7. Networks and chains
Global cities and world
city networks

Michael Timberlake and David A. Smith

“World cities,” according to Peter Hall, who introduced the concept in his book of that title (1966), are the metropolitan regions in which is conducted a disproportionately large share of the world’s business. They are typically the centers of government, they are big in terms of population, they are wealthy, and they are centers of high culture. Because world cities are centers of trade and government, business and finance, and attract disproportionate numbers of professionals and the wealthy, they also generate transportation hubs, such as large airports, which provide global linkages. Hall illuminated the world city (WC) concept with seven qualifying city-regions: London, Paris, Randstad Holland, Rhine-Ruhr, Moscow, New York, and Tokyo. Most of the early WC research was case study oriented (cf. Abu-Lughod 1999; Hall 1966; King 1990; Sassen 1991) but these world cities (Hall 1966; Friedmann 1986) and “global cities” (Sassen 1991) are typically categorized, at least implicitly, on the basis of their roles in various relational networks that are planetary in scope. The more recent quantitative studies (cf. Alderson and Beckfield 2004; Smith and Timberlake 1995b; Taylor 2004) are explicit about the networked character of the world urban system and the WC hierarchies that emerge based on those links. At a general theoretical level, the key network connections usually fall into a few functional categories: economic, cultural, social, and, less frequently, political, and they may take the form of material, human, and informational exchanges.

The research identifying empirical WC networks is based on various, imperfect representations of these general constructs. It shows how the world’s great cities are increasingly interconnected through organizational ties (e.g., as sites for headquarters and regional offices for global firms) and by the flows of capital, information, and people. Thus, researchers conceptualize these cities as members of a single system of cities, and like most systems, the world’s city system is hierarchical, with some cities filling more globally central roles in these organizational and flow networks than others. Systematic WC researchers began with basic mapping of global urban hierarchies but moved to explaining (a) why and how the hierarchy changes and (b) why and how cities are different in relation to their place in the hierarchy. After more than 15 years of systematic, comparative, and (recently) longitudinal research, we know what the world city network (WCN) looks like at multiple points in time, using multiple measures of connectivity, understanding that specific patterns of centrality and hierarchy differ with time period and the particular network relation which the research considers. However, the shifts are ordered, constrained, matters of degree, and tied to familiar world-system processes and structures.
An emerging perspective on world cities in a global hierarchy

Central to the rise in WC research was the growing influence of the world-system perspective on urbanization and development through the late 1970s and 1980s. Foreshadowed by Gunder Frank’s imagery of “chains of constellations of metropoles and satellites” in Latin America (1966: 6) and Castells’ framing of “dependent urbanization” (1977: chapter 3), Walton (1977) and Roberts (1978) developed arguments about how city growth in the poorer world regions is shaped by the historical context of a region’s initial incorporation into the capitalist world-system, as well as subsequent changes in its role in the world-economy. By the early 1980s, Walton (1982) and Chase-Dunn (1984) published essays that systematically laid out the “urbanization in the world-system” approach and established a research agenda. Timberlake’s edited volume (Timberlake 1985) provided the most comprehensive effort to develop this perspective with contributors exploring how either national urban patterns (e.g., Nemeth and Smith, 1985) or particular cities’ growth trajectories (e.g., Chase-Dunn 1985) were linked to unequally structured economic and power relations operating across countries and globally; Sassen’s (1985) essay on capital mobility and labor migration prefigured her later work on global cities. Almost simultaneously, this world-system approach to framing urbanization and development issues began appearing in journals in the form of historical case studies (Feagin 1985; Smith 1987) and a plethora of quantitative cross-national analyses (Bradshaw 1987; Kentor 1981; London 1987; London and Smith 1988; Meyer 1986; Timberlake and Kentor 1983).

In the meantime, Friedmann (1986, 1995) and Sassen (1991) developed more nuanced analyses of WCs. A 1993 conference organized by Knox and Taylor, brought together sociologists, geographers, and urban planning scholars working on world cities (Knox and Taylor 1995). The resulting edited volume established an interdisciplinary project focused on the study of WCs and WCNs. Building on Friedmann’s landmark 1986 paper, “The World City Hypothesis,” the editors argued that world cities are, to varying degrees, integrated into a broader world-economy which is capitalist, with cities being “key” to the extent that they are important “basing points” for capital. The nature of integration varies according to the different characteristics of each city (e.g., immigration, economic polarization, etc.). Other crucial insights included: the global system of cities is hierarchical in terms of the relative network centrality of the constituent cities (e.g., Friedmann 1995; Lyons and Salmon 1995; Smith and Timberlake 1995a, 1995b); WCs compete for centrality in this hierarchy (e.g., Friedmann 1995; Knox 1995); and the WC hierarchy imperfectly and inconstantly mirrors the world-system position of national societies in the core/periphery hierarchy (Sassen 1995; Taylor 1995). Some authors (e.g., Sassen 1998: 197–202) suggest a secular decoupling over time while others (e.g., Taylor 1995) claim that there have been cyclical realignments of the two hierarchies. Cities are sites where organizations, such as firms, may choose to locate production and command/control functions. When more firms site more activities in particular cities, those cities become more central to the global system of cities. With centrality in globally important organizational networks, key cities become increasingly important as global centers for other commonplace human activities: commerce, immigration, tourism, business travel, consumption, and so on. These activities often “hang together” spatially, rendering an overall global hierarchy of cities.

