

**Vital Positioning through the World City Network:
Advanced Producer Service Firms as Strategic Networks,
Global Cities as Strategic Places**

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Abstract

Sassen's identification of global cities as 'strategic places' is explored through world city network analysis. This involves searching out advanced producer service (APS) firms that constitute 'strategic networks', from whose activities strategic places can be defined. 25 out of 175 APS firms are found to be strategic and from their office networks, 45 cities out of 526 are designated as strategic places. A measure of 'strategic-ness' of cities is devised and individual findings from this are discussed by drawing on existing literature about how APS firms use specific cities. A key finding shows that New York and London have different levels of strategic-ness and this is related to the former's innovation prowess and the latter's role in global consumption of services. The strategic-ness of Johannesburg, Mexico City, Palo Alto, and leading Chinese and German cities are also discussed in terms of the balance between production and consumption of advanced producer services.

Key words

Advanced producer services, global cities, London, New York, strategic places, world city network

Introduction

In her classic *The Global City* Saskia Sassen (1991, 3-4) identified, as her ‘point of departure’, processes of globalization that had ‘created a new strategic role for major cities’ resulting in a ‘new type of city’ that ‘is the global city’. In her subsequent textbook on the subject, she distinguished global cities as one of three types of ‘strategic places’ (Sassen 1994, 18) – later extended to four (Sassen 2006, 31) – but her discussion makes clear that it is global cities that are by far the most important strategic places in economic globalization. The prime purpose of this paper is to investigate cities as strategic places in contemporary globalization using the methodology developed as world city network analysis (Taylor 2001, 2004; Taylor et al. 2011a). This approach deals with many more cities than Sassen considers: here we ask the question, which of these numerous cities can be reasonably identified as strategic places? We deploy world city network analysis findings to answer this question quantitatively so that amongst the cities thus identified we can measure degrees of ‘strategic-ness’. From this we explore different ways in which cities are being strategic drawing on the literature dealing with individual cities.

We treat the concept of strategic places as a specific expression of Eric Sheppard’s (2002) geographical positionality within globalization. One of the examples he draws upon in his broad discussion of positionality is the ‘status’ of cities being defined ‘by their position within transnational networks’ so that ‘one can see that the role and trajectory of such cities is bound up with their positionality’ (p. 324). In arguing that ‘[o]ur understanding of the spatiality of globalization will be impoverished ... if positionality is neglected’ (p. 319), Sheppard lists several advantages of this approach

(p. 319, 325-6) two of which are particularly relevant to our study of strategic places. First, there is the matter of mutuality across networks: the role of the non-local in constituting all local places whatever the scale of definition – the conditions for change depend upon ‘direct interactions with distant places’ and not just ‘local initiative’ (p. 319). Second, this same mutuality, which is the essence of network building, can lead researchers away from considering the ‘unequal power relations’ (p. 319) that also inhabit networks – all nodes are equal but some are more equal (strategic) than others. This fits neatly with our world city network analysis where it is advanced producer service firms that are the global network-makers and it is their urban agglomeration that creates Sassen’s global cities. Thus what is strategic has to be treated from two directions. From the perspective of cities there are key firms that operate as strategic networks, which cities need to be part of; but equally, from the perspective of firms there are key cities that are strategic places, where firms have to be. Thus our argument will bring together Castells’ (1996) spaces of flows and spaces of places into a single analysis and interpretation.

We do not aspire to match the subtle and nuanced treatment of positionality that Sheppard achieves but we do attempt to provide a distinct empirical contribution to the discussion: a strongly-evidenced, theoretically-sound set of results that do add some subtlety to understanding cities in globalization. Our argument proceeds in six parts: (i) we present the basic model that we use which specifies contemporary inter-city relations as an interlocking network; (ii) we describe the data required to operationalize the model by creating a service values matrix showing how firms use cities, and initial forms of analyses from these data are described for both firms and cities; (iii) specific findings for 2010 data are presented describing city-dyad contrasts

and globalization strategies of firms; (iv) strategic networks are derived from the globalization strategies and these are employed to identify strategic places; (v) the strategic-ness of cities is derived by relating strategic network positions to cities' encompassing global network positions; and (vi) we interpret our findings in relation to what the literature says about specific cities we have found to be strategic places. What we have added to this literature is a comprehensive assessment of cities in this category. Our most notable finding concerns London and New York. These two cities dominate world city rankings and are often functionally linked together as 'NYLON'. Not surprisingly, both figure as strategic places in this study, but we are able to separate them in terms of 'strategic-ness': we will disentangle NYLON within the overall framework of the world city network.

Basic Model: Interlocking Network Specification

Our first premise is that cities are formed through commercial relations with other cities (Jacobs 1969), and that these inter-city relations compose networks (Taylor et al. 2010). As the products of commerce, generic city networks are specified as interlocking networks. This type of network has an unusual formation in that it operates through three levels instead of two. As well as the net and node levels common to all networks, it has a third 'sub-nodal' level. This is its vital property for understanding commercial city networks because it is at the sub-nodal level that we find the agents of the networking process: firms who locate in the city and have relations with other cities are the network-makers. In identifying these agents we avoid reifying cities as economic agents: it is firms that create city networks by their everyday work through multiple locations. Therefore city networks encompass the net level at the scale of the economy the cities operate in, the node level as cities, and a

sub-nodal level as multi-location firms. In the specific case of the contemporary world city network, these are the global economy, important cities across the world including Sassen's global cities, and leading advanced producer service firms (Taylor 2001).

The choice of specifying advanced producer service firms as the economic agents making the world city network derives directly from Sassen's (1991) identification of this economic sector as key creator of her global cities. This occurs in two ways. First, global cities through their 'control and command functions' house corporate headquarters and agencies of government that provide the main market for advanced producer services. Second, it is these cities that are the production centers for advanced producer services, the places where product and process innovations keep growing this cutting edge economic sector. This consumption/production dual character of global cities will have a central role in interpreting the strategic places we identify below. However, we depart from Sassen's use of advanced producer services to identify a small subset of cities as 'global' and instead recognise that advanced producer services are much more widespread than her discussion implies. We define a world city network based upon the activities of advanced producer service firms that encompasses several hundred cities across the world. This reflects the fact that economic globalization is an all-encompassing process; there are no 'un-global cities', just variations in the form and intensity of global processes across different cities based largely upon a city's historical trajectory and contemporary positionality. Thus we specify the world city network in terms of the worldwide office networks of leading advanced producer service firms.

The world city network is formally specified in Taylor (2001); here we provide just a basic outline. The network is represented by a city-by-firm matrix \mathbf{V}_{ij} , where v_{ij} is the ‘service value’ of city i to firm j . This service value is a measure of the importance of a city to a firm’s office network, which depends on the size and functions of a firm’s office (or offices) in a city.

The inter-city connectivity between two cities a and i (ICC_{a-i}) is defined as:

$$ICC_{a-i} = \sum v_{a,j} \cdot v_{i,j} \quad (\text{where } a \neq i) \quad (1)$$

This provides a measure of the potential work flows, transfers of information and knowledge, between pairs of cities. The assumption behind conceiving the product of service values as a surrogate for actual flows between cities a and i for firm j is that the more important the office, the more links there will be with other offices in a firm’s network. In other words, we are using a simple interaction relation: two cities housing large offices will generate more inter-city work flows between them than two cities each with small offices.

