Smart cities – case of Hungary

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Content

1. The Urban Cycle

2. Europe: Towards the Information Society

3. Smart City Research in Europe

4. Smart City Initiatives in Hungary

5. Smart City Concept and Urban Planning
The items of urban life cycle

**Dutch school (Klaassen at al. 1981)**

- urbanization
- suburbanization
- des-urbanization
- re-urbanization

**Enyedi (1988)**

- explosion of city network (urbanization)
- suburbanization (relative de-concentration)
- des-urbanization
- information society
Increasing number and rate of city dwellers

Percentage of total population living in cities, 1990-2050 (forecast).

Developed countries
- 1990: 73%
- 2020 Forecast: 80%
- 2050 Forecast: 88%

Developing countries
- 1990: 35%
- 2020 Forecast: 51%
- 2050 Forecast: 67%

Source: IBM Institute for Business Value analysis of United Nations data.

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Europe: towards the information society

December 1993:
„Growth, competitiveness and employmnet: The challanges and ways forward into the 21st century” (EC White Paper)
• infastucture development of informatics related to the economy

June 1994
Bangemann report: „Europe and the Global Information Society – Recommendation to the European Council” (10 applications)
• teleworking, distance learning
• a network for cross universities and research centres
• road traffic management, air traffic control
• healthcare networks
• electronic tendering
• trans-european public administration network
• city information highway
Information society strategies

Term of the turn of the milleneum

Levels
• national
• sub-national/regional
• local

Success countries
• Scandinavian countries
• The United Kingdom
**Smart Planet – IBM 2008**

**Instrumentation:**

*Instrumentation, or digitization, of a city’s system means that the workings of that system are turned into data points and the system is made measurable. By 2010 there is likely to be 1 billion transistors, the building block of the digital age, for every human being.*

**Interconnected:**

means that different parts of a core system can be joined and “speak” to each other, turning data into information.

**Intelligence:**

refers to the ability to use the information created, model patterns of behavior, or likely outcomes and translate them into real knowledge, allowing informed actions.

*Source: Pongrácz (2013)*
‘Intelligent’ vs ‘Smart’ cities

Intelligent cities

• Applications of ICT in the communication between city management and local residence
  - ensure to give and get information
  - e-administration

Smart cities

• ICT as city management tool
  EFFICIENCY, COST-EFFECTIVENESS, RELIABILITY
  and
  TRANSPARENCY & COMMUNICATION
What is a Smart City? Conceptualizing Smart City

Source: Giffinger (2014) based on Nam, Taewoo & Pardo, Theresa A. (2011)

Technology Factors
- Physical infrastructure
- Smart & mobile technologies
- Virtual & digital technologies

Institutional Factors
- Governance
- Policy
- Regulations/directives

Institutional Factors
- Human infrastructure
- Social capital

Human Factors
- Creative city
- Learning city
- Human city
- Knowledge city

Creative city
Learning city
Human city
Knowledge city

Smart City

Digital city
Intelligent city
Ubiquitous city
Wired city
Hybrid city
Information city

Smart community
Smart growth

Wired city
Hybrid city
Information city

Smart City

Hybrid city
Information city

Smart City

Knowledge city

Human Factors

Smart City

Smart City

Institutional Factors

Institutional Factors

What is a Smart City?
Conceptualizing Smart City
Smart City research in Europe

2007: TU Wien, TU Delft, Univ. Ljubljana

www.smart-cities.eu

- 70 European medium size cities
  (over 100,000 and under 500,000 inhabitants)

- 74 Eurostat based indicators (6 themes)
# Comparison of studies on smart cities

<table>
<thead>
<tr>
<th>Type of examined settlements</th>
<th>European smart city research (R. Giffinger, 2007)</th>
<th>IBM Smarter City Assessment</th>
<th>Hungarian Smarter City Assessment (2011)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>European cities with universities</td>
<td>Cities from all over the world</td>
<td>Hungarian cities</td>
</tr>
<tr>
<td>Size of examined settlements</td>
<td>medium size (100000 – 500000 inhabitants)</td>
<td>large and medium size cities</td>
<td>small and medium size cities</td>
</tr>
<tr>
<td>Used indicators</td>
<td>74 indicators mostly Eurostat based</td>
<td>more than 200 indicators, weighting based on specific city priorities, so can be different in cities, indicators from IBM Global Location Strategies</td>
<td>80 indicators from National Statistical Office, GKlenet and from own databases, same weighting in each city</td>
</tr>
<tr>
<td>Level of indicators</td>
<td>35 local indicators, 39 regional and national indicators</td>
<td>local level indicators</td>
<td>local level indicators</td>
</tr>
<tr>
<td>Type of examination</td>
<td>ranking</td>
<td>scoring</td>
<td>scoring and principal component analysis</td>
</tr>
<tr>
<td>Other sources</td>
<td>-</td>
<td>Global Location Strategies’ extensive experience in the selected cities, particularly for intangible factors</td>
<td>document analysis, consultation and face to face meetings</td>
</tr>
</tbody>
</table>

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Smarter city assessment in Hungary –
Research objectives

• Starting from the definition of smart cities, reviewing the competitiveness of **nine Hungarian cities**: Debrecen, Szeged, Győr, Pécs, Miskolc, Veszprém, Székesfehérvár, Tatabánya, Kőszeg.

