frankfurt	Hong Kong	0.5053
10	Brussels	Hong Kong	0.4526

	city 1	city 2	LAW dyad
1	New York	London	1
2	London	Hong Kong	0.7739
3	Washington	London	0.6683
4	Tokyo	London	0.6482
5	Singapore	London	0.6432
6	New York	Frankfurt	0.6281
7	New York	Brussels	0.6231
8	Paris	New York	0.6131
9	London	Beijing	0.5126
10	Shanghai	London	0.5025

	city 1	city 2	LAW dyad
1	New York	London	1
2	Paris	New York	0.6779
3	London	Hong Kong	0.5706
4	New York	Frankfurt	0.5552
5	Washington	London	0.5184
6	Tokyo	London	0.4417
7	London	Beijing	0.4387
8	Paris	Hong Kong	0.3957
9	New York	Brussels	0.3896
10	Shanghai	London	0.3865

	city 1	city 2	MC dyad
1	London	New York	1
2	Paris	New York	0.8228
3	Milan	New York	0.8228
4	Madrid	New York	0.7722
5	Stockholm	New York	0.7468
6	London	Washington	0.7342
7	London	Toronto	0.7215
8	Zurich	New York	0.7089
9	London	Singapore	0.6772
10	London	Chicago	0.6329

	city 1	city 2	MC dyad
1	New York	London	1
2	Paris	New York	0.7485
3	London	Chicago	0.7423
4	New York	Milan	0.6687
5	New York	Madrid	0.6626
6	Sydney	London	0.6503
7	Tokyo	London	0.6074
8	Toronto	London	0.6074
9	Singapore	London	0.6012
10	Stockholm	New York	0.5767

	city 1	city 2	MC dyad
1	New York	London	1
2	Paris	New York	0.922
3	London	Boston	0.7936
4	London	Chicago	0.7202
5	Zurich	New York	0.711
6	New York	Madrid	0.6927
7	New York	Frankfurt	0.6881
8	Paris	Chicago	0.656
9	Singapore	London	0.6468
10	New York	Milan	0.6422

**Table 23.** Dyad values between Europe and the rest of the world, per every year and per each sector

2000

EU region	world region 2	ACC dyad	ADV dyad	FS dyad(x3)	LAW dyad	MC dyad	ALLSECTORS		
	<b>300 Total</b>	460.1124	183.012	640.3206	33.8761	125.1586	1442.4797	200	Europe
	400 Total	172.9	61.5055	136.7043	1.3476	35.212	407.6694	300	Asia
	500 Total	475.6107	118.6404	472.4034	25.0162	157.5417	1249.2124	400	Africa
	600 Total	303.4979	103.5724	242.2905	7.8114	60.4569	717.6291	500	North America
	700 Total	127.9521	37.6258	99.2163	2.3635	26.5593	293.717	600	South America
	Grand Total	1540.0731	504.3561	1590.9351	70.4148	404.9285	4110.7076	700	Oceania

2004

EU region	world region 2	ACC dyad	ADV dyad	FS dyad(x3)	LAW dyad	MC dyad	ALLSECTORS
	300 Total	561.8968	233.3799	656.337	40.1078	242.6895	1734.411
	400 Total	223.7484	79.2666	128.6724	1.5484	51.9963	485.2321
	500 Total	542.128	130.4508	453.6861	31.1308	262.9752	1420.3709
	600 Total	360.4072	125.9768	262.7034	13.7435	127.1505	889.9814
	700 Total	139.9689	42.0497	93.3111	2.8798	50.4568	328.6663
	Grand Total	1828.1493	611.1238	1594.71	89.4103	735.2683	4858.6617

2008

EU region	world region 2	ACC dyad	ADV dyad	FS dyad(x3)	LAW dyad	MC dyad	ALLSECTORS
	300 Total	636.9439	342.4205	630.3785	24.8457	170.5489	1805.1375
	400 Total	172.6947	90.8466	80.0136	2.678	22.935	369.1679
	500 Total	433.0542	138.9902	347.1315	26.4481	241.9174	1187.5414
	600 Total	383.8659	155.2121	200.2605	6.4082	70.0543	815.801
	700 Total	130.1384	41.8033	92.1279	4.4435	38.9995	307.5126
	Grand Total	1756.6971	769.2727	1349.912	64.8235	544.4551	4485.1604

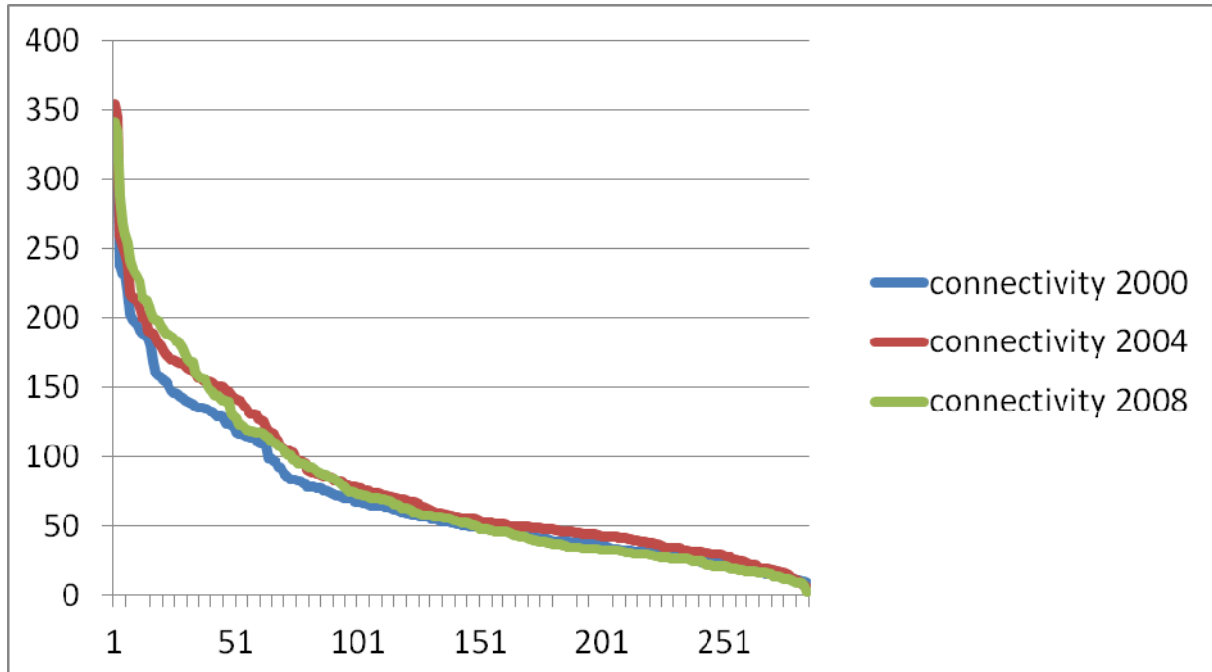
**Table 24.**European Globalization Strategies – six factor analysis

	FAC1		FAC2		FAC3		FAC4		FAC5		FAC6
Warsaw	2.60	London	10.43	Frankfurt	4.50	Frankfurt	4.98	Birmingham (UK)	3.08	Paris	5.98
Budapest	2.33	Amsterdam	-1.03	Madrid	4.12	Munich	4.23	Edinburgh	3.03	Brussels	5.38
Prague	2.24			Amsterdam	3.58	Paris	3.57	Dublin	2.63	Dublin	1.94
Vienna	2.22			Zurich	3.40	Dusseldorf	3.43	Manchester	2.58	Milan	1.49
Stockholm	2.14			Paris	3.29	Hamburg	3.20	Leeds	2.48	Ljubljana	1.34
Athens	2.13			Milan	2.59	Berlin	2.30	Glasgow	2.35	Barcelona	-1.00
Lisbon	2.12			Stockholm	2.10	London	1.47	Bristol	2.32	Rome	-1.01
Bucharest	2.03			Geneva	1.26	Brussels	1.25	Liverpool	1.64	Munich	-1.06
Helsinki	2.00			Dusseldorf	-1.02	Barcelona	1.01	Newcastle	1.52	Dusseldorf	-1.12
Copenhagen	1.93			Sofia	-1.04	Vilnius	-1.06	Amsterdam	1.50	Hamburg	-1.15
Rome	1.72			Vienna	-1.07	Zurich	-1.17	Southampton	1.49	Stuttgart	-1.31
Milan	1.66			Bucharest	-1.19	Ljubljana	-1.33	Belfast	1.43	Lisbon	-1.45
Dublin	1.64			Nicosia	-1.20	Athens	-1.34	Nottingham	1.33	Oslo	-1.46
Brussels	1.62			Budapest	-1.42	Stockholm	-1.47	Aberdeen	1.32	Copenhagen	-1.58
Zurich	1.61			Prague	-1.44	Dublin	-2.17	Cardiff	1.26	Berlin	-1.79
Oslo	1.54			Berlin	-1.85			Brussels	1.19	Frankfurt	-2.23
Sofia	1.52			Hamburg	-2.33			Zurich	1.18	Stockholm	-2.24
Barcelona	1.47							Rome	1.16	Zurich	-2.94
Madrid	1.37							Rotterdam	1.04		
Zagreb	1.18							Sofia	-1.01		
Berlin	1.15							Skopje	-1.03		
Bratislava	1.14							Bratislava	-1.15		
London	1.10							Vilnius	-1.23		
Amsterdam	1.03							Zagreb	-1.25		
Southampton	-1.00							Tallin	-1.28		
Norwich	-1.00							Belgrade	-1.29		
Nottingham	-1.06							Bucharest	-1.29		
Plymouth	-1.09							Ljubljana	-1.41		
								Frankfurt	-1.86		

