



# Strategic globalizing centers and sub-network geometries: A social network analysis of multi-scalar energy networks



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## ABSTRACT

Over the past three decades, a multitude of studies have examined the relational properties of corporate networks as a proxy for analyzing interurban hierarchies and structures. While this has been important in illuminating the nature of global connectivity, a significant conceptual lacuna exists in understanding how a multi-scalar analysis of interurban networks informs a more complete understanding of the geographies of globalization, and how cities within these networks act as regional globalizing centers. Building upon the theoretical and methodological foundations of ‘world city network’ (WCN) research, this paper investigates the corporate networks of the energy industry as a historic driver of globalization using social network analysis from an Australia geographical perspective. Globally and nationally scaled energy networks derived from the Platts and Australian Securities Exchange (ASX) corporate lists are used to explore the convergence of nationally and globally articulated networks, and identify cities instrumental in the globalization of the national industry sub-networks. These are strategic ‘globalizing centers’ which, in contradistinction to ‘global cities’ or ‘world cities’ as broad classifications, play nuanced roles in anointing industry-specific circuits of capital and information. The analysis of two complementary yet distinct networks provides theoretical insight into how scale plays an integral role in defining/articulating interurban relations.

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## 1. Introduction

Understandings of the global distribution of cities and their relative positionality in the world system has now enjoyed at least three fruitful decades of research. At the forefront of this research are relational empiricists and theorists whose focus is largely on networks, albeit articulated at multiple scales (Taylor, 2001). This ‘new metageography’ (Beaverstock et al., 2000) has opened up novel possibilities to overcome the territorial trap (Agnew, 1994; Brenner, 1999) of geographical embeddedness and has placed relational perspectives on urbanism at the forefront of the discourse on place, scale, space, and territory (Jessop et al., 2008; Paasi, 2004). Given the rise of firms, and in particular multinational corporations, as globally connected articulators of resources, capital, and information (Dicken and Malmberg, 2001), the relationships between headquarters and branch locations have been operationalized as a proxy for understanding urban relations through a corporate lens. This explains both firms’ strategic locational strategies (Derudder and Witlox, 2004) as well some of the logics

underlying the global structuration of interurban relations and the strategic positionality of cities (Bassens and van Meeteren, 2014; Beaverstock et al., 1999; Taylor et al., 2014).

While there is no consensus on the ‘best’ means by which to understand socio-spatial relations through urban networks (Liu and Derudder, 2013; Neal, 2012; Hennemann and Derudder, 2014), a broad range of scholarly perspectives has advocated that regionalization should be considered alongside globalization as a meaningful underlying process (Bunnell, 2013; Good et al., 2011) by investigating the relational contours of overlapping scales (Taylor et al., 2012), the complex interplay of dispersion and concentration driving the globalization of cities (Rossi et al., 2007) and non-advanced producer services (non-APS) industries (Toly et al., 2012). Notwithstanding this, a significant theoretical lacuna exists in understanding how regionally articulated sub-networks complement global ones, and the role that particular cities play within multi-scalar networks. If so-called ‘global cities’ and ‘world cities’ retain the command-and-control functions of the global corporate hierarchy as ‘basing points for capital’, then globalizing centers serve as active pathways for flows of capital and information that connect national and supra-national regional systems to globalized circuits (cf. Bassens and van Meeteren, 2014; Taylor et al.,

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2014). It is now relatively clear that 'global' functions are at best merely one facet of interurban connectivity (Surborg, 2011; Smith, 2014), and that more refined understandings of less-than-global networks must be considered. In other words, if we conceive of national and regional systems as sprockets of varying sizes within a 'global' machine, globalizing centers would find themselves at the axels, and global cities would turn the largest of the gears. However, the smaller and medium sized gears, as well as the cogs that connect them, are of equal importance.

We argue that regional globalizing centers emerge in complement to the widely theorized global/world city meta-geography, and posit that by focusing on the convergence of nationally and globally articulated networks; we can identify cities that are instrumental within regional- and industry-specific sub-networks. In the sections that follow, we explicate how this unfolds within the energy sector through global and Australia-based corporate networks. The spatial distribution of the energy sector is tied to a diverse range of logistical, political, and economic constraints associated with the geography of natural resources and large consumption markets. After a deeper focus on the theoretical underpinnings of this research project, we delve into the specificities of the Australian urban system as well as the energy sector. Following well-established network analysis methodology, we explain how this empirical analysis lends itself to broader theorization regarding how regional globalizing centers play nuanced roles within industry-specific sub-networks, and to this end provide strategic sites for understanding broader political and economic processes.