Typically in world city network analysis these inter-city connectivities are aggregated for each city and the totals are interpreted as the global network connectivity of a city (GNC), indicating a city’s overall importance within the network:

$$GNC_a = \sum ICC_{a-i} \quad (\text{where } a \neq i) \quad (2)$$

This has been the main measure derived from the model and can be interpreted as how well a city is integrated into the world city network, and hence its ‘global status’.

Basic Data: Filling the Service Values Matrix

To operationalize this model requires assessment of firms' office networks to empirically construct a city-by-firm matrix V_{ij} of service values. The data required for this exercise are readily available on firms' websites where they promote their 'global' status as a means of both impressing clients in a competitive services market and recruiting graduates in a competitive jobs market. However this source, plus supplementary information as available, produces different levels and types of information for every firm. Thus the data have to be converted using a simple coding system to enable cross-firm comparison for analysis. We have found that a coding from 0 to 5 has served this purpose; such numbers are the service values ($v_{i,j}$ in equation (1)) measuring the importance of city i in firm j 's office network. Thus, 0 indicates a city where firm j has no presence, 5 is firm j 's headquarter city. Codes 1 to 4 are then allocated as follows: a typical office of firm j scores a city 2, there must be something deficient to lower the score to 1, and something extra for it to rise above 2. For the latter, an especially large office scores 3, an office with extra-city jurisdictions (e.g. regional HQ) scores 4. Each firm is assessed individually to decide on boundary decisions away from 2. With n firms and m cities, such data collection creates an n firms x m cities array of service values, the basic matrix for interlocking network analysis. Each column of the matrix shows a firm's location strategy as a string of integers from 0 to 5 across m cities; each row shows a city's service mix as a string from 0 to 5 across n firms.

In 2010 we assessed the office networks of 175 firms across 526 cities. The former consisted of 75 financial services firms and 25 each of accountancy, advertising, law and management consultancy firms. Firms were chosen using trade information

ranking firms by size based upon the latest information available (e.g. on turnover). Cities were chosen on the basis of previous experience in this work (315 cities used in earlier data collections) plus all other cities with more than 2 million population, all other capital cities of countries with over one million population, and all other cities housing the headquarters of one of our 175 firms. These are arbitrary rules of inclusion but the aim was to include more cities than necessary (526 in all) so as not to exclude any potentially relevant cities in what is a very dynamic process of world city network formation. The end result is a 175 firms x 526 cities matrix for 2010 providing 92,050 service values for analysis.

Specific Findings for 2010: City-dyad Analysis and Globalization Strategies

There are two findings from analyses of these 2010 data that have stimulated the current paper. One concerns a city-dyads analysis that focuses on the inter-city connectivities as defined in equation (1) (Taylor et al. 2012a). The other is a principal components analysis of the service values matrix treating firms' location strategies as the input, as 175 variables (Taylor et al. 2012b). For full details of these analyses, readers are referred to the original papers; here we highlight specific findings that will directly feed into how we understand strategic networks and strategic places in subsequent analysis.

In any city-dyad analysis of a large matrix such as ours, there are myriad pairs of cities whose inter-city connectivities can be computed as given in equation (1). The initial way of dealing with this surfeit of results is to concentrate on just the largest

connectivities: in this case only the leading 40 city-dyad connectivities are considered. In Table 1 the number of times each city from the top 20 cities as defined by global network connectivity (equation (2)) feature in the leading inter-city connectivities is listed. For instance, New York appears in more top 40 city-dyads than any other city, 10 times in all. Because global network connectivity is composed of inter-city connectivities (equation (2)), there will be a broad relation between overall global network connectivity and the number of leading city-dyads a city belongs to. For instance, it can be seen that there are 7 out of these 20 cities that do not feature at all in the leading city-dyads by inter-city connectivities and these are generally found in the lower ranks of global network connectivity in Table 1. But this relation is far from being definitive, Dubai has no partners in top 40 city-dyads despite being ranked 9th for global network connectivity. In stark contrast, Frankfurt, ranked a lowly 19th for global network connectivity, is a member of 8 such city-dyads, which puts it on a par with Hong Kong, Singapore and Shanghai and only one behind London. What can this mean?

In such circumstances it is often the exceptions to the rule that are particularly informative and this is what makes the Dubai/Frankfurt comparison so intriguing. A city's global network connectivity is an aggregate measure that tells us nothing about the specific inter-city connections that constitute it: how many connections it is composed of (i.e. the number of other cities it shares firms with), which cities it is more strongly connected to and where it is relatively weakly connected. Thus what appears to be happening with Dubai's global network connectivity is that it is composed of a relatively dispersed pattern of inter-city connectivities featuring more lesser cities than expected for its global network connectivity ranking. Frankfurt, on

the other hand, tends to have a more concentrated pattern of inter-city connections constituting its global network connectivity, particularly featuring other major cities. Our preliminary interpretation is to link this to these cities' positionalities in the world city network: Frankfurt has a more strategic position within the world city network than Dubai despite the fact that the latter is more generally integrated into the network. It was this train of thought that stimulated us to consider how we could extrapolate from this particular finding and measure the strategic-ness of cities more generally. To go down this research path requires us to examine the network-makers, the firms whose office networks lie behind the Dubai/Frankfurt contrast, and indeed other discrepancies in the relation between global network connectivity and membership of top 40 city-dyads displayed in Table 1.

The second study we draw upon concerns analysis of advanced producer service firms' office networks as location strategies. Obviously every firm considers its products and their markets when deciding to invest the capital to set up a new office in another city. Thus the outcome of these decisions at any one point in time constitutes a firm's location strategy. This particular geography is represented by a firm's column of integers in the service values matrix; for 2010 we have 175 such strategies. Although every strategy is different across our firms there are some clear similarities amongst them that can be teased out using a principal components analysis. This technique is a 'data reduction' method that converts x variables into y components where y is appreciably smaller than x . This is achieved by using the correlations between variables to combine them into groups of like variables, the 'principal components' of the data. The importance of each component is derived from its correlations (called 'loadings') with the original variables. In the analysis

reported here the 175 individual firm location strategies (variables) were reduced to just 10 components that are interpreted as common location strategies. Of these 10 components, two were much more important than the others, between them accounting for 40% of the common variance found in the service values matrix. We concentrate on these two common location strategies here.