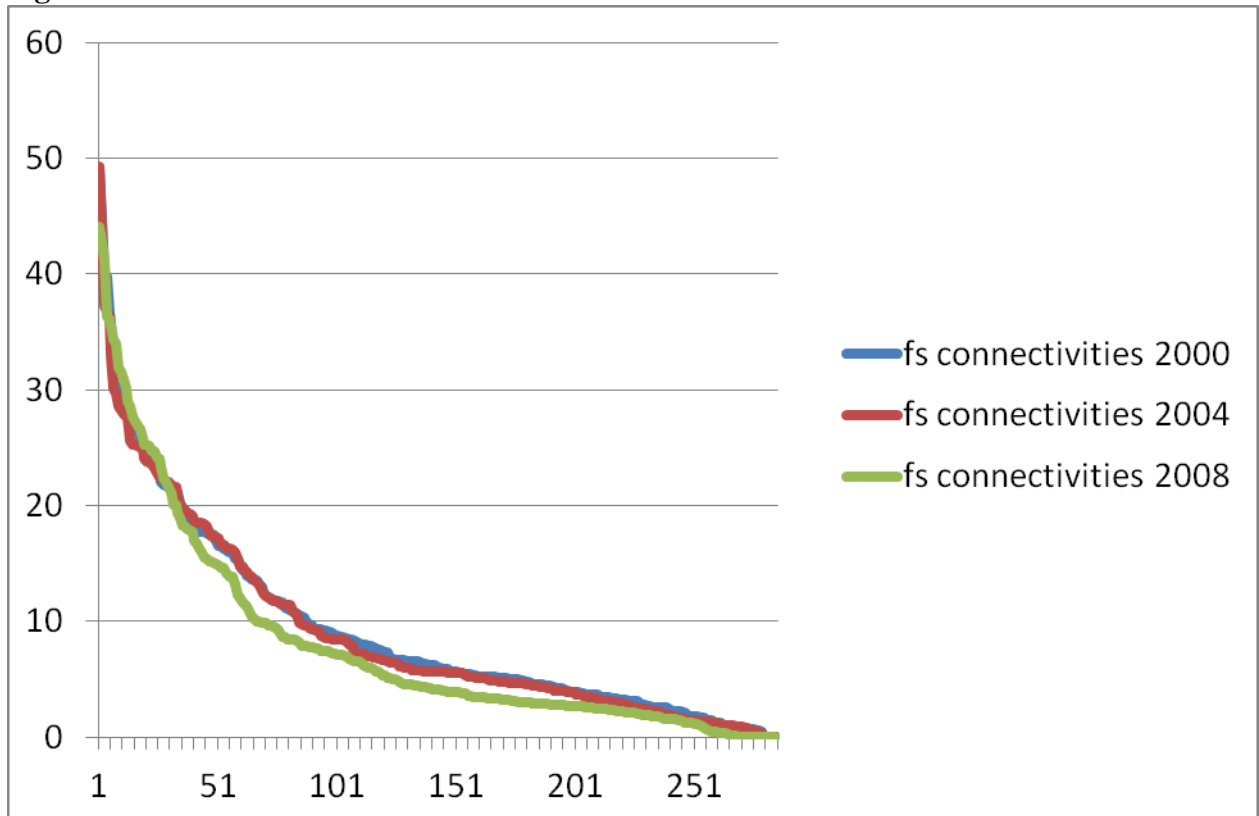
## APPENDIX B – FIGURES

Source: Authors, data supplied by the Globalization & World Cities (GaWC) Research Network: <http://www.lboro.ac.uk/gawc/>

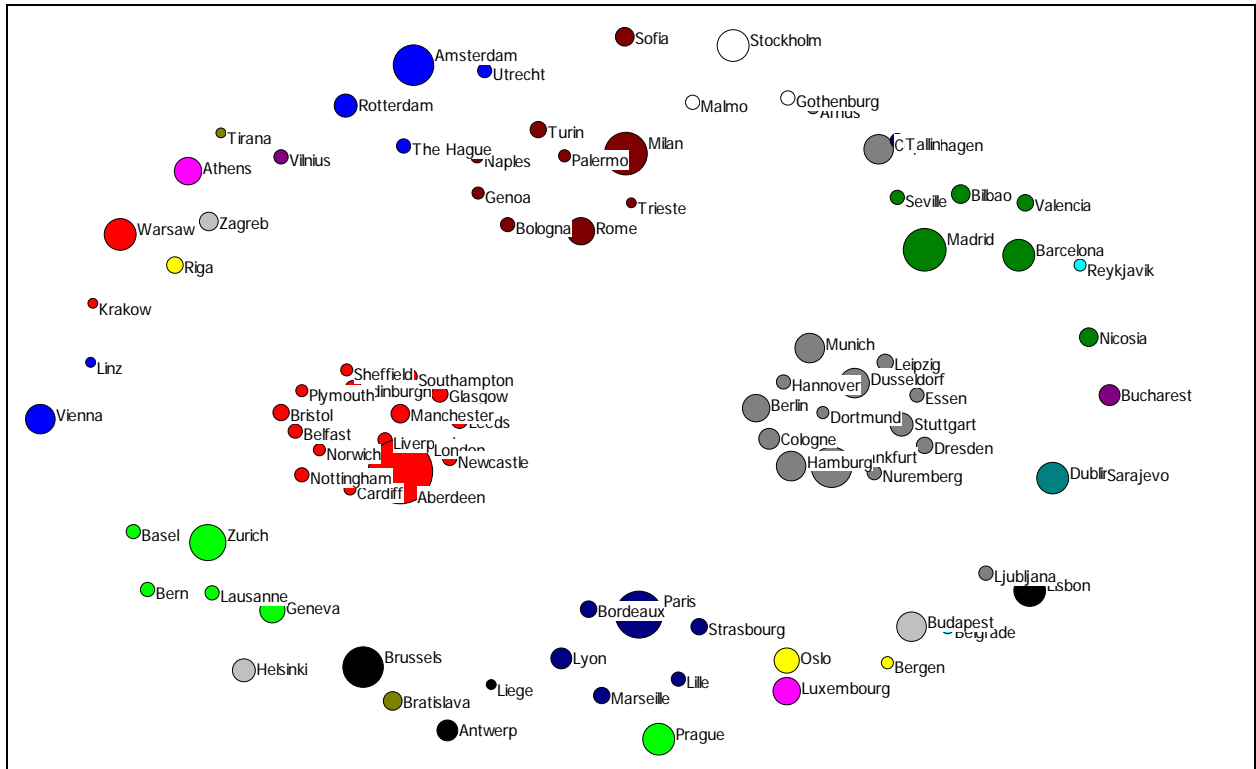
**Figure 1.** APS distributions of standardized connectivities



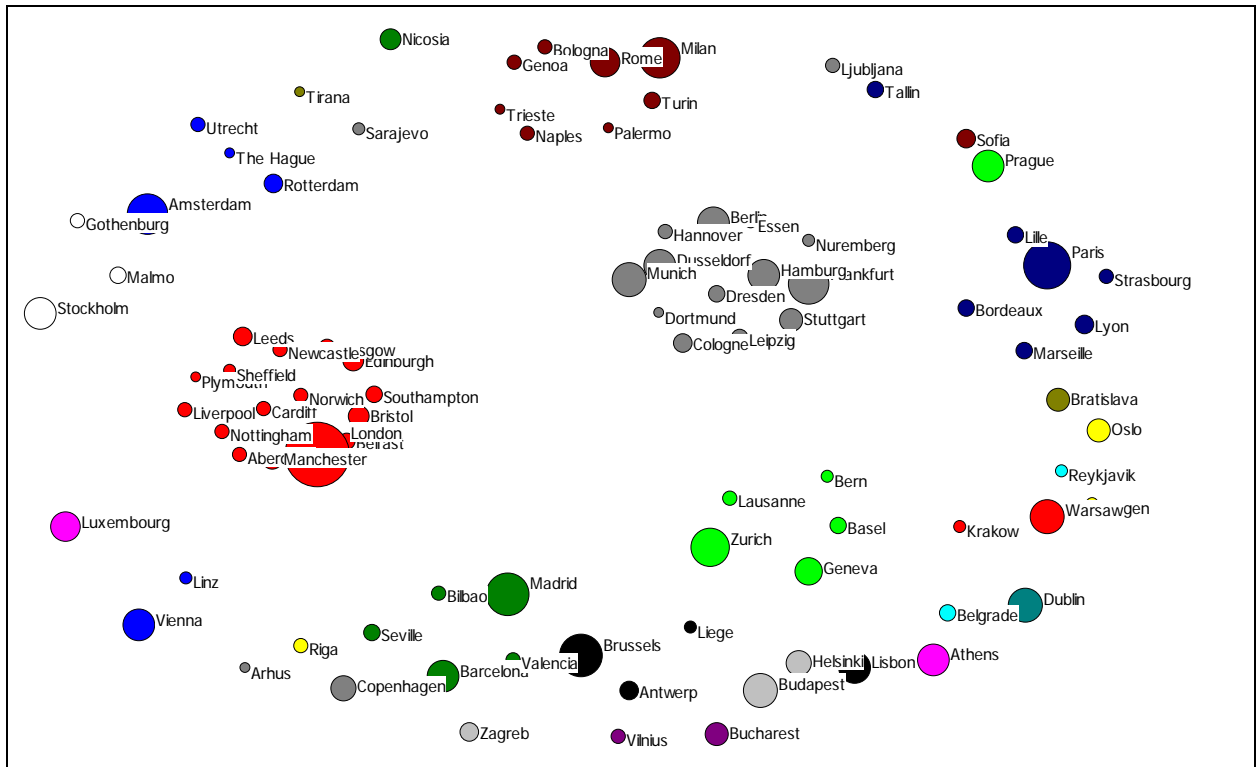
**Figure 2.** FS distributions of standardized connectivities