## 2. The past and present of WCN

WCN research is fundamentally situated in the long-running discourse of a multi-disciplinary group of academics examining the spatial connectedness of cities through various urban, economic and social measures (Acuto, 2011). It is sometimes pinned as a derivative of central place theory (Beaverstock et al., 2000), whose preoccupation with hierarchies and service functions (Berry and Garrison, 1958; Christaller, 1933) had a strong influence on contemporary scholars. As tightly bound national systems became liberalized and internationalized, world-systems theorists from the 1970s onward increasingly related urban geographic changes to processes of global integration of economic, social and political networks. Wallerstein (2011 [1974]) conceived of cities as being not materially but socially organized according to a hierarchy of capitalist power and technological advancement, and Friedmann's seminal paper (1986) drew on Wallerstein and others (see Acuto, 2011; Knox, 1996), suggesting that capital accumulated in linkages formed through processes of urbanization and economic restructuring such that cities became *basing points* for capital.

Castells (2011 [1996]) added that cities, as network mediatory nodes of information flows, could be viewed as processes rather than places. This was elaborated upon by Sassen (2001), who developed this envisioning a global network of new political and economic relations that could be organized, not only as nodes (as per Friedmann), but strategic advanced production locations (e.g., finance and technology). She proposed that global power and control was concentrated in certain command and control cities, forming a hierarchy with the cities of London, New York and Tokyo at the apex. Though there are multiple germane dimensions to Sassen's book, her argument that 'unlike other types of services, [advanced producer services (APS)] are only weakly dependent on proximity to the consumers served' (2001, p.11) helped to reorient the decades-old Christallerian focus on consumer-oriented networks and urban functions. Though Friedmann and Sassen said nothing of the network relations between cities (Beaverstock

et al., 2000), they facilitated discussion on the cities themselves, which led to renewed attempts to quantify the world city system through the identification of a spatial command and control hierarchy of cities.

Seeking a more empirical approach than had come previously, Taylor (1997) reasoned that the nationally oriented nature of attribute-based data only allowed for the 'comparative analysis of objects', and that any 'statement that [places] objects in a ranked list constitute a hierarchy is conjecture and nothing more' (p. 325). Lyons and Salmon (1995) concurred, noting that using corporate headquarter counts as a proxy for strategic location did not generate a nuanced understanding of city relations and the emerging importance of regional over national cities for corporate strategic location. Driven by comparability issues between national and global data sets to describe urban and economic network relational geographies, scholars attempted to describe information flows and linkages between cities (see Alderson and Beckfield, 2004; Good et al., 2011; Smith and Timberlake, 2001; Taylor, 1997) through either labor migration and communications networks (business and social) (e.g., Choi et al., 2006; Keeling, 1995; Smith and Timberlake, 2001) or corporate data on either headquarter-subsidary and headquarter-branch office locations (e.g., Alderson and Beckfield, 2004; Beaverstock et al., 2000; Godfrey and Zhou, 1999).

Responding to critiques (Godfrey and Zhou, 1999; Robinson, 2002; Short, 2004) of an initial focus on APS (cf. Derudder and Taylor, 2005; Hoyler et al., 2008; Taylor, 2001; Taylor et al., 2002) and pre-determined industry lists thereof (Beckfield and Alderson, 2006), contemporary studies reflect a variety of industry sectors as a means to better scope the complex processes of globalization. For example, the mapping of the media industry by Hoyler and Watson (2013) and Krätke and Taylor (2004) attempts to understand the globalizing role of culture to development and the use of advanced manufacturing by Krätke (2014), Lüthi et al. (2013) and Schmitt and Smas (2012) is used to call attention to drivers of modern economic development. Measuring the spatial concentration of specialized firms and non-governmental actors (Taylor, 2004) within cities has enabled a less hierarchical understanding of cities and increasingly complex mapping of networks vis-a-vis regional nodes, inter-urban networks and geographic relational flows (cf. Carroll, 2007; Felsenstein et al., 2002; Jacobs et al., 2010; Martinus and Tonts, 2015; Taylor et al., 2002).

Certainly, the world cities research agenda continues to be strongly linked to seminal notions of cities as a 'command and control' centers, 'basing points for capital' or, most crudely, 'global cities' and 'world cities'. Beyond purely economic nomenclatures, however, there is an increasing understanding that the global urban network is subject to competing social, economic and political forces being largely influenced by state-specific factors that govern how cities actually globalize and connect to one other. This has important scalar implications: the world-system is comprised of multiple sub-systems each of which operate in highly specific and asynchronous, yet inter-dependent ways. Coe et al. (2004) noted regional development resulted from the actions of both local and non-local actors involved in the global production process, which can be 'differentiated by their degree of *territorial embeddedness*' (p. 471, italics in original version). Others, such as Ma and Timberlake (2013) argue that territorialization between global cities and less global urban counterparts may depend upon the national balance between market-based and political forces with strong development states (e.g. Japan, Korea) able to 'buffer the adverse effects of globalization' (p. 268) better than more extroverted economies (e.g. USA, UK), while Dicken et al. (2001) assert that understanding the global economy has meant 'incorporat[ing] multiple scales ... to avoid privileging specific organizational loci of analysis' (p. 91). Indeed:

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