The characteristics of principal components can be discerned from their component scores on the objects of the analysis, in this case the cities. The scores for the two main components identified above, illustrating the two leading common location strategies from the 2010 service values matrix, are given in Table 2. These strategies are labelled intensive and extensive globalizations for reasons that will become apparent as we describe them. In each case we identify a ‘home-region’ on which the strategy is centered – most of the headquarters of the firms that constitute each component are to be found here (see Taylor et al. 2012b, Table 3) – and a ‘global outreach’ that identifies how the rest of the world is serviced through the location strategy. In both cases we find the home-region encompasses US cities plus London – we have coined the term ‘USAL’ to describe this global-regional formation (Taylor et al. 2012b). However, although overlapping, the constitution of these two regions is quite distinctive: in the first list in Table 2 there are 12 US cities plus London, in the second just three US cities plus London. With global outreach we find the obverse: just six cities in the first list but with 33 featuring in the second list. The reason for their specific labels is as follows. The intensive globalization strategy focuses on the prime locus through which economic globalization was initially constructed (USAL) with the rest of the world serviced through just three key cities in each of the two other major ‘globalization arenas’ – Brussels, Frankfurt and Paris in Western Europe

and Hong Kong, Tokyo and Beijing in Pacific Asia. In contrast the extensive globalization strategy emanates from just four main USAL cities combined with a very comprehensive servicing across the rest of the world: the top 5 cities in the global outreach are from regions beyond USAL, Western Europe and Pacific Asia (the latter two regions are represented, but primarily by their less important cities such as Kuala Lumpur and Athens).

In what follows we use results from the two globalization strategies to try and understand the findings from the previous city-dyad analysis, specifically to generalize beyond the Dubai/Frankfurt contrast.

Identifying Strategic Networks and Strategic Places

In our model it is the firms that are the agents of globalization, the transnational network makers, and therefore to comprehend strategy we start by identifying strategic firms, and then use them to find the strategic places that are our initial concern in this paper.

Although the two components are orthogonal (i.e. not related, their correlation equals zero), there will be firms that use elements of both common strategies as reflected in their loadings on the two components. These are the firms we will identify as ‘global strategic firms’. Specifically, we use firms’ component loadings on (i.e. levels of correlations with) the intensive and extensive globalization strategies to define a ‘global strategic measure’ for all 175 firms in our data. We compute the product of the loadings on the two components for each firm to create this measure. Global strategic firms are then identified as those with a measure of 0.10 and above. The

basic reasoning behind this procedure is to find firms with relatively high positive loadings on both components. Thus firms with a negative loading on one of the components are immediately eliminated. Firms scoring high on one component but not the other are similarly discarded: even with a rare high loading on 0.8 on a component, a firm would require a loading of at least 0.125 on the other component to reach a measure of 0.10. In a more balanced case, a firm loading 0.33 on both components would similarly just qualify. The results of this exercise are shown in Table 3 where 25 global strategic firms are listed.

We can see from Table 3 that four out of the five service sectors in our data are represented; the exception is accountancy where firms tend to have large, ubiquitous networks of offices. Financial services are also under-represented – only three of the 25 firms listed. This is perhaps a surprise since finance is often viewed as the core activity in a city to which other advanced producer services are attracted. However, our data include just the largest financial service firms and most of these have rather large office networks and therefore are less strategic, like accountancy firms. Thus the key sectors represented are law with 9 firms, management consultancy with 8 firms, and advertising with 5 firms. Apart from a single London firm, all the firms are US firms (i.e. in our previous parlance, they are all from USAL).

We are now in a position to identify which cities are strategic places within the world city network: we define these as cities that house offices of 10 or more strategic firms. This produces a list of 46 cities shown in Table 4.¹ The cities are ranked by their

¹ It should be noted that although this methodology includes arbitrary threshold decisions for defining strategic firms and strategic places, these were not the only ones tested in the

strategic network connectivity derived from computing the network connectivity defined by equation (2) but only including the 25 strategic firms in the calculations. Most of the cities Sassen (1991) mentions as ‘global cities’ appear in the top half of this table with the cities she focuses on being ranked first (New York), second (London) and tenth (Tokyo). From our previous discussion we can immediately note that Frankfurt (13th) ranks higher than Dubai (18th) supporting our preliminary suggestion that the former was more strategically placed in the world city network than the latter. We can now see that this finding is largely on account of Frankfurt attracting more strategic firms than Dubai: 20 to 15. All 25 strategic firms are found in London and New York, the latter is ranked higher because its offices tend to be more important than London’s (e.g. more headquarters): this is shown by the higher connectivity New York obtains from its strategic firms’ offices. Other cities with high connectivity per strategic firm office are Miami, just above New York, and Johannesburg and Düsseldorf just below New York. All three of these cities are specialist regional centers with important extra-mural functions (e.g. continental-scale regional headquarters). It is the variability in the two final columns of Table 4 that suggests there is more to the geography of strategic places than expressed through the absolute strategic connectivity totals we have used to rank the cities.

research. The key point is that the different choices had very little effect on subsequent analysis. In other words, the results we present below are quite robust with minor differences having no relevance to the conclusions drawn.

Relating Strategic Network Connectivity to Global Network

Connectivity

We continue our exploration of strategic network connectivities by relating them to the cities' original global network connectivities. This is most simply done by comparing ranks; these are both shown in Table 5 and with differences in ranks listed. Thus London and New York swap places at the top of the list but the most noteworthy changes are:

- the large rises in the ranks of Chicago, Los Angeles, and especially San Francisco
- the rapid rises of Frankfurt, Miami, Bangkok, Johannesburg and Düsseldorf, Stockholm, Auckland, Riyadh and especially Palo Alto
- the modest but consistent reduction in ranks of leading Pacific Asian cities – Hong Kong, Singapore, Tokyo, Shanghai and Beijing
- the large reduction in ranks of Dubai, Toronto, Brussels, Kuala Lumpur and Delhi.

More generally, Table 5 fulfils our aim to generalise beyond the Dubai/Frankfurt contrast that first stimulated this study.

Table 6 provides two ways of taking the analysis forward by moving from absolute measures of strategic network connectivities to relative ones. First, we present the percentages of a city's global network connectivity that is strategic. In this interpretation of strategic-ness, Palo Alto is ranked first with by far the highest percentage – about one sixth – of its connectivity strategic. Clearly this is a special case – its extreme ranking difference in Table 5 showed this. What we have here is a city that is weakly connected into the world city network but is nonetheless a major

strategic place. Obviously this reflects the global high-tech status of Silicon Valley and we discuss how this relates to advanced producer services in the next section. Other points to note from the first list in Table 6 are that leading US cities dominate at the top – San Francisco, Chicago, New York, Los Angeles and Miami – interspersed with both surprising and less surprising cities prominent in Table 5 – Auckland, Riyadh, Düsseldorf, Bangkok, and Johannesburg. In this list Frankfurt, ranked 12th, is very definitely recoded as more strategic than Dubai ranked 40th. But the most intriguing feature of this list is the separation of London and New York. In nearly all research on the world city network these two cities take the top two ranks but here New York is ranked a relatively high 6th while London drops to a relatively lowly 23rd. This points us towards different roles of New York and London in the world city network expressed through their relative strategic positionalities. This finding will be at the heart of our interpretation of results in the next section.

