Guest editorial of the special issue on 'Airline Networks and Urban Systems'

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Infrastructure networks in general and transportation networks in particular have always been important determinants of the economic potential of urban agglomerations. In the last few decades airline networks have become the most conspicuous example of this transport/urban economy-nexus. The main reason for the rapidly growing importance of airline networks is that they have dramatically decreased geographic and temporal constraints of moving people and their knowledge, which are increasingly crucial inputs in the global knowledge economy. As a result, cities have become ever more concerned with the quantity and quality of airline connections, and the purpose of this special issue is to examine some important issues associated with the relation between the geographical development of airline networks and the evolution of urban systems.

In particular, all of the papers in this special issue explore how air transportation networks, and the fundamental national and international connectivity they provide cities, lie behind processes of economic development. ConsequentlyI it is no surprise that in recent years a number of studies have used the geography of these networks to explore spatiality of the so-called 'world city network' (WCN) (Taylor, 2004). The papers presented here develop this area of research and offer critical interventions into existing debates.

Derudder et al. open the special issue by examining how information on air passenger flows is indeed potentially a prime data source for assessing spatial patterns in this transnational urban network. They also argue, however, that previous analyses have been hampered by inadequate and/or partial datasets. They, therefore, present a systematic overview of the most notable data deficiencies, and examine how some of these deficiencies may be rectified. It is argued that future airline-based analyses of urban systems should address these data deficiencies in order to enhance the conceptual relevance of the results. Three other papers in this special issue present such analyses of urban systems at a variety of scales. These articles are therefore joined in their assessment of urban networks from the perspective air transport flows, but diverge in their methodological approach and their geographical focus: Timberlake and Ma present a longitudinal network analysis of the position of the major Chinese cities in airline networks; Burns et al. apply multidimensional scaling in order to interpret and visualise the spatial configuration and positioning of the different metropolitan centres within European air transport flows; and Grubesic et al. draw upon basic graph theoretical techniques to map out the increasingly complex web of second and third tier cities emerging in Europe, Asia and North America. Taken together, these three studies give a good overview of the variety of approaches that has been devised for analysing urban systems through the lens of airline flows.

The starting point of the paper by Timberlake and Ma is the commonplace observation that because one finds important nodes in the WCN in all major economic regions, one can expect that dynamic regions such as China will have cities that become increasingly important in airline networks. Their longitudinal focus therefore analyses the development of airline connections to/from major Chinese cities, and they thereby specifically focus on two related questions, i.e. (i) the question of the evolution of Chinese cities in the 'national urban system'

in the light of the gradual opening to global market forces and (ii) the question of the airline connectivity of major Chinese cities in the context of the emerging WCN. The authors' formal network analysis of air passenger flows at different points in time shows that over the last decade Shanghai has become increasingly central to both China's national urban system and the WCN thus challenging Beijing's position as leading city in China. Both cities, however, have gradually come to assume more central positions in global airline networks, albeit that under conditions of contemporary globalization Beijing is trailing Shanghai in importance. Timberlake and Ma use these results to discuss the merits of the WCN literature in general. They note, for instance, that the changing status of the Chinese capital corresponds to the country's increasing involvement with the capitalist world economy, whereas Shanghai's ascendancy as the leading world city in China may indicate that global forces have come to play an increasingly important role relative to that of the developmental state.

Burns et al. focus on the spatial implications of the functional proximity between European metropolitan urban regions in terms of air passenger flows. They rightly note that until recently the traditional spatial configuration of the European economic geography was based on the core-periphery model, with the pentagon extension of Brunet's famous 'Blue Banana' as core area and the remainder of Europe as its periphery (albeit to varying degrees). The territorial cohesion-mantra imposed by the *European Spatial Development Perspective* (ESDP) challenged this core–periphery model, and posited the development of a more balanced, polycentric urban system. The paper by Burns et al. assesses this polycentricism from the perspective of airline flows, and the authors do so by examining the air transport relations between 28 so-called Metropolitan European Growth Areas (MEGAs). The underlying idea is that a systematic evaluation of these flows will contribute to an enhanced comprehension of the spatial dynamics of the European metropolitan territory that is able to go beyond a standard mapping based on the individual components of the European urban system. Grubesic et al., in turn, take a global rather than regional perspective in their analysis of the air transport/urban system-nexus. By examining the emerging global hierarchy of cities and major metropolitan regions in the context of airline network connectivity, they provide a unique insight in the emergence of international urban systems that country-specific and even region-specific analyses are simply unable to capture. Using a proprietary database of nearly 900 airline carrier schedules for the year 2006, the authors examine regional connectivity between 4,650 worldwide origins and destinations. Through the application of a Nystuen-Dacey method for assessing nodal hierarchies, they are able to reveal an increasingly complex web of nodal hierarchies in North America, Europe and Asia.

The last paper in this special issue focuses on a somewhat different dimension of the consequences of mounting importance of airline networks. Button and Vega propose to examine the longer-term effects of the modern air transportation system on labour markets and labour migration. In addition to the deepening of mobility in production and in capital movement, labour has also become more mobile: the extensiveness of air transportation facilitates easier migration, while the development of low cost carriers makes short-term migration possible. Based on these observations, Button and Vega present an empirical analysis that makes use of aggregate data to look at tends in international labour movements, particularly concerning the European situation, and, to a lesser extent, at recent developments within the United States. Apart from an analysis of what is going on in terms of the use being made of air transportation by migrants, the paper also reflects on the light this may shed on migration theory in more general terms.

Together, then, the papers presented in this special issue draw our attention the three important and inter-related issues in research about the WCN, the airline industry and geographies of the economy more broadly. First, the papers reinforce the need for caution in all work that takes airline date and uses it as a proxy for WCN processes. The papers presented take us further towards a position where some of the problems that Derudder and Witlox (2005) highlight can be resolved but they also highlight the need for much more work on this topic in the future. In particular, further refining of the way we use patchy and often proprietary data that has questionable or block-boxed methodologies requires further innovations in analytical techniques.

Second, the papers make an important contribution to ongoing discussions about the temporal dynamics of the WCN (see Taylor and Aranya, 2008). The various examinations of the changing geographies of airlines and air travel show the constantly dynamic nature of the WCN, particularly in Asia. This is important at multiple levels but is particularly significant in relation to the third contribution of the papers in this special issue. All of the papers in different ways highlight the role of airline networks in the formation of, often unevem, geographies of economic activity and development. The papers further reveal how the positionality of particular places in airline networks can be advantageous or detrimental in attamepts at regional or city-level economic development (see also Zook and Brunn, 2006).

It would seem, therefore, that the three major insights offered by the papers in this special issue open up future avenues for research in which airline networks and their role in the economy receive further attention from geographers as part of attempts to contribute to broader debates across the social sciences that further refine our understanding of the WCN and geographies of economic activity and uneven development.