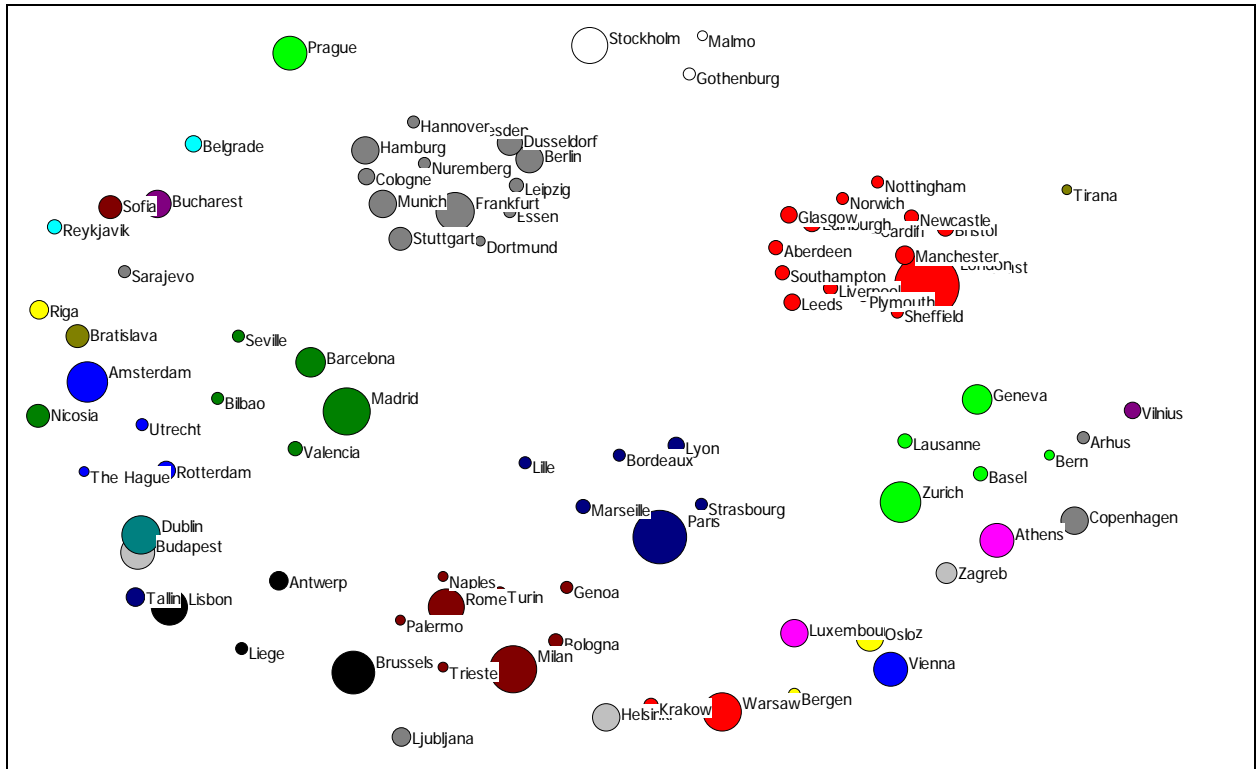
**Figure 3. EU APS**  
2000



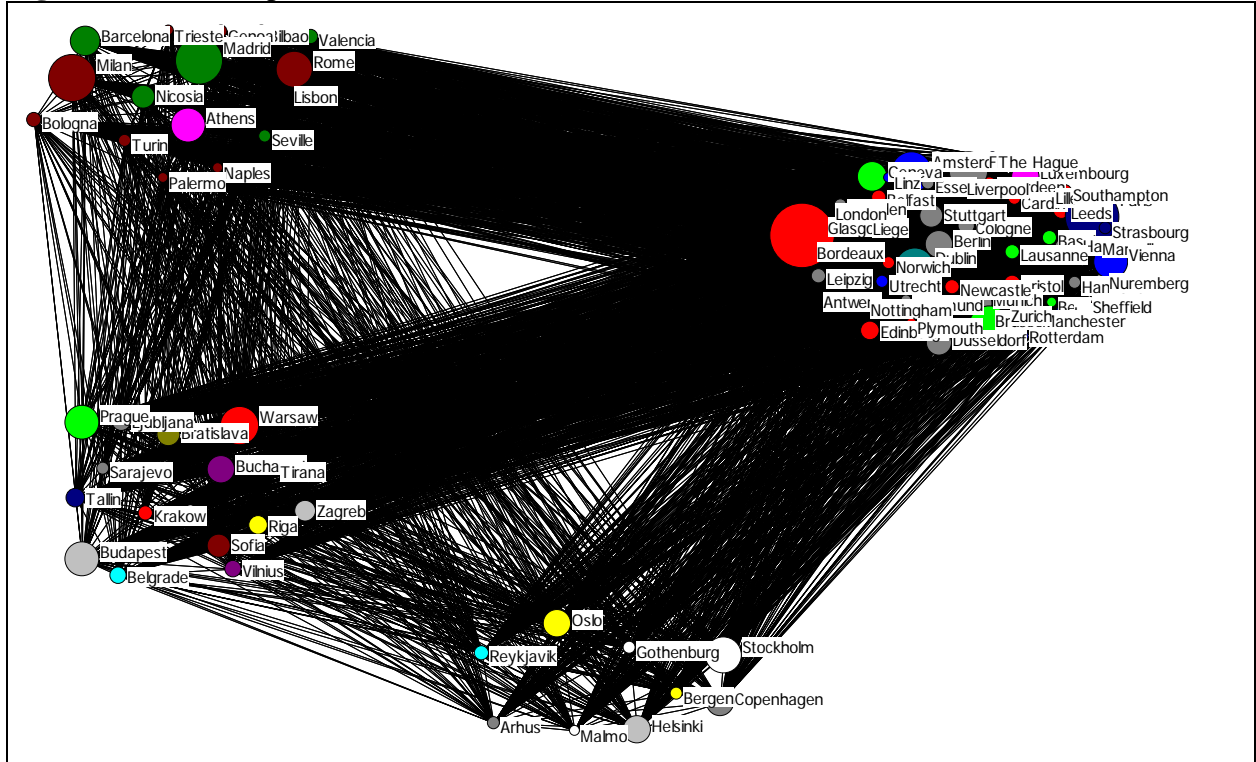
**Figure 4. EU APS**  
2004



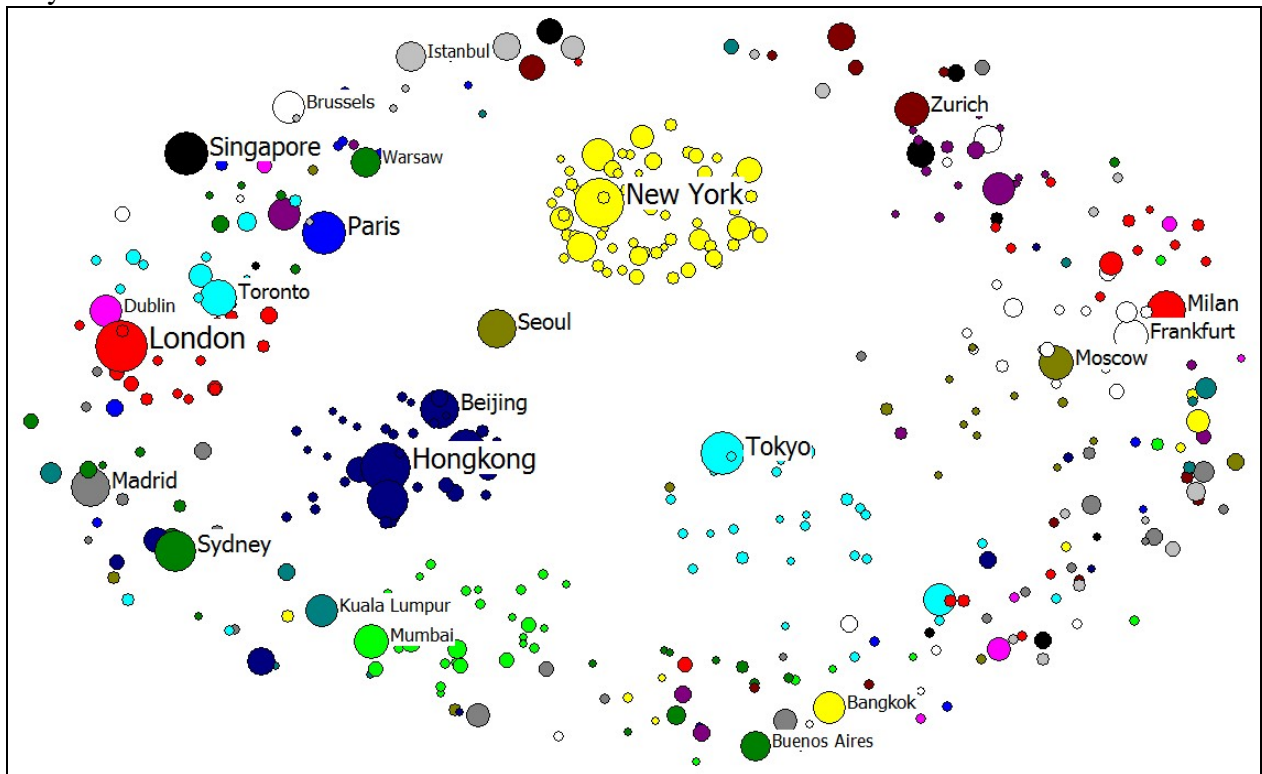
**Figure 5. EU APS**  
2008