The second ranked list in Table 6 shows relative strategic-ness in a different way. Strategic network connectivity is regressed against global network connectivity and the residuals are recorded. These are standardized (zero mean and a standard deviation of one) so that positive numbers indicate relative strategic over-connectedness and negative numbers relative under-connectedness. In this formulation New York is ranked first and London falls further down the list to 26th and is shown to be relatively strategically under-connected. This list is broadly similar to the percentage list with US cities dominating slightly more at the top, and Dubai falling even more below Frankfurt. This is our favored measure of strategic-ness since it expresses strategic connectivity deviations directly from what might be expected through a city's global network connectivities. This strategic network geography that we have

uncovered within the world city network is shown in Figure 1; it forms the basis of our specific interpretations of strategic places and their differences below.

Interpretation of Positionalities: Disentangling ‘NYLON’ and More

The quantitative findings shown in Table 6 and represented in Figure 1 require interpretation based upon both theoretical extensions of the model employed and empirical knowledge of the cities as advanced producer service centers. In practice these two needs cannot be separated (and this is particularly the case when we try and comprehend our results on New York and London). However in terms of the empirics, clearly we cannot deal with all 46 cities and therefore we proceed as follows. We begin with consideration of London and New York, surely the world’s most studied cities, and focus on writings that have discussed their differences. In addition, our interpretation takes in Castells’ (1996) specification of his spaces of flows from which our model derives. We then deploy what we have learned from this prime city-dyad comparison to other specific cases. These are chosen from a mixture of intrinsic interest and availability of relevant literature to meet our needs. Thus we deal with China cities and German cities, Palo Alto, the highly strategic but weakly connected city, and two emerging market cities: Mexico City and Johannesburg, the former more strongly connected the latter more strongly strategic. In each vignette we bring in discussion of other cities as and when appropriate.

New York and London

New York and London define the only city-dyad that actually has a name: NYLON. It is part of a tradition that sees these cities at the forefront of fashion and which has been enhanced by economic globalization whereby leading world movers and shakers

are said to work through three offices, one in each city and another in transit over the Atlantic Ocean. Smith (2012, 421) describes how these two cities have come to be viewed as a single city: ‘a transatlantic metropolis that is the heart-beat of the global economy’. The key point that Smith makes is that the cities operate in conjunction for the benefit of a small rich minority. But the conflation of the two cities hides the differences that we are seeking. Their complementarities are based upon dissimilarity and this has been the subject of a careful comparison as global financial centers by Sassen (1999) and Wójcik (2011).

According to Sassen (1999, 81) New York and London constitute ‘a cooperative division of labor’ that operates as follows:

- (i) ‘London is the preeminent city for global finance today, in good part due to numerous international firms that have located key operations and resources in the City [so that] London’s unique denationalized platform for global operations gives it its competitive advantage’ (pp. 83-4);
- (ii) But ‘what London lacks is Wall Street’s brilliant financial engineering’ and therefore ‘New York dominates in another way by offering market innovations and new financial products. Wall street – still the Silicon Valley of finance– has made U.S. investment firms leaders in the global market’ (pp. 83-4).

More than a decade later it seems that this differentiation is still very much in place; Wójcik (2011, 6), in a new survey but also drawing on Strange (1997) and Michie (2006), describes it this way:

‘While New York commands access to the largest and most liquid domestic financial market in the world, London’s physical, political and historical

geography implies access to a different time zone, European markets, and global connections ... Taking advantage of its sheer liquid domestic market, and the deepest pool of financial engineering talent, New York leads financial innovation... Hedge funds come from the USA, and so do venture capital and private equity. Most new products and methods of trading in the global securities markets emanated from New York.... London, in turn, has specialized as a centre, where financial firms (with US banks in the lead) adapt financial innovation from the USA to foreign and international markets.'

The message is clear: London is particularly good for global financial business, New York is particularly good for global financial innovations.

These key differences between New York and London in the world city network can be equated with Castells (1996, 413) distinction between hubs and nodes in his space of flows:

'Some places are exchangers, communication hubs playing a role of coordination for the smooth interaction of all the elements integrated into the network. Other places are the nodes of the network, that is the location of strategically important functions that build a series of locality-based activities and organizations around a key function in the network'

In these terms, London appears more 'hub-like' through integrating business while New York is more 'node-like' in building new functions, the latter interpreted as being more strategic. Further, there is a sense in which London is 'used' with New York firms as key 'users', indicating a hierarchical element in the cities' complementarities that Sassen (1999, 81) recognised (see also Wall and Knaap, 2011). And returning to her essential 'global city' process (Sassen 1991) where the

city is both a market for advanced producer services (APS) and a producer of APS, we can view the relationship between these two functions as variable across cities: high levels of new production relative to market (exchange) is a distinctive strategic place process, more focus on market service than production is a general network process. Such an interpretation provides both an explanation for our results showing New York exhibiting more 'strategic-ness' than London, and also suggests a general means of comparing cities in the world city network in terms of their relative strategic-ness.

China Cities

To illustrate the latter we can turn briefly to the China cities in our analysis using Lai's (2012) study of the mutualities between Beijing, Hong Kong and Shanghai as financial centers. She describes a 'dual headquarter strategy' for Beijing-Shanghai relations and 'parallel markets' for Hong Kong-Shanghai relations. Although she equates Hong Kong's role with that of New York (p. 1275), if we move analysis from city-dyad to city-triad a rather different picture obtains.

The roles of the three China cities are quite distinctive. Beijing is the political center, 'responsible for policy-making and macro planning' (Lai 2012, 1283), in other words the locus of command and control. Shanghai, on the other hand, 'is tasked with testing new products, developing new markets and financial innovation' (p. 1283). The result is that Shanghai has 'the highest concentration of foreign banks' and hosts 'new financial markets in futures, derivatives and foreign exchange' (p. 1283). In contrast Hong Kong has grown as a strategic conduit 'connecting global capital and China' (p. 1275) and continues in the role of China's 'offshore financial centre.' (p. 1275).

It takes very little imagination to equate this structural logic to similar relations between Washington as political center, New York as innovative center, and London as offshore center. In the latter case both London and Hong Kong have exploited a political autonomy by being outside the direct sovereign/administrative control of the USA and China respectively. In other words these are necessary global platforms where you can do things that are not possible in the cities of the USA and mainland China.

Our analysis adds weight to this city-triad comparison. In both lists in Table 6 the three China cities appear ranked in the same sequence as the USAL cities: New York and Shanghai are relatively most strategic, with London and Hong Kong least, and Washington and Beijing in between. London and Hong Kong, in particular, have very similar levels of relatively low strategic-ness.

Palo Alto

As the main city in Silicon Valley, Palo Alto is a very special strategic place, as reflected in our analysis through its unusual combination of very low general integration into the world city network with very high strategic-ness. How does the production of high tech innovations that Silicon Valley is famous for transfer into APS innovation as our results imply? This special place has special servicing needs that have led to specialization in deal making, advising new firm start-ups and university spin-offs, arranging access to venture capital, taking successful firms public, plus mergers and acquisitions activity (Lashinsky 2002; Reiffenstein 2009). The main service sector providing these services is law and law firms, working as 'patent attorneys' in particular, illustrate servicing the business of innovation (Reiffenstein 2009).