Measuring world city-ness: From attributes to relations

Research on city systems has a long history (e.g., Duncan et al 1960; Ross 1987), and though it has always relied on theories featuring relational concepts (e.g., dominance), its execution was mainly
based on cities’ attributes, usually population size, but sometimes some other characteristic, such as their number of Fortune 500 headquarters (e.g., Cohen 1981). A relational operationalization of far-flung urban systems was more difficult because it is harder to find quantitative measures of interaction than to estimate attributes such as city population sizes. Meyer (1986) made a valuable early effort, examining international banking headquarters and subsidiaries in Latin American, North American, and European cities. Smith and Timberlake (1995b, 2001) located data on international inter-city air travel to derive a global network with London, Paris, Frankfurt, and New York at the top. Soon, Taylor and other researchers at the Globalization and World Cities research center (GaWC; http://www.lboro.ac.uk/gawc/) developed a relational world city data set based on the locations of headquarters and back offices of top producer services firms (cf., Taylor et al 2002) while Alderson and Beckfield (2004) compiled data on multinational enterprise (MNE) headquarters-subsidiary linkages across more than 3,000 cities. Carroll (2007) operationalized the global urban hierarchy in terms of corporate board of director interlocks among Fortune 500 firms in order to study the relationship between cities and global class formation. Derudder and Witlox improved upon our air passenger flow data with a more complete representation of the city-to-city volume of travelers across a larger number of cities for 2000 (see Derudder and Witlox 2005). Presently, researchers are working on assembling network data representing a myriad of city-to-city linkages for multiple time periods.

Critiques from within and without WC Scholarship

*World Cities versus Global Cities?* Many researchers working within this tradition freely exchange the terms “world city” and “global city.” Derudder (2006) suggests that the empirical research on world cities is often based, unwittingly, on divergent theoretical guideposts. While we have used the term “world cities” to describe places that are integrated into a worldwide network of urban areas and are relatively and to varying degrees important to the operation of the global economy, Sassen uses the term “global city” and consciously distinguishes it from world cities, especially as developed by Friedmann. Derudder argues that whereas Friedmann is concerned about identifying cities that are relatively dominant in terms of global economic power, Sassen is focused on cities that control production because they are the sites for advanced producer services—financial, creative, and highly skilled professional services that not only operate globally, but in fact make “globalization” as we know it possible (cf., Sassen 1998, Ch. 7; Taylor 2011). Friedmann envisages global urbanization in terms of economic power in general (including through manufacturing/production) while Sassen emphasizes global cities as key sites for global control (particularly as providers of advanced producer services). Derudder goes on to show that the empirical studies of the hierarchical international networks of cities often draw haphazardly on these two divergent theoretical paths to justify their analyses and frame their findings. While it is important to specify carefully how the particular relational data that scholars use is connected to key concepts in this literature, there are good conceptual rationales for examining various city-to-city global flows that transcend the Friedmann/Sassen conceptualizations and can capture dimensions of WC-ness not limited to the original formulations. WC scholarship is still at a stage where it is more important to be catholic and inclusive of different efforts than to impose a theoretical orthodoxy.

*World Cities off the Map.* The research on the WCN creates “maps” locating cities of rich countries atop the world-system’s city system. This raises the suspicion that the WCN project is biased in leaving huge cities of the global South “off the map” (Robinson 2002). While non-core world cities were *not* the central focus of most early WC research, the theoretical thinking behind this research offers opportunity to understand all cities. Conceptualizing the whole WCN gives us an excellent way to explore how the “megacities” of poor countries “fit” into the global...
hierarchy—and gives us some new traction in exploring the meaning (or “effects”) of how these places are located both in terms of the WC system and the core/periphery hierarchy of national states. Urban areas that hold places on lower rungs of the WCN and are also located in the peripheral zone of the world-system may be doubly disadvantaged. WC scholars have begun conceptualizing city dynamics in terms of the articulation of their structural positions in these other global structures.