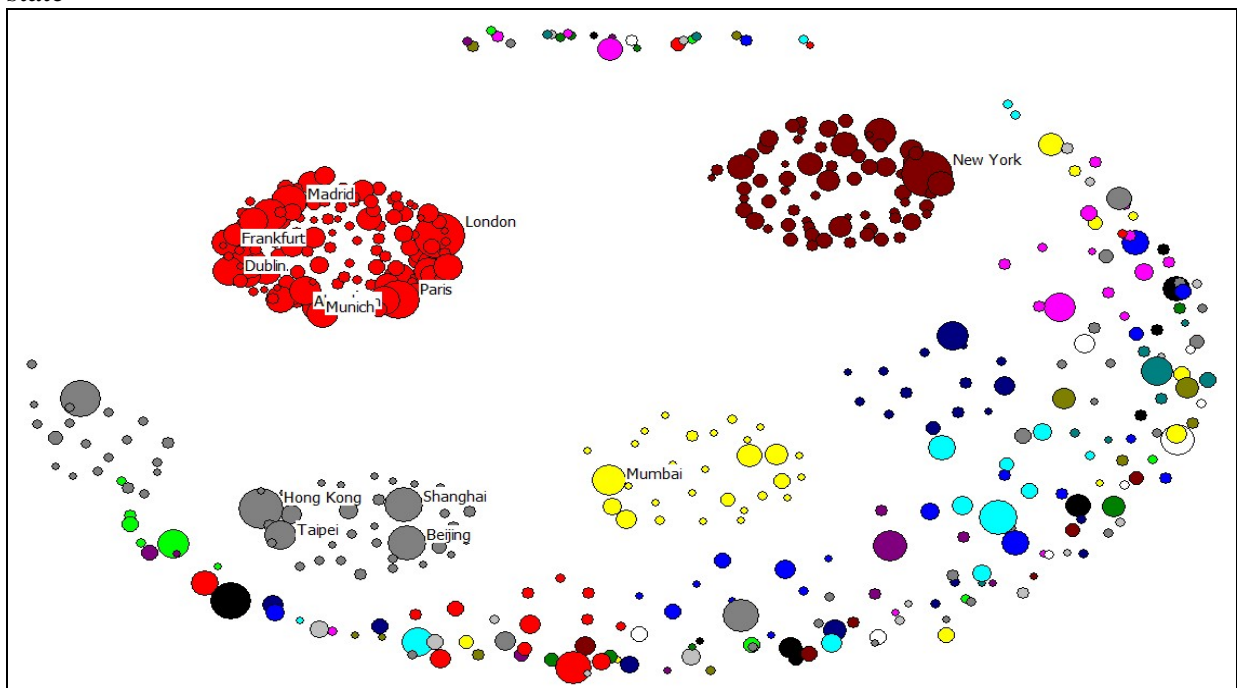
**Figure 6. Four Europes in the ECN**



**Figure 7.** 2008 Mappa Mundi for FS only

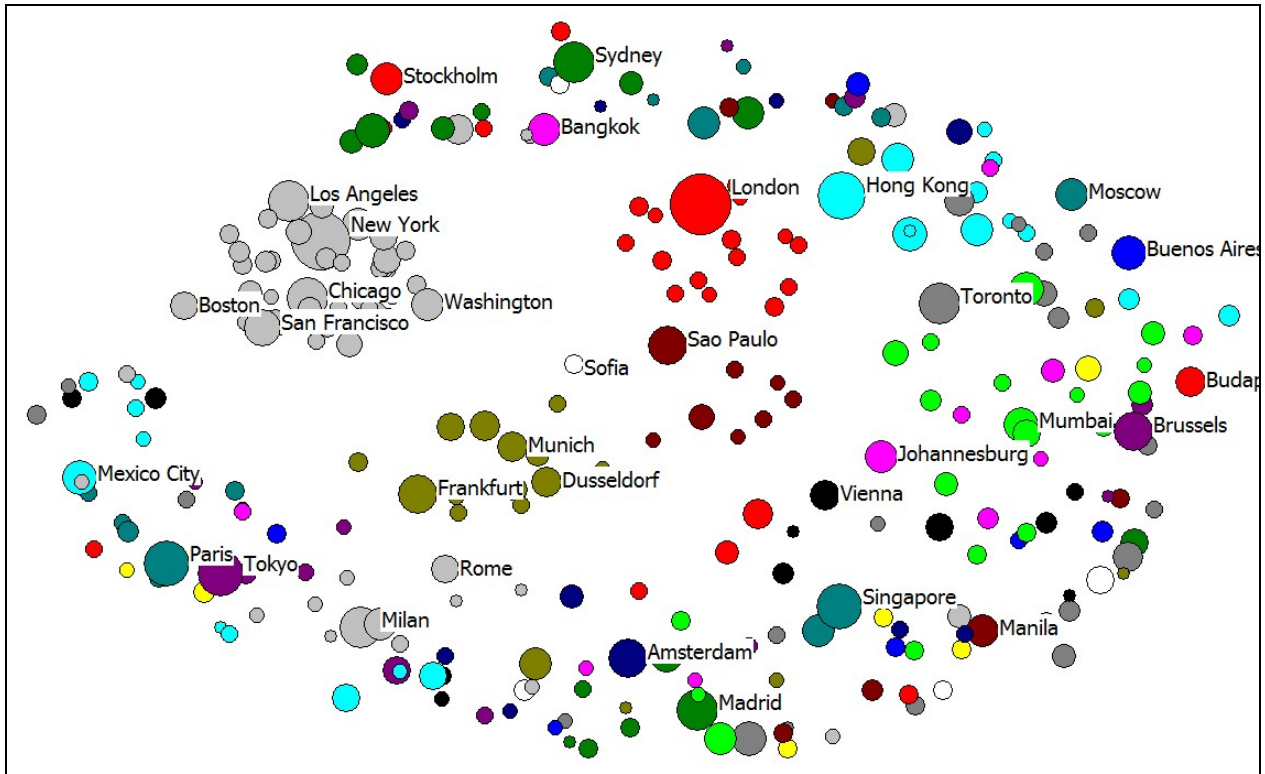


**Figure 8.** 2008 Mappa Mundi treating the EU as a state

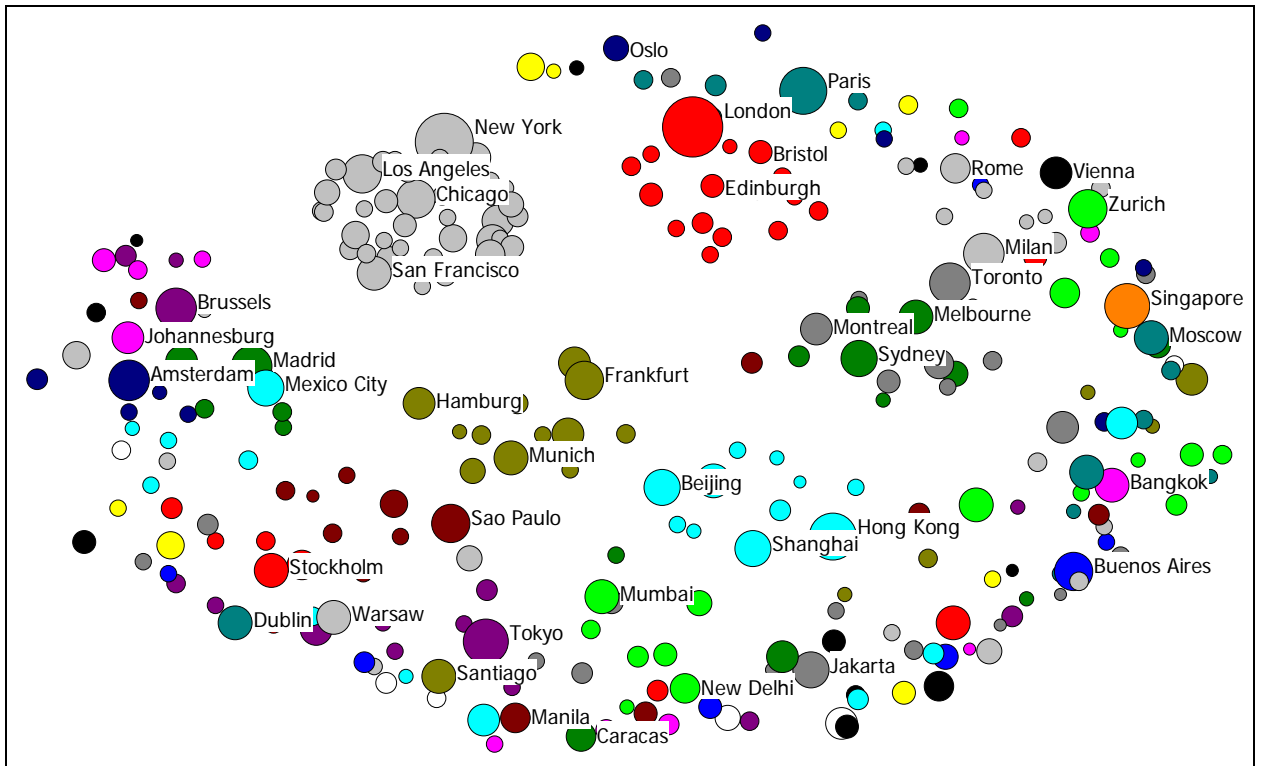