According to Reiffenstein (2009, 572) law firms ‘by mediating between the private interests of firms and the public concerns of the patent office, perform a critical role that is not merely ancillary but instrumental to the workings of the knowledge economy’. In other words, these law firms are part of the technology community (p. 579). In terms similar to those used to describe New York’s role in finance, Reiffenstein quotes Friedman et al. (1989) as saying that ‘the Silicon Valley lawyer not only works with engineers, he thinks of himself as a kind of engineer – a legal engineer’ (p. 578). Thus

‘Silicon Valley occupies a special place in this [patent] system. Its attorneys are the “engineers” of business and legal precedent particularly as it relates to the translation of science to industry. Firms located there enjoy a locational advantage from a proximity to milieus of basic and applied research: buyers and sellers of technology’ (p. 580).

This special place is a strategic place because ‘every one of the major Silicon Valley law offices is a component of a much larger branch network’ (p. 579) enabling the firm ‘to link buyers and sellers of technology and to lubricate the innovative process by linking places’ (p. 580), now necessarily including ‘international transactions’ (Lashinsky, 2002). Thus Palo Alto is only a small city but it is a big player in the world city network as our strategic-ness analyses have shown.

Mexico City

Mexico City is strongly integrated into the world city network (in the top 20 listed in Table 1) but according to our analyses it is relatively underconnected strategically (Table 6). We will use Parnreiter’s (2010) study of how APS firms in Mexico City operate in global commodity chains to interpret our findings in this case.

Parnreiter (2010, 36-7) begins by asking the crucial question, does the APS sector in Mexico City function as merely enabling agent of economic globalization or do these firms help shape the nature of the production networks they are servicing? To answer the question he finds he has to break with Sassen's (1991) 'equating the management of the world economy with its control' (p. 43). These are two separate mechanisms that are 'frequently conflated' despite the fact that

'it is questionable whether all high-wage, high-tech and high-profit services necessary for running global production processes are actually related to decision-making. This question is particularly relevant to global cities in non-core countries, which have a sizeable producer service sector but are normally not considered to host decision-making capacities' (p. 44).

Thus although many of the practitioners he interviewed emphasize the importance of their local office within the world city network, Parnreiter is able to show that this is largely necessary work but not strategic work. He concludes

'Though at first glance it seems that the networks of producer service firms are rather flat, their organizational model implies that there is the chain of command. Despite the fact that the local cooperation is ... seen as ... essential to do business, the "big" strategies are made by the lead partners [and] the number of lead partners an office of a global service provider can have depends ... by and large on the geography of headquarters of TNCs. Since there are far fewer companies with origins in Mexico that compete successfully in the world market than foreign firms in Mexico, the Mexico City offices of accountancy, legal or real estate firms will not often be in command' (p. 47).

This is entirely consistent with our finding on the differences between Mexico City's global network connectivity and its strategic network connectivity.

Since Parnreiter frames his argument in world-systems terms, we are invited to extrapolate this interpretation to other important cities from 'non-core countries': from Table 6 and Figure 1 this would include São Paulo, Jakarta, Buenos Aires, Kuala Lumpur, Delhi, and Mumbai. But not all cities from non-core countries are strategically underconnected.

Johannesburg

Bangkok and Johannesburg are the exceptions to Parnreiter's argument in our analyses (Table 6, Figure 1). In this case we use Surborg's (2011) study that employs positionality as his 'point of departure' (p. 325) and treats 'cities in the third world for what they are: places occupying a very specific position in the world economy, each one of them a unique place' (p. 326).

Drawing on Rogerson (2005), Surborg (2011) provides hints at what is unique about Johannesburg that may have enabled it to be more strategic than expected in a world of 'uneven connections'. Put simply, in the post-apartheid era, 'Johannesburg's experience was different from most other major cities in southern Africa because South Africa's liberalisation of its economy was largely a result of domestic policy, while that of other countries ... was usually the result of externally enforced structural adjustment policies' (p. 324). Beyond his African comparisons, we can note that this posited relative autonomy can be also contrasted with Mexico City 'trapped', as it

were, in the North America Free Trade Association (NAFTA).² Both Johannesburg and Mexico City can be designated ‘gateway cities’ linking ‘national “investment opportunities” to global circuits of capital’ (p. 319) but whereas Parnreiter (2010, 50) concludes that Mexico City operates as ‘a “bridgehead” for the interests of the dominant centres of the world economy’, Johannesburg’s recent trajectory may have encompassed more autonomy in the world economy for its economic elites resulting in the city’s ‘specific position’ being more strategic in the world city network.³

A note of caution has to be inserted here. We do not have anywhere near the quality of evidence upon which Parnreiter (2010) based his Mexico City research for our understanding of Johannesburg in the world city network. Thus at this time, ideas about the reasons for Johannesburg’s strategic positioning remain in the realm of speculation. Our findings for this city suggest further research is needed to pinpoint the mechanism attracting strategic APS firms to Johannesburg.

² The fact that Toronto, the only Canadian city to be included in our 46 strategic places, is ranked bottom in both lists in Table 6 does clearly suggest that NAFTA has tended to work for the benefit of APS firms in leading US cities at the expense of their Canadian and Mexican counterparts.

³ For recent examples of two of our ‘strategic firms’, see ‘New Johannesburg Office: A Gateway to Africa for Canadian Mining Companies’ at emailcc.com/rv/ff000884c0cfb0734ec2b80e1d49beb856820713 (accessed 01-Sep-2012), and see ‘Bain & Company expands Financial Services practice in South Africa’ where it is announced that ‘We are growing our team of financial specialists at a time of global challenges and unique opportunities for South Africa’s leading players’ at www.bain.com/about/press/press-releases/bain-and-company-expands-financial-services-practice-in-south-africa.aspx (accessed 01-Sep-2012).

German Cities

German cities have tended to rank comparatively low on global network connectivity in previous studies of the world city network, due to the polycentric character of the national urban system (Hoyler 2011; Lüthi et al. 2012)⁴ but in the analysis above (Table 6) two German cities, Düsseldorf and Frankfurt, are found to be Europe's leading cities in terms of relative strategic-ness. This signals not only the overall significance of the German market for globally operating advanced producer services, but particularly the relative importance of the two cities in legal and consultancy services (Taylor et al. 2011b, Tables 11.5 and 11.6).⁵ Frankfurt's strategic position comes as no surprise: as the country's leading financial center and major hub for specialist business services, the city and its wider region have long been a gateway to Germany for transnational firms, particularly those originating in the US (Grote 2008; Hoyler et al. 2008) and in more recent years it has led Europe in its connections with Pacific Asia (Taylor et al. 2011b, Table 11.7c). Düsseldorf's outstanding strategic role lies in its specialization as location for international business services accessing the country's largest metropolitan region, Rhine-Ruhr (Knapp et al. 2006). It also occupies a specific niche as Europe's second largest center for Japanese economic activity (after London) (Glebe 2003, 100), a global orientation the city actively seeks

⁴ Although Germany has by far the largest economy in Europe, the leading cities in the UK (London), France (Paris), Italy (Milan) and Spain (Madrid) all have larger global network connectivities than Frankfurt, Germany's most connected city.

