Modeling the emergence of metropolitan transport autorithy in a polycentric urban region

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As Soja points out (2011), "The urban, the metropolitan, and the subnational-regional scales seem to be blending together". Flows of goods, people and ideas between cities intensified larger scales during the second half of the twentieth century, under the impetus of lower transport costs, growth of global economy and technological innovations, which allowed a significant increase in travel speeds and the emergence of polycentric "Mega-City Regions" (MCR) (Hall & Pain, 2006), which corresponds to a change of scale in the operation of metropolitan areas. The emergence of MCR also correspond to a transformation of governance, some regions having advanced forms of integrated governance such as Stuttgart (Germany) and Montreal (Canada) (Lefevre, 2009).

The approach presented here combines empirical observation and theoretical modeling to study several factors candidates for explaining the emergence of centralized form of governance within MCR (exogenous factors such as demographic growth, and endogenous factors such as balance between stakeholders). In this complex frame of analysis, we decided to focus on public provision of transport infrastructure. Hence, transport networks projects combines the interests of stakeholders at both local and macro scales and funding of such projects now involve several stakeholders at various scales. Also, it plays a direct goal in urban dynamic.

To this end, we present here the MetropolSim model which combines an Land Use Transport Interaction model for generating commuting patterns and urban dynamics and game theory oriented agent-based model to simulate endogeneously the provision of transport infrastructure (by providing the best marginal increase of accessibility level corresponding to a given agent). As King et al. (2009) points out "Key to the emergence of leadership and followership is the need to coordinate". We will first analyse the case of two regions in which the authors proved that "if this trait difference between players is stable [...], stable leader–follower pattern will emerge over time" : however the situation appear more complex in our case for the gain matrix evolves dynamically because transport provision affect accessibility level which in turn affects the relative importance of each region. The approach will allows us to study systematically what starting configurations lead to centralized or decentralized modes of governance within MCR.

Bibliography

Hall, P, Pain, K, 2006, The Polycentric Metropolis. Learning from Mega-City Regions in Europe, London: Earthscan
King, A., Cowlishawb, G., 2009, Leaders, followers, and group decision-making. Communicative & Integrative Biology, Volume 2, Issue 2, p. 147-150.
Lefèvre, Christian, 2009, Gouverner les métropoles, LGDJ
Soja, E.W., 2011, Beyond Postmetropolis. Urban Geography, 32:4, 451-469