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Viewpoint

Examining the transition processes in the Pearl River Delta polycentric mega-city region through the lens of corporate networks

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ABSTRACT

This paper presents an analysis of the shifting spatial organization of the Pearl River Delta (PRD), a large-scale urbanized region bordering Hong Kong that includes major cities, such as Guangzhou and Shenzhen, alongside a range of other fast-developing cities and towns. Our methodology measures and compares the different networking components of the PRD's spatial organization and uses data on the geography of firms' networks as observed in the links between locations of headquarters and subsidiaries in 2001, 2008 and 2013. We examine whether there has been a shift towards integrated polycentricity in the unfolding spatial organization of this 'workshop of the world' through functional polycentricity and a typology of the geographies of these links. The results suggest complex interaction processes in the PRD in which network interactions significantly increased in 2001–08 and slightly declined in 2008–13 (with the exception of manufacturing links, which are increasingly managed from headquarters in Guannei, Shenzhen). We argue that the PRD is increasingly characterized by a functional polycentric and cross-regional interaction pattern for market-oriented sectors; although more regionalized, networks continue to dominate sectors that have higher proportions of state-owned enterprises.

1. Introduction

The purpose of this paper is to contribute to the literature on the emergence of polycentric mega-city regions (PM-CRs), tentatively defined here as large regions with multiple, functionally connected urban nuclei at their core. To this end, we present an analysis of the shifting spatial organization of the Pearl River Delta (PRD) between 2001 and 2013 (based on cross-sections for 2001, 2008, and 2013), an era of increased global connectivity for the PRD at large (Liu, Derudder, & Wu, 2016; Schoon, 2014; Timberlake, Wei, Ma, & Hao, 2014; Yeh, Yang, & Wang, 2015; Zhang & Kloosterman, 2016). Although the PRD has major urban attention-catchers in the form of Guangzhou and Shenzhen, the region as a whole is densely urbanized with a range of larger and smaller cities that are proximately located and – as we will show – increasingly functionally integrated.

In recent decades, we have witnessed increased scholarly attention to polycentric developments in booming urbanized regions in China (Wu, 1998; Lin, 2001; Seto & Kaufmann, 2003; Yeh et al., 2015; Zhang & Kloosterman, 2016; Zhao, Zhong, & Xu, 2015; Liu et al., 2016), and this paper aims to contribute to this literature by assessing the polycentric spatial organization of the Pearl River Delta (PRD). Almost two decades ago, Mogridge and Parr (1997) had already identified the PRD as one of the fastest developing metropolitan regions in eastern Asia, a view later confirmed by Hall (1999). In terms of planning practices in China, it can be noted that policymakers have always been interested in the functional linkages among cities in the PRD. At the scale of prefecture regions, urban networks in the PRD have been outlined in the 'Planning for a new path of urbanization in Guangdong province (2014–2020)' and 'Planning for the whole territory of the Pearl River Delta (2015–2020)'. These two documents verified the functions of Shenzhen, Guangzhou, Dongguan, and other cities. It was found that Shenzhen has the highest degree of headquarters in the networks. However, functional links among central and non-central sub-regions in the PRD have not yet been researched intensively.

At the same time, the desire of local government officials to attract firms' branches from outside the prefecture regions has become increasingly important in an era of economic globalization. For instance, the 'Thirteenth economic & social planning of Shunde (2015–2020)' stated that government officials in Shunde, a non-central sub-region in the prefecture region of Foshan, want to improve their industrial cooperation with Panyu in Guangzhou rather than with the central city of Foshan. In line with this desire of local governments, some managers of private enterprises in Shunde are also seeking government permits to set up branches in sub-regions in Guangzhou to expand their markets. The (potentially) rising importance of functional links across prefecture

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boundaries has not been systematically considered in empirical research on the city networks in the PRD (Chen, Ma, Li, Luan, & Li, 2013; Tong, Liu, Li, & Yu, 2014; Yeh et al., 2015; Zhang & Kloosterman, 2016).

Therefore, the starting point of this paper is that finer-grained analyses of urban networks, including prefectures' sub-regions, may enhance our understanding of a range of (polycentric) urbanization processes in mega-city regions (Zhou, 2016). Previous studies have often ignored prefectures' 'internal geographies', as these prefectures' central cities are often assumed to dominate the development of the entire region with non-central sub-regions having little chance to command or even attract economic activity viz. other prefectures. This then results in a Christaller-like central place pattern in each prefecture region, an effect that can be likened to a system of water pumps with pipelines continually absorbing economic resources from a prefecture's non-central sub-regions into its central city (Zhou & Hu, 1992; You, Wei, Li, & Tang, 2005; Wang, Wang, Hong, & Nian, 2015; cf. Shearmur & Doloreux, 2015). In such a context, prefecture-level analyses focusing on central cities alone may seem warranted. However, a range of rescaling processes has implied that different levels of government have become involved in competition to attract investment by harnessing economic activity within its own administrative boundaries (Ma & Wu, 2005; Wu, 2015a). The net result may be that regional and local development may increasingly be driven by economic interaction outside of prefectures (Xue & Wu, 2015), a process that would be reflected in an interaction pattern composed of functionally connected spatial units across regions and administrative areas. The purpose of this paper is to explore the finer-grained geographical changes in these functional interaction patterns. To this end, we will analyze shifting patterns of polycentricity in the PRD through the lens of corporate networks. In our analysis, we will also pay attention to possible differences emerging from firms being active in different sectors. Given this focus, we will mainly address the region's urban networks rather than the ways in which these changing geographies may or may not be harnessed by urban planning or regional governance, topics that have been addressed extensively in the academic literature (e.g., Zhou & Hu, 1992; Ye, 2014; Wang et al., 2015; Wei, 2015; Wu, 2015a; Xue & Wu, 2015).