The WC Polarization Thesis. Friedmann’s “world city hypothesis” (1986) argued that polarization in terms of social inequality was a necessary concomitant of WCN position. The claim that the most dominant places in the global urban hierarchy are also centers of some of the global economy’s most severe and intractable contradictions—home, simultaneously, to enormous wealth and power and to marginalization and poverty—is also echoed in other scholar’s work (e.g., King 1990; Sassen 1991). Indeed, growing socioeconomic polarization in New York, London, or Tokyo should give pause to those “boosters” who argue that WC status is “good” for most urban residents—data seem to belie this rosy view. However, the precise mechanism linking high WC status to inequality is rather vague: Sassen claims that the presence of so many upper-income professionals in global cities creates pressure for “gentrification” (which displaces poorer people from affordable housing) while also generating demand for low-wage, even “informalized” jobs to service the needs of those wealthy elites. But there is also recent evidence that there is a long-term secular rise in inequality (associated with “global neoliberal” policies) all over the world today (Korzeniewicz and Moran 2009). Is the polarization really more pronounced in world cities, and even if it is, what is the evidence specifically linking this condition to WCN position?

Abu-Lughod’s book America’s Global Cities: New York, Chicago, and Los Angeles (1999) documents each city’s deep global connections through the very sorts of mechanisms described by Sassen as defining her quintessential global cities. Abu-Lughod builds the case that all three make the grade as global cities by Sassen’s criteria and all are highly polarized, but she locates the sources of these inequalities in the culture and history of each city rather than its role in the WCN. Hamnett (1998) also challenges the WC polarization thesis, arguing that WCs are experiencing increased demand for high wage professional occupations, but there is, in fact, weakening demand for low-wage work. “Professionalization” rather than “polarization” characterizes more globally central cities in the current international division of labor. Hill and Kim (2000), studying East Asian cities, also object (and question the notion of convergent structural features for global cities), and Hill and Fujita (2003) concur, arguing that differences in the nature and policies of the state provide better explanations of relative levels of WC polarization than WCN position.

Recent empirical research
Growing Inclusiveness. A significant amount of recent research focuses on world cities that are beyond the core. For instance, Pirie (2010) shows how the South African cities of Johannesburg and Capetown are integrated into the global urban hierarchy via airline connections and shows that these cities are increasingly linked with cities all over the world, but particularly with cities within Africa, Asia and the Middle East. Córdoba Ordóñez and Gago (2010) perform a similar analysis of Latin American aerial connectivity to show the growth and the degree of cohesion of the region’s “internal” urban networks, as well as its extensive ties to the world urban network in the period 1970–2008. Still, African cities have been “neglected” relative to the great number of studies on world cities that are being produced, as are Middle Eastern cities (but see Bassens et al 2009 for a recent exception). Except for some key places (e.g., Hong Kong) Asian cities have been neglected.
as well, but this is rapidly changing. David Meyer’s (2000) masterful case study of Hong Kong as a global metropolis was followed by Shin and Timberlake’s work (2000) showing that from the 1990s onward, there was rapid mobility for East Asian cities. Recent scholarship also documents global city formation processes in Taipei (Kwok 2005), Shanghai (Wassertrom 2008), and re-examines Hong Kong’s long history as a Chinese global city. Ma and Timberlake (2008) note the rapid rise of Beijing and Shanghai from 2000 to 2005.

New relational measures over more time periods. Following the relatively early work that systematically operationalized the WC networks mentioned above, many other efforts are underway to assemble network-like data representing additional city-to-city linkages. Matthiessen et al (2010) estimate the significance of cities as “knowledge centers” in terms of the locational affiliations of authors of important scientific journal articles. Their research gives us a sense of the relative importance of different city-regions as knowledge centers and looks at this in the mid-1990s and again several years later to get some sense of change. The empirical urban hierarchy they find is distinctive in some ways—but London and Tokyo-Yokohama are at the top in both time periods and just below in the more recent period are the San Francisco area, New York, Boston, and Los Angeles in the United States, Osaka in Japan, and Paris and the Amsterdam city-region (with Beijing rising rapidly in the most recent period). Several years ago, Sassen (2002) and Garcia (2002) called for increased scrutiny of the roles of global cities in the emerging architecture of global digital networking. Choi et al (2006) took up this challenge in their analysis of WC air transport and internet backbone links, finding that the two networks are highly correlated, with London in the most dominant position in both. Vinciguerra et al (2010) recently developed a spatial model of network evolution to examine the European internet infrastructure. It is very likely that digital networks will be a fertile topic for future WC network research.