⁵ Düsseldorf's Office of Economic Development particularly highlights its prowess in law and management consultancy – see 'Unrivalled density of top law firms and management consultancies' at www.duesseldorf.de/en/economic/standort/dienstleistungen.shtml (accessed 01-Sep-2012)

to expand to other Pacific Asian economies, most notably China. Germany's major economic center in the south, Munich, also features among the 46 cities in this analysis, highlighting a distinctive geography of market access and functional specialisation in advanced producer services, particularly in finance, law and management consultancy, which distinguishes the three cities from the larger but less specialised cities of Berlin and Hamburg.

The geography of strategic-ness uncovered for German cities is therefore different from the one found in China, the only other state, apart from the US, with three strategic places in the analysis, missing out the capital city (for historical reasons, see Krätke 2001) but demonstrating strategic attraction across a number of key cities within a comparatively small territory.

Concluding Remarks

This paper has added to our knowledge of the contemporary world city network by going beyond the basic measurement of global network connectivities to show a distinctive pattern of strategic network connectivities. Our findings appear credible and have been shown to link with literatures on selected individual cities. There are, of course, caveats to bear in mind when assessing these results overall.

- We have not produced definitive strategic places but rather specific strategic places relating to one economic sector, advanced producer services. We do argue the particular importance of this sector for economic globalization but there will be other strategic places for global commodity chains defined by other criteria.

- We have provided a cross-sectional analysis for 2010 to define city positionalities but, of course, these are inherently historical; information on city trajectories is a necessary addition to make better sense of our results.
- The latter point is very relevant to the fact we have used two USA (with London) location strategies of firms as the basis of the analysis, selected from ten identified location strategies. This choice was justified by their being both the most important strategies identified and because they are from the world region that largely generated economic globalization. However it is their recent history and present that are being designated ‘most important’; but this designation may be less relevant for the future in a dynamic world economy: Pacific Asian, especially China, location strategies will have their own emerging strategic places that our methodology is not designed to find.

What we have been able to do is provide some order in an increasingly complex economy through excavating strategic places within world city network structures. In this way we present an extensive picture in which to view the mechanisms of contemporary economic globalization.

We began with Sassen’s ‘global cities’ as new strategic places that have solved the problem of providing operational capacity in a new global economy. Although restricting ourselves to ‘spatial’ identification of the strategic, this concept has still emerged as a multifarious mix of processes. In particular, our strategic places appear to have various combinations of command capacity and generation of innovations. These sometimes related but quite different functions have a common property of working best where there is ‘buzz’, the hallmark of global cities (Storper and Venables 2004). This urban externality is built upon face-to-face exchanges, both

formal and informal. This relates global cities as strategic places to a key issue in economic globalization of how to develop and maintain the necessary face-to-face working relations in economic activities simultaneously being conducted in widely separated places. Jones (2007) has tackled this question by identifying ‘five drivers behind the need for face-to-face interaction’ (p. 231) that ‘shape the development of corporate globality’ (p. 230):

1. to maintain transnational operation
2. to undertake transnational control functions
3. to foster transnational knowledge practices
4. to stimulate transnational innovation practices, and
5. to maintain corporate coherence.

Our study has indicated how these can be linked to Sassen’s original thesis. Jones describes his drivers as overlapping, which means that they can have different balances in different cities. Thus it is that our 46 cities as strategic places will vary in their strategic-ness in relation to the strength of the drivers operating within their firms. Our study suggests that strategic-ness is most related to drivers 4 and 2 – innovation and control – and the other ‘maintenance’ drivers are more to do with general network operations.

We will finish with a further comment on comparing London and New York, indisputably global cities as classically described by Sassen (1991) and featuring as perhaps the most interesting finding of our study. Our finding has separated them in terms of their strategic-ness but what does this mean for the future? One implication of strategy is that it is long term as opposed to tactical and operational. This suggests that in the aggregate, the more strategic a place, the more resilient it should be.

Translated to global cities, this means New York is likely to be more resilient than London in an increasingly dynamic world economy. But we have also disaggregated strategic-ness in terms of what their different levels actually mean and this points to a quite different interpretation: the basic feature distinguishing New York's strategic-ness from London's is the latter's leadership in service innovation. This appears to work as New York generating innovations, which are then widely applied in London for global consumption. Thus the economic success of the two global cities appears to parallel Jacobs' (1969, 39) 'two master economic processes': new work through innovation in city economies, and diffusion of new work by import replacement in city economies. Clearly while global city New York is a case of the former, we can add that global city London is a case of the latter. The key point is that innovation is more complex and less common than import replacement (as simpler imitation and adaption). It might well be that if the dynamism of the world economy does precipitate a move in the center of gravity eastwards, as commonly predicted, then New York's strategic innovation character may be less resilient than London's strategic imitation character: probably new work through other's innovations (from wherever) will be easier to sustain than specific, local innovative activity itself. In this argument London can better adapt to western relative decline as the world's most resilient global city.

References

Castells, M. 1996. *The rise of the network society*. Oxford: Blackwell.

Friedman, L. M.; Gordon, R. W.; Pirie, S.; and Whatley, E. 1989. Law, lawyers, and legal practice in Silicon Valley: a preliminary report. *Indiana Law Journal* 64:555-67.

Glebe, G. 2003. Segregation and the ethnoscape: The Japanese business community in Düsseldorf. In *Global Japan: the experience of Japan's new immigrant and overseas communities*, eds. R. Goodman, C. Peach, A. Takenaka, and P. White, 98-115. London: RoutledgeCurzon.

Grote, M. H. 2008. Foreign banks' attraction to the financial centre Frankfurt – an inverted 'U' shaped relationship. *Journal of Economic Geography* 8:239-58.

Hoyler, M. 2011. External relations of German cities through intra-firm networks – a global perspective. *Raumforschung und Raumordnung* 69:147-59.

Hoyler, M.; Freytag, T.; and Mager, C. 2008. Connecting Rhine-Main: The production of multi-scalar polycentricities through knowledge-intensive business services. *Regional Studies* 42:1095-1111.

Jacobs, J. 1969. *The economy of cities*. New York: Random House.

Jones, A. 2007. More than “managing across borders?” the complex role of face-to-face interaction in globalizing law firms. *Journal of Economic Geography* 7:223-46.

Knapp, W.; Scherhag, D.; and Schmitt, P. 2006. RhineRuhr: 'Polycentricity at its best'? In *The polycentric metropolis: Learning from mega-city regions in Europe*, eds. P. Hall and K. Pain, 154-62. London: Earthscan.