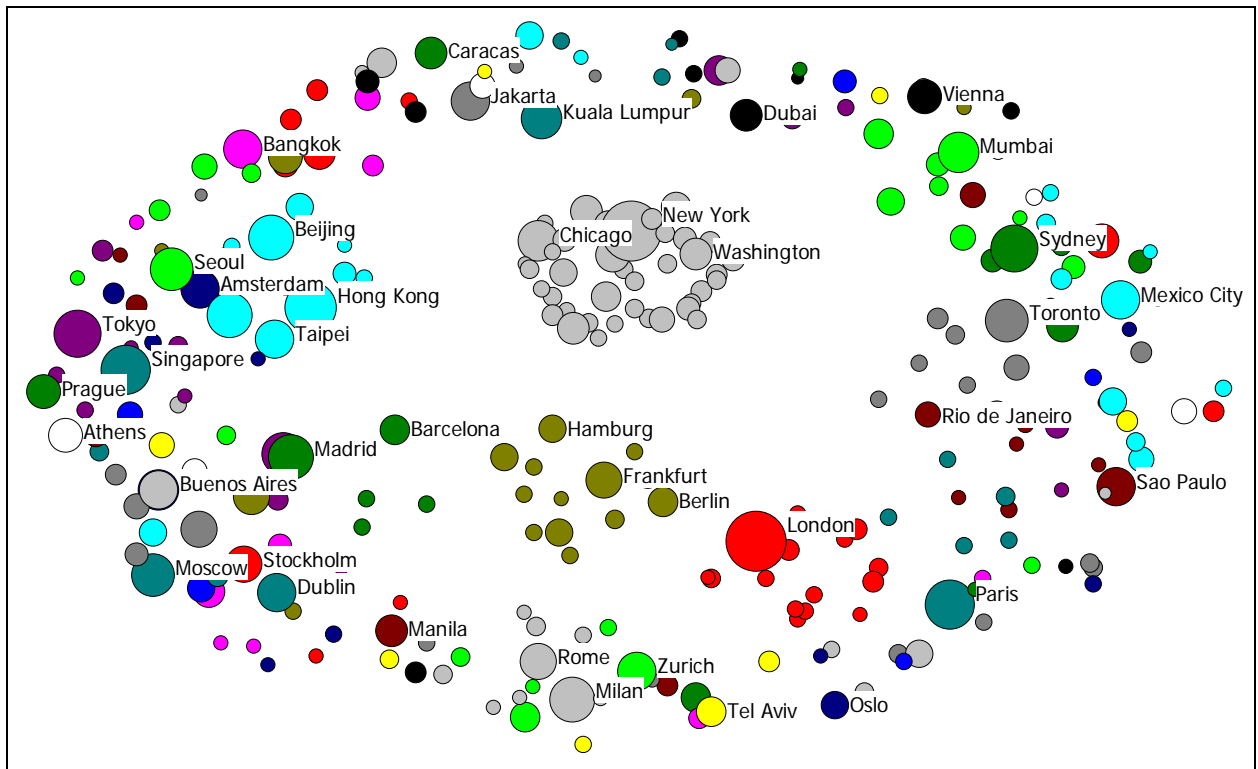
**Figure 9. APS MM**  
2000



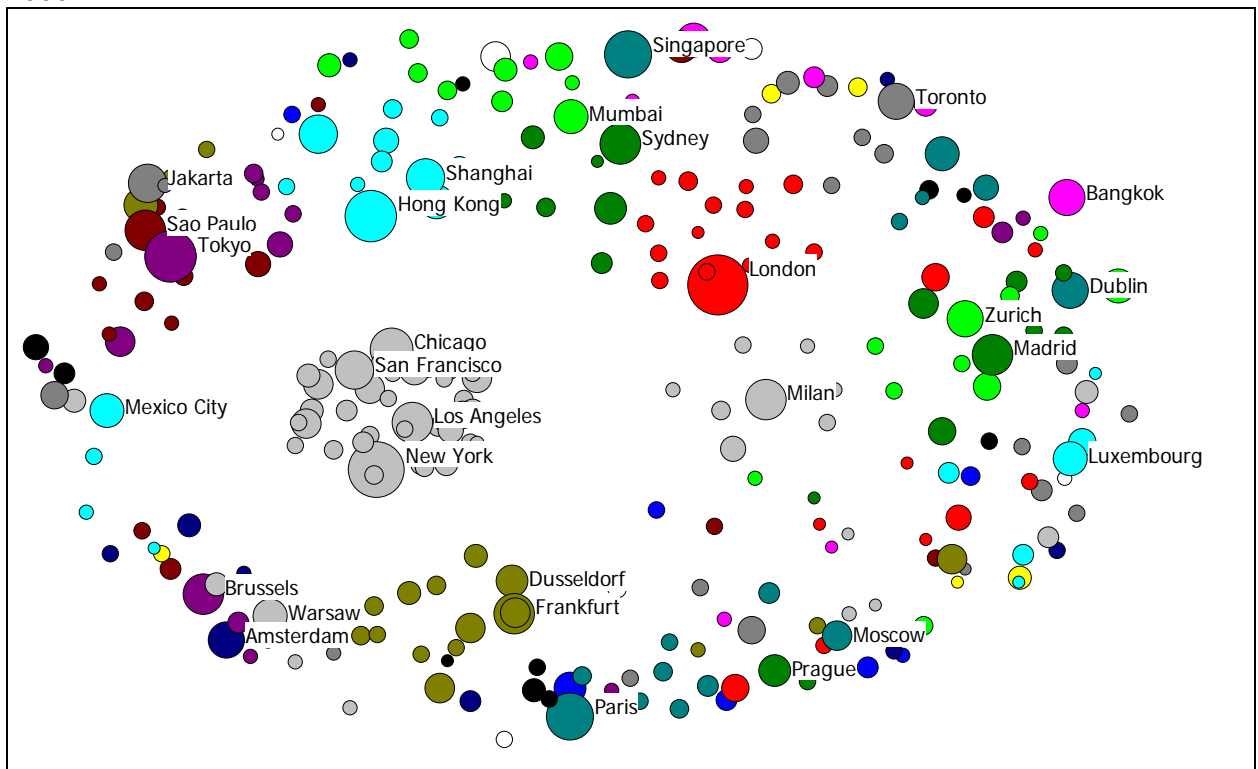
**Figure 10. APS MM**  
2004



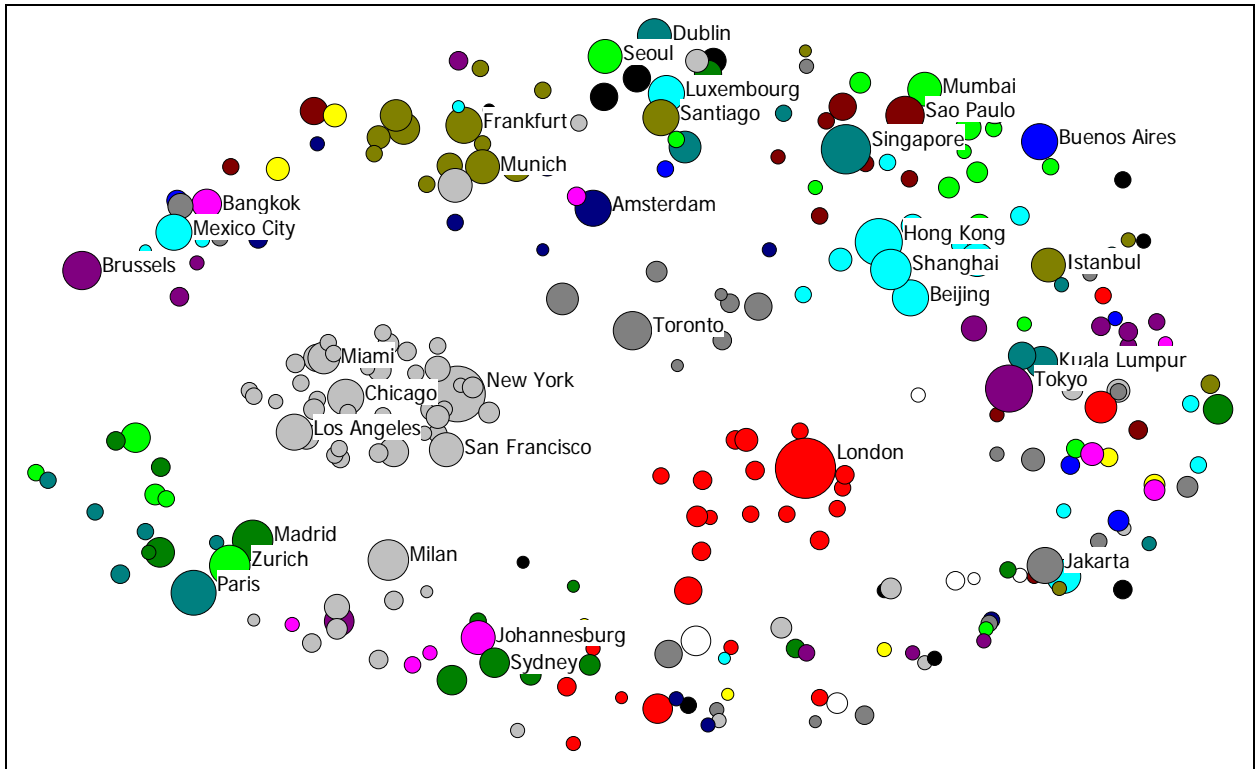
**Figure 11. APS MM**  
2008



