

## Quick Literature Review on Growth of Cities. CSSS2014

City dynamics have been analyzed from the point of view of economic growth (White and Engelen 1993) or with an emphasis on social segregation (Schelling 1978; Portugali 2000). More recently, transport (Waddell 2002; Waddell et al. 2007) and land-use change using Agent-Based Models (ABMs) (Filatova, Parker, and Van der Veen 2009; Furtado et al. 2012) have used cities' morphological transformation in order to understand their dynamics and aid public policy.

On a seminal paper, Anas, Arnott and Small establish that much of a city structure is path-dependent. "The urban structure locks in past forces that may have little bearing today" (1998, 1460). This lock-in structure also implies high levels of irreversibility. The authors criticize typical economic models that do not properly incorporate spatial structure. However, the ABMs available are too morphologically bound with little gain in terms of economic or social understanding.

Other advantage to analyzing cities from a bottom-up perspective according to Anas and colleagues is that this more flexible conceptualization enables the description of (a) centralized urban patterns, (b) leapfrogging growth, (c) inertia, discontinuities and irregularities, besides (d) historical events' evolution and (e) "first-mover advantage". All of which are typically observed in real cities.

### **Why Cellular Automata (lattice analysis) for urban growth analysis.**

Cellular automata (CA) represent one of the main ways to apply the self-organizing systems approach to urban models of land-use and transport. Specifically, for urban matters, Batty (1998), Torrens (2001), Pines and Thisse (2001), Capello (2002), Longley and Batty (2003), and Glaeser, Gyourko and Saks (2006) acknowledge CA as a promising instrument to deal with local interactions and social neighborhoods, spatial irreversibilities, cumulative processes, and a variety of behaviors and urban space uses. Specifically, Brown (2005) and Batty (2005) highlight the usage of CA models in studying processes, as opposed to forecasting (Furtado 2009, 49).

### **List of references. Being the first and second ones the most relevant.**

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