The Old and the New: City Systems and New Data Opportunities

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Once upon a time...

Waldseemüller’s world map including America, Saint-Dié des Vosges, 1507
Once upon a time

Basic geographic information
= potential source of new wealth and power on territories and circulation networks

➔ keep it secret (S. Zweig: Amerigo, 1941)

La géographie, ça sert d’abord à faire la guerre (Y. Lacoste, 1976)
Nowadays

• Google maps, Google earth...
• Openstreet map: Volunteer geography (M. Goodchild)
• Geolocalisation in big data, Geoapps...

⇒ Open data, information sharing...

But has geopolitics disappeared?
Urban rivalries as a driving force in urban systems dynamics

Giovanni Botero:
Delle cause della grandezza e bellezza delle città (1588)

What is urban value today?

Still well hidden data:

• almost never measured by GDP (except in China)
• proxys (biaised) through housing costs, price of hamburger (but vegans increase...)
• other value sticks: power, esthetics, heritage, environmental sustainability, social cohesion, individual happiness...
Cities should not get lost in isolation

Systems of cities increase urban value through network returns:

• exploitation of differences in size and function
• information « remittances » in a variety of communication networks
How networking boosts urban growth

Gibrat’s model

Model with interactions

Source: Cottineau, 2014
Hierarchical diffusion of innovation in systems of cities

F. Paulus
C. Vacchiani
-Marcuzzo,
Pumain D.
Cybergeo
2006
### Stages in innovation waves revealed by scaling exponents

Scaling parameters reflect innovation cycles generating urban growth

<table>
<thead>
<tr>
<th>$\beta &gt; 1$</th>
<th>Stages in cycles</th>
<th>Location</th>
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</thead>
<tbody>
<tr>
<td>Innovative</td>
<td>High return</td>
<td>Concentration in large cities</td>
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<tr>
<td>$\beta = 1$</td>
<td>Common place</td>
<td>Diffusion everywhere</td>
</tr>
<tr>
<td>Normal return</td>
<td></td>
<td></td>
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<tr>
<td>$\beta &lt; 1$</td>
<td>Mature</td>
<td>Residual in small town</td>
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<tr>
<td>Low return</td>
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**Evolution**

- Cycle 1 (T1)
- Cycle 2 (T2)
- Cycle 3 (T3)

*Source: Paulus, Vacchiani-Marcuzzo, Pumain, 2006*
Three stages in urban systems dynamics (series of Simpop models)

1- Agrarian economy
   Local resources
   (SimpopLocal)

2- Market economy
   Network returns
   (SimpopNet)

3- Knowledge economy
   Environmental intelligence
   (SimpopClim)

SIMPOP models: France Guérin-Pace, Lena Sanders, Hélène Mathian with Stéphane Bura, Benoît Glisse, Thomas Louail (and Jacques Ferber, Alexis Drogoul, Jean-Louis Giavitto, Guillaume Hutzler). Anne Bretagnolle, Clara Schmitt, Sébastien Rey, Clémentine Cottineau, Elfie Swerts (with Romain Reuillon, Mathieu Leclaire, Paul Chapron, Guillaume Cherel)
A multi-objective process of network added value

• To measure broader « network effects » (not only « network economies »)
• To make them work for helping urban development and ecological transition
• To accelerate information diffusion for reducing development gaps and inequalities
Thank you for your attention!