DIFFUSION OF PUBLIC PRIVATE INNOVATIONS: CONDITIONS FOR SCALING UP SMART CITY PROJECTS

By Susana Borras og Lasse Bundgaard
I. PROBLEM STATEMENT AND SCALING

• What is scale in Public-Private Partnerships

• Why scale up?

• Our definition of scale:
  • “The deployment of a specific technological innovation into a city-wide solution which has moved beyond early experimental phases of pilot testing and is put to use for the whole city and therefore institutionally and organizationally embedded in a specific form of urban governance.”
2. ENGAGING WITH THE LITERATURE

- SUSTAINABLE TRANSITIONS literature => recent on urban living labs:
  - Focus on 3 types of diffusion: embedding, translating and scaling.
  - Findings => stakeholders strategies are key (purposefulness)
  - Limitation: limited focus on the organizational frameworks
- SMART CITY literature =>
  - Normatively oriented on what is "smart" or on promoting specific views
  - Empirical studies of scale up: roll-out, expansion, replication
  - Findings: only 1-case for each type.
  - Limitation: conceptual blurriness & lack of explanatory/explaining approach
3. THEORY & CONDITIONS

- Five Conditions

1 – COLLABORATIVE PARTNERSHIPS:

The literature on PPPs talks about possible dysfuntionalities
Partners are diverse, perceived on equal terms & intensity of their interactions in terms of alignment of interests.

2 – AGENTS CAPABILITIES:

Technical competences & knowledge, particularly public agents
Practical management of the project
Organizational capacity in terms of autonomy administrative units
3 – NEEDS ARTICULATION
• Identification of the specific problem/opportunity for the city
• Social needs
• Citizens & end-users define/understand

4 – LEGITIMACY as input dimension
• Levels of social contestation/acceptance
• Ownership of the data
• Participatory engagement

5- Levels of UNCERTAINTY
• Technical specifications in the project
• Functional specifications of the technology
• Problem definition is open
4. METHOD

- Qualitative Comparative Analysis
  - Necessary Conditions
  - Sufficient Conditions
- Relations between sets
  - Asymmetry
  - Equifinality
  - Conjunctural Causation
- Combinations of conditions
<table>
<thead>
<tr>
<th>Case</th>
<th>Name</th>
<th>Source</th>
<th>Technology</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Smart Cities Through Smart Lighting, Brussels, BE</td>
<td>Smart50</td>
<td>IoT and LED Lights</td>
</tr>
<tr>
<td>2</td>
<td>Underground Infrastructure Sensing, Burlington, US</td>
<td>Smart50</td>
<td>IoT</td>
</tr>
<tr>
<td>3</td>
<td>Smart Public Lighting Control Project, Montreal, CA</td>
<td>Smart50</td>
<td>IoT and LED Lights</td>
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<tr>
<td>4</td>
<td>Transforming household waste in Austin, US</td>
<td>Smart50</td>
<td>Platform</td>
</tr>
<tr>
<td>5</td>
<td>Wireless IoT Connectivity Platform, San Leandro, US</td>
<td>Smart50</td>
<td>IoT and LED Lights</td>
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<tr>
<td>6</td>
<td>Smarter Streets with Video Analytics in Las Vegas, US</td>
<td>Smart50</td>
<td>IoT Surveillance Sensor</td>
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<td>7</td>
<td>OneTransport Initiative, Watford, UK</td>
<td>Smart50</td>
<td>IoT and Data Platform</td>
</tr>
<tr>
<td>8</td>
<td>IoT sensors on smart lighting, San Diego, US</td>
<td>Smart50</td>
<td>IoT and LED Lights</td>
</tr>
<tr>
<td>9</td>
<td>Smart Shuttle, Columbus, US</td>
<td>NIST</td>
<td>Autonomous Vehicle</td>
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<td>10</td>
<td>EnvyPorto air quality, Porto, PT</td>
<td>NIST</td>
<td>IoT Air Quality Sensor</td>
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<td>11</td>
<td>Smart City Platform, A Coruna, ES</td>
<td>NIST</td>
<td>IoT and Data Platform</td>
</tr>
<tr>
<td>12</td>
<td>Copenhagen City Data Exchange, Copenhagen, DK</td>
<td>Desktop Research</td>
<td>Data Platform</td>
</tr>
<tr>
<td>13</td>
<td>Smart Bins, Copenhagen, DK</td>
<td>Desktop Research</td>
<td>IoT Waste Sensor</td>
</tr>
<tr>
<td>14</td>
<td>SmartPoles, San Jose, US</td>
<td>Desktop Research</td>
<td>IoT Surveillance Sensor and LED Lights</td>
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<td>15</td>
<td>Smart City Living Lab – Government as a platform, Taipei, TW</td>
<td>NIST</td>
<td>IoT and Data Platform</td>
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<tr>
<td>16</td>
<td>Smart Waste Management &amp; Logistics for Municipal Solid Waste Collection Operations, Goyang, KR</td>
<td>NIST</td>
<td>IoT Waste Sensor</td>
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<tr>
<td>17</td>
<td>Sensor City, Assens (NL)</td>
<td>Desktop Research</td>
<td>IoT and Data Platform</td>
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</tbody>
</table>
6. ANALYSIS

- PATH 1 => Capable agents AND (not)NEEDS AND Legitimacy
  - CASES: 12, 17, 5, 6, 8, 11 and 3

- Needs is a condition that is opposite to what we expected => Cases 12 and 17 have scaled up but without defining needs

- Capable agents & legitimacy are key => particularly cases 5, 6, 8, 11 and 3 are about installing sensors on streets (San Leandro, Las Vegas, San Diego, A Coruna and Montreal):
PATH 2 => Collaboration intensity AND (not) Capable agents AND legitimacy
AND (not) uncertainty

- Cases: 4 & 16
- Low uncertainty and Not Capable agents is sufficient => Case 4: scanning hazardous waste.
6. DISCUSSION

• Legitimacy is key

• What are the role of needs and what does it tell us about scale up as a measure of success?

• What is local governments’ role in the governance and development?

• Public Value < Scale up?
<table>
<thead>
<tr>
<th>Type</th>
<th>Cost</th>
<th>Value</th>
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</thead>
<tbody>
<tr>
<td>Utilitarian /Deontological</td>
<td>Use of Collectively Owned Assets and Associated Costs</td>
<td>Achievement of Collectively Valued Social Outcomes</td>
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<tr>
<td>Utilitarian</td>
<td>Financial</td>
<td>Mission Achievement</td>
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<tr>
<td>Deontological</td>
<td>Social Cost of Authority</td>
<td>Justice and Fairness</td>
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Connect and follow

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