WC network studies are increasingly longitudinal as well as involving more and different types of linkages. One of the first over-time studies of WC networks was our paper documenting shifts in cities’ ranks based on changing patterns of airline passenger flows among pairs of the top 30 world cities for six one-year time periods beginning in 1977 and ending in 1997 (Smith and Timberlake 2001). London, Paris, and New York were consistently in the top four cities, joined by Frankfurt (a major air “hub,” to be sure, but probably also a significant global city, too). Tokyo ranked high in 1991 but declined thereafter, while other East Asian cities ascended the hierarchy in the 1990s, consistent with that region’s economic dynamism at the end of the twentieth century. Data limitations restricted such studies until recently. In 2010 a special issue of the journal, Urban Studies (Derudder et al 2010), published several longitudinal WC network studies using relational data. Alderson et al (2010) examine the MNE headquarter-subsidiary network over a 26-year time span and find that the hierarchical roster of world cities as measured by various types of network centrality “reshuffle” considerably, (though the very top cities remain consistently dominant) with some “control functions” becoming somewhat more centralized in the final two decades of the twentieth century. They also examine changes in the correspondence between cities’ location in the world-system of nations (e.g., core, semiperiphery, and periphery) and their hierarchical positions in the WCN and find a close correspondence in each time period, with almost no significant change across the time periods studied (1981–2007) except that semiperipheral cities are more likely to be upwardly mobile. Using data on air passenger flows among about 200 cities from 1977–2007, Mahutga et al (2010) also examine the extent to which the global city hierarchy is increasingly centralized and changes in the correspondence between global cityness and world-system position of the countries in which they are located. They found that the network of airline passenger flows is becoming less centralized. More passengers are flying to and from more cities in the world, producing a less hierarchical network. Consistent with Alderson et al they find that core
cities are far more likely to rank higher in the system of cities than cities located in countries of the periphery and semiperiphery. In addition, cities in countries of the periphery are less likely to be upwardly mobile than cities elsewhere, but cities in the semiperiphery are somewhat more likely to have become more globally central over time than cities in the core (and far more likely than cities in the periphery). Moreover, East Asian cities are more likely to have increased their world cityness than other cities, and this effect is independent of world-system position. Derudder et al (2010) map shifts in the degree of global network connectivity of some three hundred cities, using the GaWC data on advanced producer services. From 2000 to 2008 the chief findings, in summary fashion, are that cities in the United States declined, and key cities in Asia, the Middle East, and Eastern Europe became significantly more connected over this period. Orozco-Pereira and Derudder (2010) use the same GaWC data to explain the changing positions of cities in the WCN from 2000 to 2004 in terms of several hypotheses that are represented in their analysis by different independent variables. They show that cities located in countries with higher levels of international trade are more likely to advance in the WCN, as are cities with greater air passenger and telecommunications connectivity and cities larger in population size. Interestingly, “being there first” does not seem to help explain increases in hierarchical position: the lagged dependent variable, measured four years earlier, has no effect on the measure of change.

Conclusions

WC research has exploded in recent years, with scholars producing numerous case studies of specific cities, comparative studies of a few cities, and quantitative comparative studies of a great number of the world’s prominent cities. Most of the theoretical underpinnings of this research rely on notions of how cities are involved in global processes and how this involvement links them to global systems of cities. The conceptual schemes for exploring world cities are relational, and explicitly or implicitly evoke social networks. The objectives of the research include describing how particular cities embody the characteristics of world cities, how cities compete for WC position, how the cities of the world map onto the world-system’s city system, the extent to which the ordering of cities changes on the global hierarchy, why it changes, and whether relative position on the hierarchy matters for social structure and social relations within cities. This research increasingly employs diverse indicators of how cities are networked and the more recent analyses are more likely to examine changes over time.

Across these dynamic studies we see ascendance of some cities, including the rise of particular Asian and Middle Eastern cities, for example. Other studies stress that the “reshuffling” in the WCN is taking place without as much true change in terms of cities from the bottom tiers of the world-system rising to the top tiers of the WCN. For example, a recent study of the regional and global connectivity of Latin American cities is consistent with the “reshuffling-without-change” conclusion (Córdoba Ordóñez and Gago 2010). While cities may be more intensively interconnected, the patterns characterizing these connections even in the most recent periods are consistent with old notions of “dependent urbanization.” Likewise African cities are, in general, still “off the map,” although specific cities are becoming increasingly networked to other neglected but dynamic regions. On the other hand, some Asian cities are rising in terms of WC hierarchies, with a few likely to contend for global city status in the coming years. Yet these rising cities are hardly evidence for the sort of decoupling of the global city system from the world-system of nation states postulated by some. The most mobile cities of Asia and the semiperiphery are located in strong, developmental states that are deliberately pushing their leading cities toward the top of the global hierarchy.
References


Michael Timberlake and David A. Smith


254