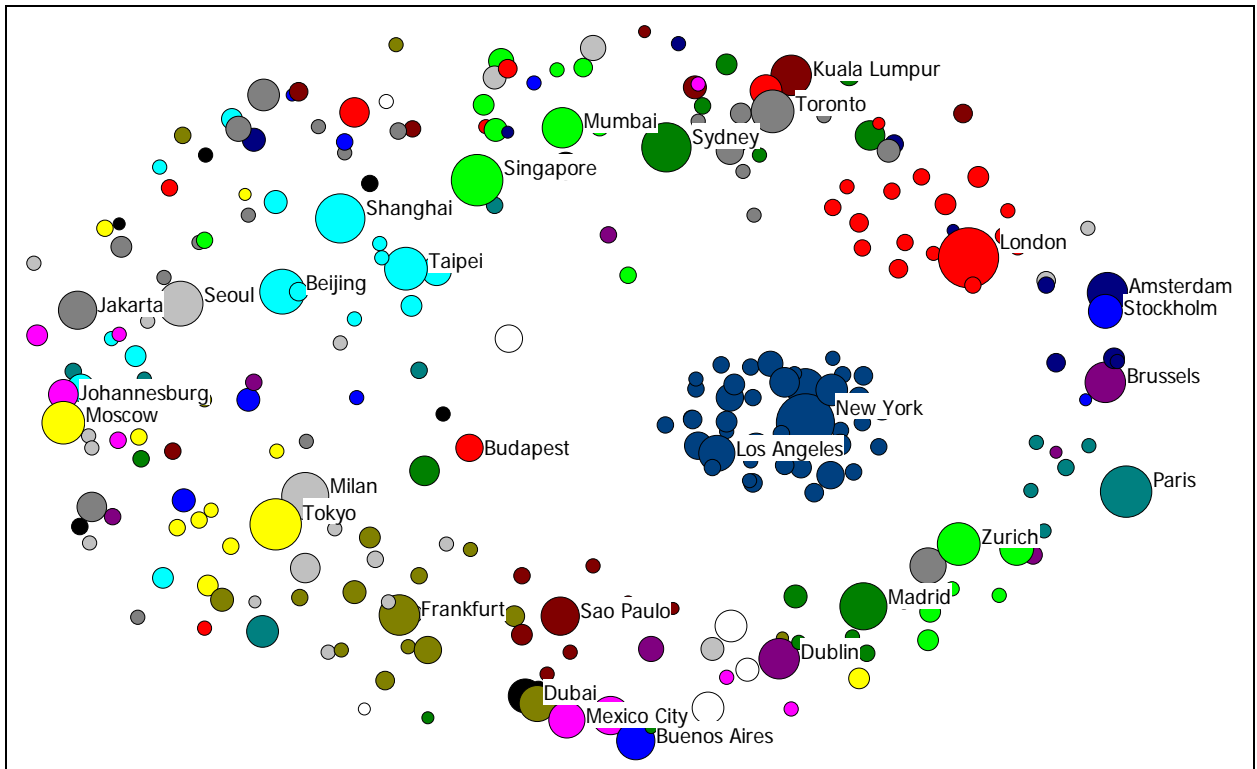
**Figure 12. FS MM**  
2000



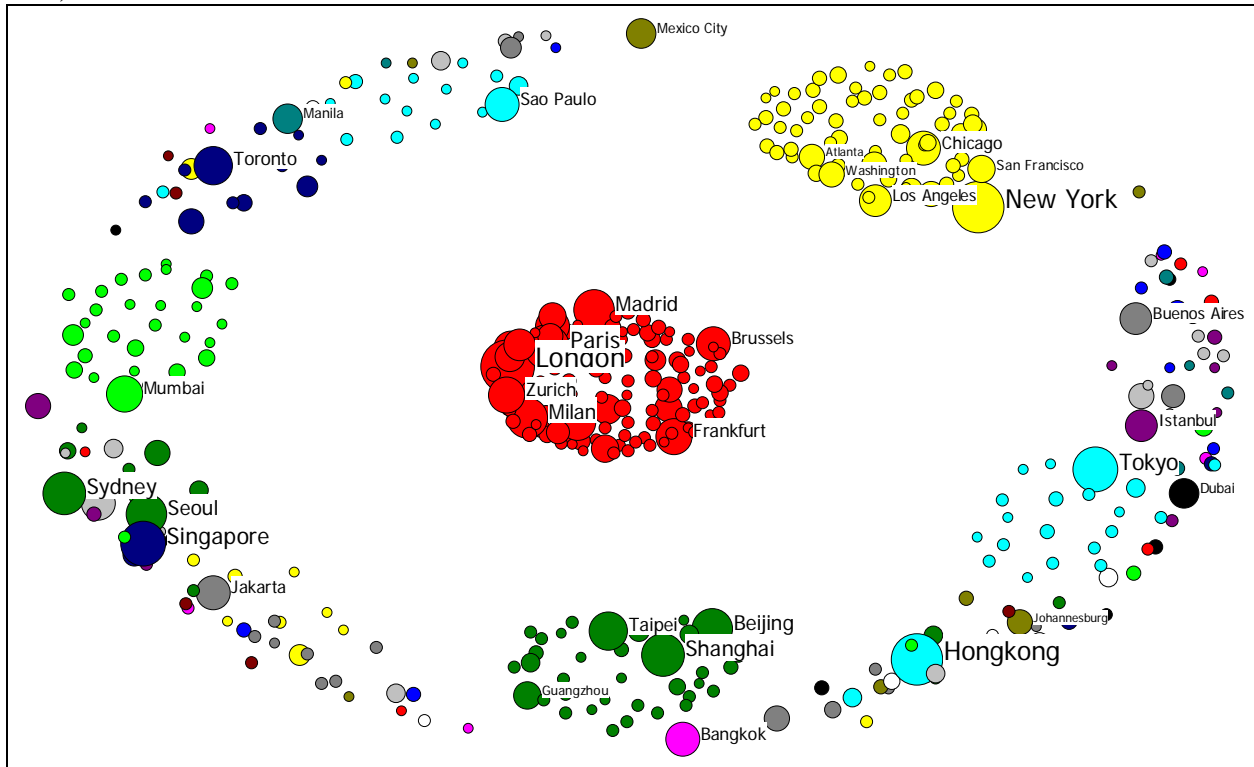
**Figure 13. FS MM**  
2004



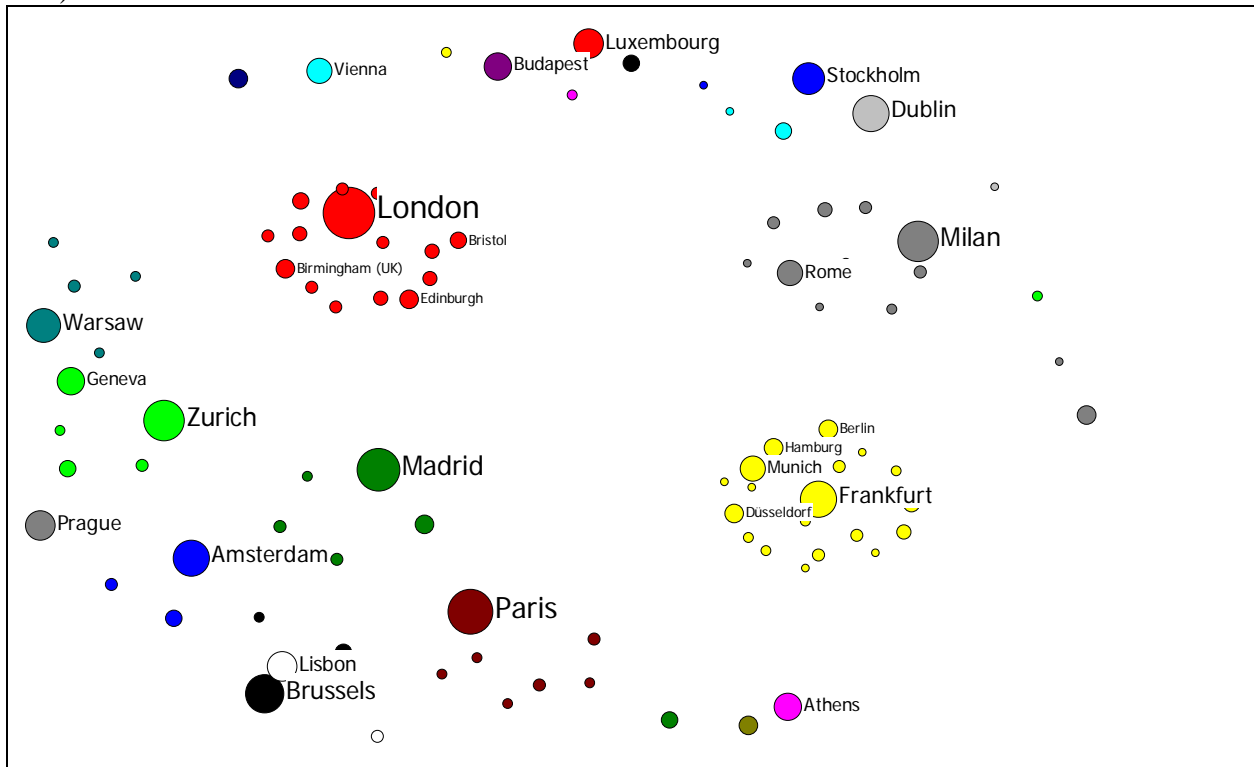
**Figure 14. FS MM**  
2008



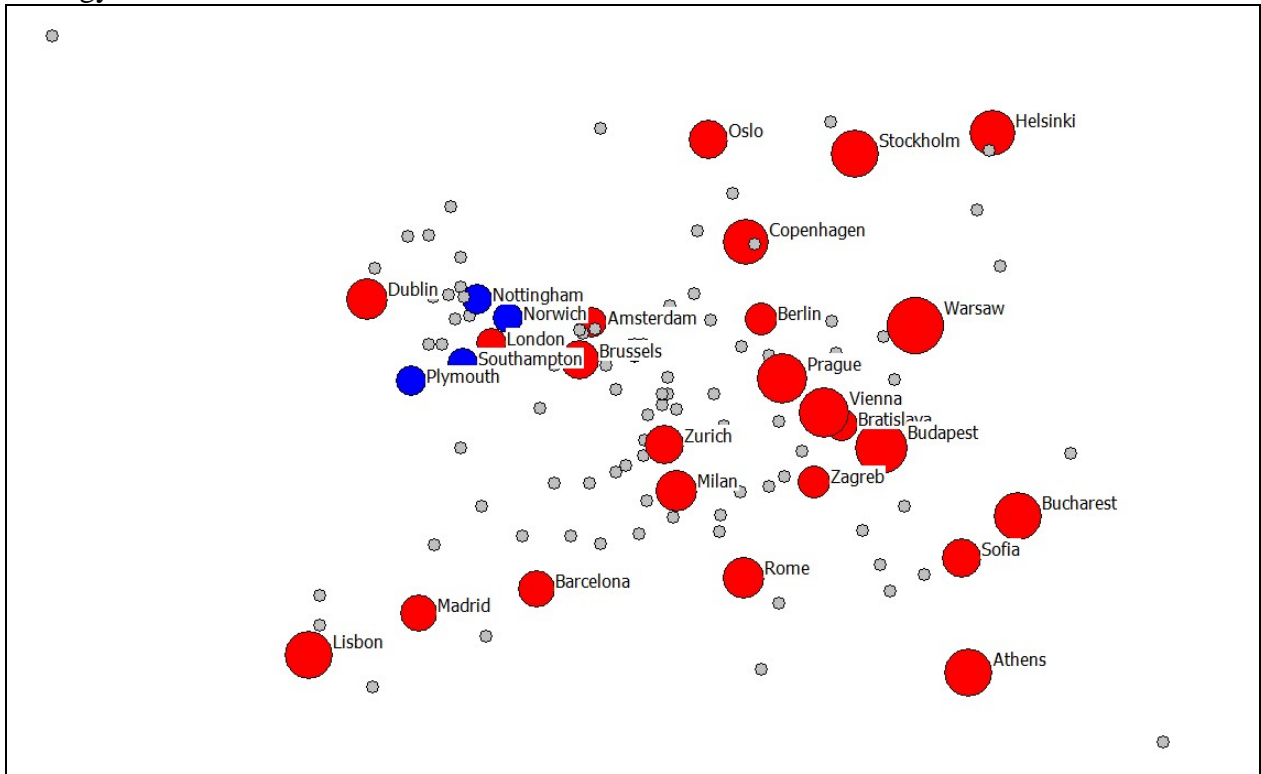