- Krätke, S. 2001. Berlin: Towards a global city? *Urban Studies* 38:1777-99.
- Lai, K. 2012. Differentiated markets: Shanghai, Beijing and Hong Kong in China's financial centre network. *Urban Studies* 49:1275-96.
- Lashinsky, A. 2002. Silicon Valley: the lawyers who got screwed too. *Fortune* 145 (11): 133-40
- Lüthi, S.; Thierstein, A.; and Bentlage, M. 2012. The relational geography of the knowledge economy in Germany: On functional urban hierarchies and localised value chain systems. *Urban Studies* doi:10.1177/0042098012452325
- Michie, R. C. 2006. *The global securities market: A history*. Oxford: Oxford University Press.
- Parnreiter, C. 2010. Global cities in global commodity chains: exploring the role of Mexico city in the geography of global economic governance. *Global Networks* 10:35-53.
- Reiffenstein, T. 2009. Specialization, centralization, and the distribution of patent intermediaries in the USA and Japan. *Regional Studies* 43:571-88.
- Rogerson, C. M. 2005. Globalization, economic restructuring and local response in Johannesburg – the most isolated 'world city'. In *Public problems – private*

- solutions? Globalizing cities in the South*, eds. K. Segbers, S. Raiser, and K. Volkmann, 17-34. Aldershot: Ashgate.
- Sassen, S. 1991. *The global city*. Princeton, NJ: Princeton University Press.
- Sassen, S. 1994. *Cities in a world economy*. Thousand Oaks, CA: Pine Forge Press.
- Sassen, S. 1999. Global financial centers. *Foreign Affairs* 78:75-87.
- Sassen, S. 2006. *Cities in a world economy*. 3rd edition. Thousand Oaks, CA: Pine Forge Press.
- Sheppard, E. 2002. The spaces and times of globalization: Place, scale, networks, and positionality. *Economic Geography* 78:307-30.
- Smith, R. G. 2012. NY-LON. In *International Handbook of Globalization and World Cities*, eds. B. Derudder, M. Hoyler, P. J. Taylor, and F. Witlox, 421-28. Cheltenham: Edward Elgar.
- Storper, M., and Venables, A. J. 2004. Buzz: face-to-face contact and the urban economy. *Journal of Economic Geography* 4:351-70.
- Strange, S. 1997. *Casino capitalism*. Manchester: Manchester University Press.

Surborg, B. 2011. World cities are just “basing points for capital”: Interacting with the world city from the global south. *Urban Forum* 22:315-30.

Taylor, P. J. 2001. Specification of the world city network. *Geographical Analysis* 33:181-94.

Taylor, P. J. 2004. *World city network: a global urban analysis*. London: Routledge.

Taylor, P. J.; Hoyler, M.; and Verbruggen, R. 2010. External urban relational process: Introducing central flow theory to complement central place theory. *Urban Studies* 47:2803-18.

Taylor, P. J.; Ni, P.; Derudder, B.; Hoyler, M.; Huang, J.; and Witlox, F., eds. 2011a. *Global urban analysis: A survey of cities in globalization*. London: Earthscan.

Taylor, P. J.; Derudder, B.; Hoyler, M.; Pain, K.; and Witlox, F. 2011b. European cities in globalization. In *Global urban analysis: A survey of cities in globalization*, eds. P. J. Taylor, P. Ni, B. Derudder, M. Hoyler, J. Huang, and F. Witlox, 114-36. London: Earthscan.

Taylor, P. J.; Derudder, B.; Hoyler, M.; and Ni, P. 2012a. City-dyad analyses of China’s integration into the world city network. *GaWC Research Bulletin* 407. Available online: <http://www.lboro.ac.uk/gawc/rb/rb407.html>

Taylor, P. J.; Derudder, B.; Hoyler, M.; and Ni, P. 2012b. New regional geographies of the world as practised by leading advanced producer service firms in 2010.

Transactions of the Institute of British Geographers doi:10.1111/j.1475-5661.2012.00545.x

Wall, R. S., and van der Knaap, G. A. 2011. Sectoral differentiation and network structure within contemporary worldwide corporate networks. *Economic Geography* 87:267-308.

Wójcik, D. 2011. The dark side of NY-LON: financial centres and the global financial crisis. *Working Papers in Employment, Work and Finance* 11-12, School of Geography and the Environment, Oxford University. Available online: <http://ssrn.com/abstract=1890644>.

Table 1 Frequency of Leading Dyad Partners of the Top 20 Cities

GNC rank	City	Number of top 40 dyad- partners
1	London	9
2	New York	10
3	Hong Kong	8
4	Paris	6
5	Singapore	8
6	Tokyo	6
7	Shanghai	8
8	Chicago	3
9	Dubai	0
10	Sydney	1
11	Milan	0
12	Beijing	6
13	Toronto	0
14	São Paulo	0
15	Madrid	1
16	Mumbai	0
17	Los Angeles	4
18	Moscow	0
19	Frankfurt	8
20	Mexico City	0

Table 2 Intensive and Extensive Globalization

INTENSIVE	Scores	EXTENSIVE	Scores
Home-region		Home-region	
New York	4.80	New York	2.21
Chicago	4.31	Chicago	1.90
Washington	3.86	London	1.59
London	3.73	San Francisco	0.84
Los Angeles	3.29		
San Francisco	2.59	Global outreach	
Palo Alto	2.18	Johannesburg	1.51
Boston	1.56	Mexico City	1.50
Philadelphia	1.38	Istanbul	1.49
Houston	1.36	Sydney	1.46
Dallas	0.97	Dubai	1.44
Pittsburgh	0.96	Kuala Lumpur	1.43
Atlanta	0.73	Athens	1.42
		Buenos Aires	1.38
Global outreach		Toronto	1.26
Brussels	1.48	Copenhagen	1.11
Frankfurt	1.11	Santiago	1.11
Paris	1.04	Mumbai	1.08
Hong Kong	0.81	Lima	1.06
Tokyo	0.68	Paris	1.06
Beijing	0.68	Manila	1.04
		Caracas	0.99
		Beirut	0.98
		Cairo	0.94
		Warsaw	0.90
		Milan	0.90
		Amsterdam	0.90
		Bucharest	0.89
		Lisbon	0.88
		Moscow	0.87
		Taipei	0.87
		Tel Aviv	0.85
		Stockholm	0.85
		Kiev	0.81
		Madrid	0.80
		Vienna	0.75
		Seoul	0.72
		Barcelona	0.69
		Jakarta	0.68

Component scores are derived from a principal components analysis in which ten components were extracted and rotated using varimax criteria – for more details see Taylor et al. (2012b).

Table 3 Global Strategic Firms

APS firm	Global strategic measure	Sector	Headquarters
Sidley Austin	0.16	Law	Chicago
Kirkland & Ellis	0.15	Law	Chicago
ZS Associates	0.15	Man. consultancy	Chicago
Wunderman	0.14	Advertising	New York
Dewey & LeBoeuf	0.14	Law	New York
A.T. Kearney	0.14	Man. consultancy	Chicago
The Boston Consulting Group	0.13	Man. consultancy	Boston
McKinsey & Company	0.13	Man. consultancy	New York
NERA Economic Consulting	0.12	Man. consultancy	New York
Monitor Group	0.12	Advertising	Boston
DDB Worldwide	0.12	Advertising	New York
Paul, Hastings, Janofsky & Walker	0.12	Law	Los Angeles
Skadden, Arps, Slate, Meagher & Flom	0.12	Law	New York
McDermott Will & Emery National	0.11	Law	Chicago
Booz & Company	0.11	Man. consultancy	New York
Bain & Company	0.11	Man. consultancy	Boston
Goldman Sachs Group	0.11	Financial	New York
Sullivan & Cromwell	0.11	Law	New York
Baker & McKenzie	0.11	Law	Chicago*
L.E.K. Consulting	0.11	Man. consultancy	London
Saatchi and Saatchi	0.11	Advertising	New York
Morgan Stanley	0.10	Financial	New York
TBWA Worldwide	0.10	Advertising	New York
Latham & Watkins	0.10	Law	Los Angeles*
Wells Fargo	0.10	Financial	San Francisco