Our approach for measuring corporate networking in the PRD is loosely based on the quantitative approach for studying urban networks presented in Alderson and Beckfield (2004); Zhao et al. (2015) and Rozenblat, Zaidi, and Bellwald (2016). In this approach, connections between headquarters and the different branches of large corporations are conceptualized as the basic components of cities' links. To assess whether and these links may or may not produce polycentric developments, we use a combination of measures of functional polycentricity and classifications of the different links according to their spatial dimension. The remainder of this paper is organized as follows. The next section further introduces the relevant theoretical background and research context. This is followed by a discussion of the methodology and data, after which we present our results. The paper concludes with an overview of our main findings, which may serve as an agenda for future research.

2. Research background: The PRD as a polycentric mega-city region

2.1. Conceptualizing polycentric regional developments

Many urban scholars have argued that as globalization proceeds, an extensive archipelago of large-scale urbanized regions is coming into being (Newman & Thornley, 2011; Scott, 2001). Scott (2001: 814), for example, has argued that regions embodying "an outgrowth of large metropolitan areas – or contiguous sets of metropolitan areas – together with surrounding hinterlands of variable extent which may themselves be sites of scattered urban settlements" increasingly function as the backbone of the global economy.

The challenge of describing and analyzing the shifting 'internal' spatial organization of such large-scale urbanized regions has resulted in a fast-evolving literature. Through this proliferation of new research, a plethora of terms has been put forward, with 'Polycentric Mega-City Regions' (PMCRs, see Hall & Pain, 2006) and 'Polynuclear Urban Regions' (PURs, see Turok & Bailey, 2004) being among the favored concepts. The dominant assumption when making sense of polycentric urban regions is that this type of spatial structure allows capitalizing on the different specializations in the region at large through efficient cross-regional infrastructures and/or the knowledge exchanges that they facilitate (De Goei, Burger, Van Oort, & Kitson, 2010). In this section, we provide a summary of the key concepts when engaging in research on regional polycentricity (for the variegated meaning of polycentricity, see van Meeteren, Poorthuis, Derudder, & Witlox, 2016). The overview obviously does not do justice to the broad range of insights that have been developed over the past few years. Instead, the key point is to demonstrate how our analytic framework relates to the conceptual state-of-the-art.

In conceptual terms, the main insight developed in recent years is that the presence of a dense, urbanized region with multiple cities of varying sizes located in close proximity does not by definition point to the presence of polycentricity and its purported advantages. Or, as Meijers (2008) aptly put it: "Summing small cities does not make a large city". Recent research has focused on a more thorough substantiation of the concept, which has led to the identification of the following defining characteristics. First, a region can only be considered polycentric when there are strong functional links between the different nodes. To this end, Meijers (2008) coins the term 'functional polycentricity' as opposed to 'morphological polycentrism' with the latter simply pointing to the presence of a set of more or less important cities in a region without the necessity of having interactions between these (for more details, see also Meijers, 2007) (see Fig. 1a).

Second, Meijers (2007) distinguishes between 'vertical' and 'horizontal' networking in the study of functional polycentrism (Camagni & Salone, 1993). Vertical urban networks are built up by inter-linked nodes from different ranks, with some nodes dominating the others during exchange. This Christaller-like central place system would reflect the pattern of 'water pumps' in China's prefecture regions in which non-central sub-regions are dominated by the central city within each administrative area (Wang et al., 2015; You et al., 2005; Zhou & Hu, 1992) (see Fig. 1b). Horizontal urban networks, in contrast, are built up by linked nodes of more or less the same rank without any clear-cut dominance during exchanges (see Fig. 1c).

Third, it has been argued that urban networks are being upscaled (Shearmur & Doloreux, 2015; Van Oort, Burger, & Raspe, 2010). Spatial interaction may thus increasingly stretch across regions and/or administrative areas, producing functional interdependencies across wider areas. Thus, although networks of cities obviously often develop within a limited geographic area (Hall & Pain, 2006), these connections may be growing less prone to distance decay and/or regional-administrative boundaries (see Fig. 1d). The geographical result of this pattern also could allow different levels of government to attract firms by harnessing economic activity from outside their own administrative area (Ma & Wu, 2005; Wu, 2015a).

Each of these insights will be used in our analytical framework in that (1) our data are link-based, (2) it discerns different types of links depending on nodes' positions in the hierarchy, and (3) it considers the geographical position of nodes.

In addition to the differences in the measurement framework proper, empirical research on polycentricity can also be differentiated based on the data sources used to assess links. Coupled with the fact that transportation networks are slow to change and reliable commuting data (especially over time) are not publicly available for the PRD, the main rationale for our empirical approach can be traced back to Pred's (1977) canonical analysis in which it is posited that territorial integration through urban networking is primarily established by the 'branching out' of the companies that drive economic development. Rather than focusing on networks of producer services (Zhang &