**Figure 15.** 2008 FS Mappa Mundi treating the EU as a state (non-standardized data)



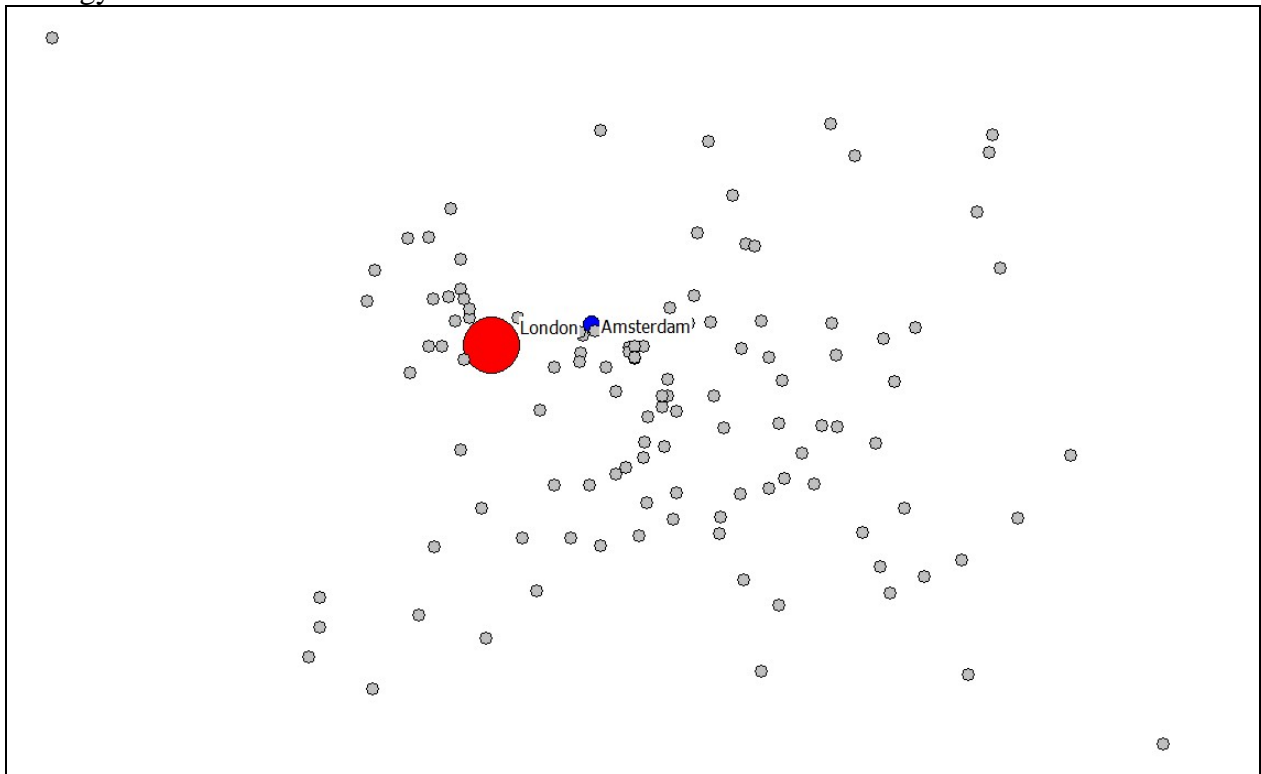
**Figure 16.** 2008 FS Mappa Mundi for European Cities only (non-standardized data)