* original (first) office, the firm claims to operate without a headquarters

Table 4 Strategic Network Connectivity

Rank	City	Strategic network connectivity	Number of offices	Connectivity per office
1	New York	10951	25	438.04
2	London	9316	25	372.64
3	Chicago	7629	24	317.88
4	Paris	7023	22	319.23
5	Hong Kong	6744	20	337.20
6	San Francisco	6484	24	270.17
7	Los Angeles	6325	23	275.00
8	Sydney	6219	18	345.50
9	Singapore	6126	17	360.35
10	Tokyo	6110	22	277.73
11	Shanghai	6019	23	261.70
12	Milan	5731	19	301.63
13	Frankfurt	5613	20	280.65
14	Beijing	5581	22	253.68
15	Moscow	5201	17	305.94
16	Miami	5040	11	458.18
17	São Paulo	4994	15	332.93
18	Dubai	4937	15	329.13
19	Bangkok	4766	13	366.62
20	Washington	4748	19	249.89
21	Madrid	4714	17	277.29
22	Johannesburg	4460	11	405.45
23	Düsseldorf	4451	11	404.64
24	Toronto	4445	15	296.33
25	Mumbai	4394	13	338.00
26	Mexico City	4343	13	334.08
27	Dallas	4327	12	360.58
28	Buenos Aires	4132	12	344.33
29	Amsterdam	4128	11	375.27
30	Jakarta	4118	11	374.36
31	Stockholm	4079	12	339.92
32	Melbourne	4061	14	290.07
33	Seoul	4052	13	311.69
34	Kuala Lumpur	4035	10	403.50
35	Munich	4002	15	266.80
36	Auckland	3952	10	395.20
37	Brussels	3846	14	274.71
38	Taipei	3790	11	344.55
39	Boston	3712	14	265.14
40	Warsaw	3630	10	363.00
41	Zurich	3562	12	296.83
42	Riyadh	3547	12	295.58
43	Rome	3475	13	267.31
44	Delhi	3412	12	284.33
45	Houston	3255	13	250.38
46	Palo Alto	2385	12	198.75

Table 5 Strategic Network Connectivity Compared to Global Network Connectivity

SNC rank	City	GNC rank	Differences
1	New York	2	1
2	London	1	-1
3	Chicago	8	5
4	Paris	4	0
5	Hong Kong	3	-2
6	San Francisco	27	21
7	Los Angeles	17	10
8	Sydney	10	2
9	Singapore	5	-4
10	Tokyo	6	-4
11	Shanghai	7	-4
12	Milan	11	-1
13	Frankfurt	19	6
14	Beijing	12	-2
15	Moscow	18	3
16	Miami	29	13
17	São Paulo	14	-3
18	Dubai	9	-9
19	Bangkok	42	23
20	Washington	28	8
21	Madrid	15	-6
22	Johannesburg	47	25
23	Düsseldorf	48	25
24	Toronto	13	-11
25	Mumbai	16	-9
26	Mexico City	20	-6
27	Dallas	38	11
28	Buenos Aires	22	-6
29	Amsterdam	21	-8
30	Jakarta	26	-4
31	Stockholm	49	18
32	Melbourne	31	-1
33	Seoul	24	-9
34	Kuala Lumpur	23	-11
35	Munich	34	-1
36	Auckland	71	35
37	Brussels	25	-12
38	Taipei	43	5
39	Boston	36	-3
40	Warsaw	37	-3
41	Zurich	32	-9
42	Riyadh	80	38
43	Rome	52	9
44	Delhi	33	-11
45	Houston	55	10
46	Palo Alto	263	217

Table 6 Strategic Network Connectivity Related to Global Network Connectivity

SNC as a % of GNC			SNC regressed against GNC		
Rank	City	%SNC	Rank	City	Regression residual
1	Palo Alto	16.45%	1	New York	2.53
2	San Francisco	11.40%	2	San Francisco	2.36
3	Chicago	10.63%	3	Chicago	2.26
4	Auckland	10.09%	4	Palo Alto	1.51
5	Riyadh	9.97%	5	Los Angeles	1.36
6	New York	9.95%	6	Bangkok	0.98
7	Los Angeles	9.85%	7	Auckland	0.93
8	Düsseldorf	9.81%	8	Düsseldorf	0.92
9	Bangkok	9.80%	9	Miami	0.79
10	Johannesburg	9.46%	10	Riyadh	0.78
11	Miami	9.36%	11	Johannesburg	0.74
12	Frankfurt	9.15%	12	Frankfurt	0.74
13	Stockholm	9.07%	13	Paris	0.63
14	Paris	8.82%	14	Stockholm	0.48
15	Sydney	8.73%	15	Sydney	0.47
16	Dallas	8.65%	16	Dallas	0.26
17	Washington	8.58%	17	Washington	0.24
18	Milan	8.35%	18	Milan	0.11
19	Shanghai	8.23%	19	Shanghai	0.01
20	Tokyo	8.22%	20	Tokyo	0.00
21	Moscow	8.21%	21	Moscow	-0.01
22	Beijing	8.20%	22	Beijing	-0.02
23	London	7.99%	23	Rome	-0.26
24	Hong Kong	7.93%	24	Munich	-0.27
25	Munich	7.85%	25	Taipei	-0.29
26	Rome	7.82%	26	London	-0.31
27	Taipei	7.80%	27	Hong Kong	-0.32
28	Singapore	7.78%	28	Melbourne	-0.40
29	São Paulo	7.68%	29	Houston	-0.43
30	Melbourne	7.68%	30	Singapore	-0.45
31	Houston	7.52%	31	São Paulo	-0.47
32	Boston	7.37%	32	Boston	-0.58
33	Madrid	7.32%	33	Warsaw	-0.67
34	Warsaw	7.24%	34	Jakarta	-0.76
35	Jakarta	7.22%	35	Madrid	-0.77
36	Mexico City	7.09%	36	Buenos Aires	-0.90
37	Buenos Aires	7.06%	37	Mexico City	-0.92
38	Seoul	6.98%	38	Zurich	-0.95
39	Kuala Lumpur	6.94%	39	Seoul	-0.96
40	Dubai	6.90%	40	Kuala Lumpur	-0.99
41	Zurich	6.86%	41	Amsterdam	-1.12
42	Mumbai	6.83%	42	Delhi	-1.13
43	Amsterdam	6.83%	43	Mumbai	-1.18
44	Brussels	6.63%	44	Brussels	-1.22
45	Delhi	6.59%	45	Dubai	-1.24
46	Toronto	6.54%	46	Toronto	-1.50

Figure 1 Strategic places in the world city network, 2010