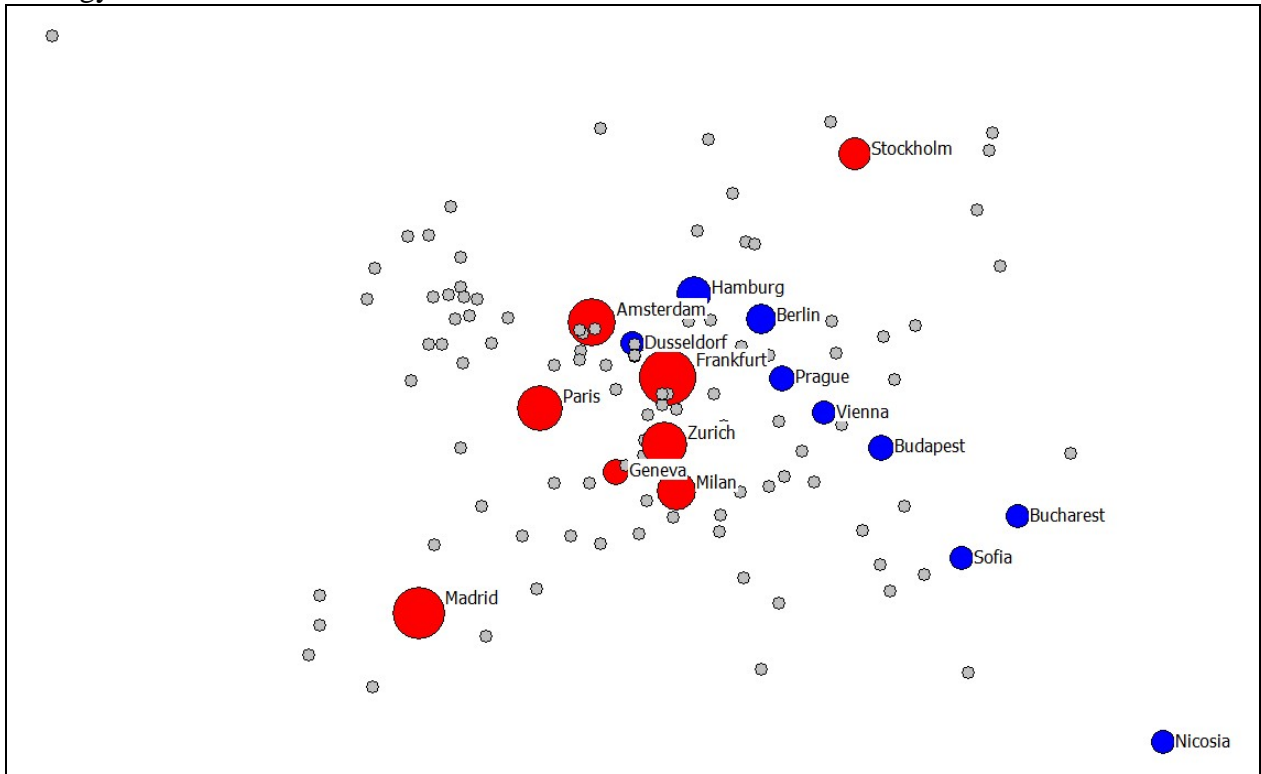
**Figure 17.** PCA analysis - Factor 1 – Outer Europe Capitals Strategy



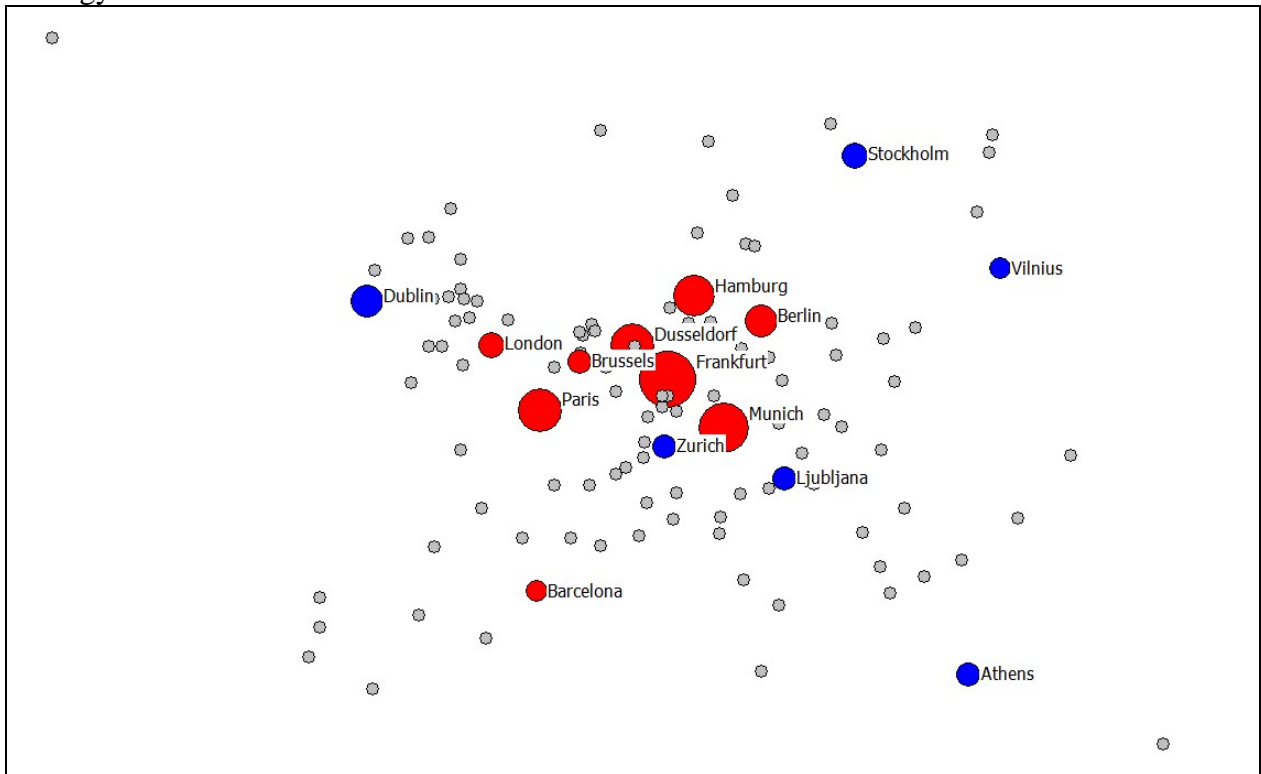
**Figure 18.** PCA analysis - Factor 2 – Primate Strategy



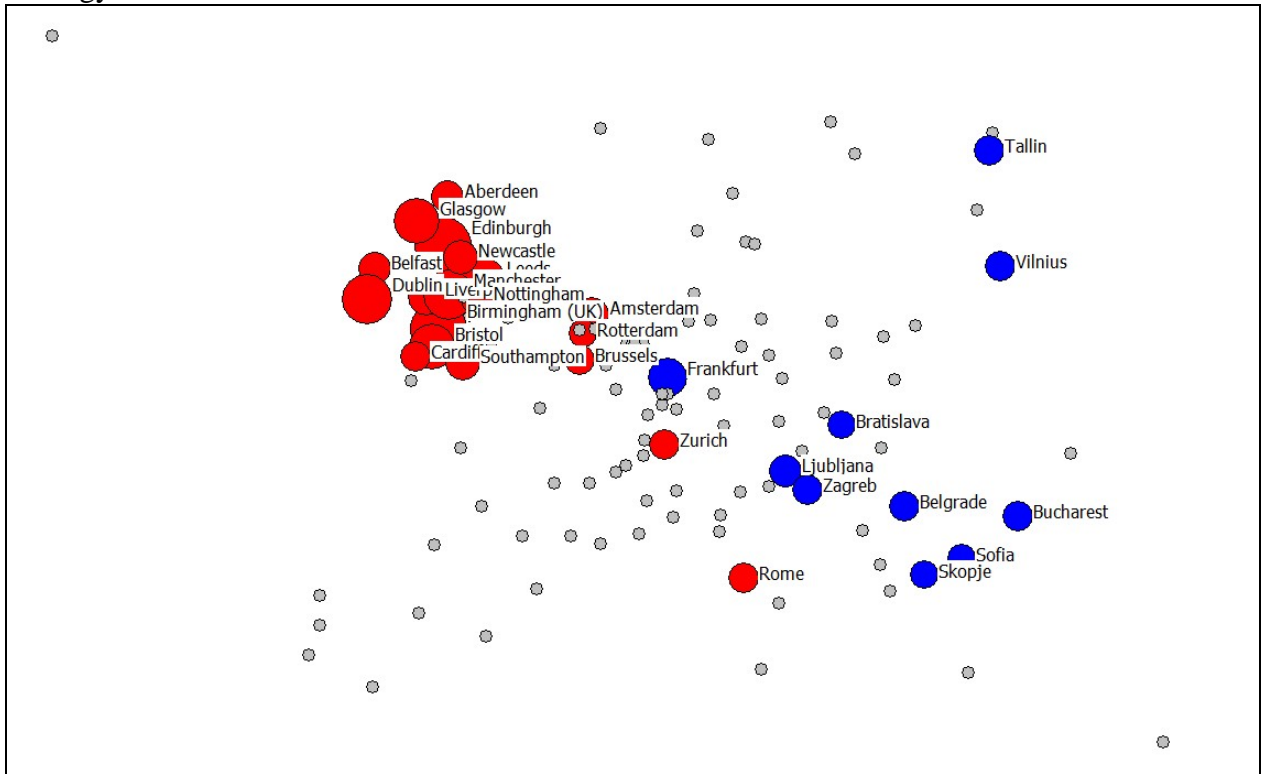
**Figure 19.** PCA analysis - Factor 3 - Major Western Europe Cities Strategy



**Figure 20.** PCA analysis - Factor 4 - German Strategy



**Figure 21.** PCA analysis - Factor 5 - British Strategy



**Figure 22.** PCA analysis - Factor 6 - Dual Strategy