• Elaboration of the **methodology of evaluation**.

• Elaboration of **development objectives** based on the conducted situation analysis.

• Formulation of strategic and project proposals taking into account the strategic objectives and vision.

• **Resource possibilities**.

• **Visualization of results**.
Mihály Lados – Boglárka Horváthné Barsi
REAL CORP 2014: Plan it Smart – Clever Solutions for Smart Cities – Vienna, Austria, May 21-23, 2014
Methodology of city assessments

• Building on the methodology of IBM Smarter City Assessment.

• Using the experiences and results of national and international city assessment surveys.

• The main objective of our analysis was the presentation of smartness of cities in some chosen dimensions.

• Intention: using only the necessary amount of subjective items essential to present the smartness and operation of the cities, not loosing the objectivity of hard indicators.
Methodology of city assessments 2

- **Using almost 80 indicators** from the databases of Central Statistical Office, GKIenet, Hungarian Academy of Sciences; **analysis of documents** (strategies, development programs, visions) and **face to face meetings**.

- **Scoring**: measuring the city performance for each of the smarter city system.

- **Statistical weighting**: largest weight for people system and business system.

Based on the situation analysis the main development directions can be elaborated built on the vision and strategic ideas of cities. Identifies challenges that cities face and where improvements can be made.
Subsystems

Within each system we examined four subsystems:

- Prerequisites
- Management (surveyed separately, not using scoring)
- Smarter Systems
- Outcomes
## Framework of city assessments

<table>
<thead>
<tr>
<th>Category</th>
<th>Prerequisites</th>
<th>Management</th>
<th>Smarter Systems</th>
<th>Outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>City services</strong></td>
<td>Local government expenditure&lt;br&gt;Local government staff</td>
<td>Coordinated service delivery</td>
<td>E-government&lt;br&gt;Application and use of ICT for service delivery and management</td>
<td>Efficiency and effectiveness of public service delivery</td>
</tr>
<tr>
<td><strong>People</strong></td>
<td>Investment in education, health, housing, public safety and social services</td>
<td>Strategic planning and management for skills and health</td>
<td>Application and use of ICT for education and health</td>
<td>Education, health, housing, public safety and social outcomes</td>
</tr>
<tr>
<td><strong>Business</strong></td>
<td>Access to finance, administrative burden, barriers to trade, business real estate</td>
<td>Strategic planning and management for business (economic development strategy)</td>
<td>ICT use by firms&lt;br&gt;E-business</td>
<td>Value added, business creation, innovation, job creation</td>
</tr>
<tr>
<td><strong>Communication</strong></td>
<td>Investment in communication infrastructure</td>
<td>Integrated strategic planning for communication system&lt;br&gt;Coordinated regulation of communication system</td>
<td>High-speed broadband, Wi-fi</td>
<td>Communication system quality and accessibility</td>
</tr>
<tr>
<td><strong>Transport</strong></td>
<td>Investment in transport infrastructure and public transport. Quality of basic infrastructure.</td>
<td>Integrated strategic planning and performance management for transport</td>
<td>Use of RFID for traffic management. Use of congestion pricing (and type).</td>
<td>Congestion levels; Accessibility within and to city; Energy intensity of transport system, CO₂ emissions from transport</td>
</tr>
<tr>
<td><strong>Water</strong></td>
<td>Investment in water infrastructure; Investment in flood defences</td>
<td>Integrated strategic planning and performance management for water</td>
<td>Use of smart technologies for water management</td>
<td>Water use; Water waste/loss;</td>
</tr>
<tr>
<td><strong>Energy</strong></td>
<td>Investment in energy infrastructure</td>
<td>Integrated strategic planning and performance management of energy system</td>
<td>Presence of smart grids; use of smart metering</td>
<td>Energy waste/loss; Reliability of energy supply; Renewable energy; CO₂ emissions</td>
</tr>
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Results of city assessments 1

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Result of city assessments 2

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Project ideas

• Preparing missing strategies:
  eg. develop strategy of local economy, transport, energy

• Development of telecommunication infrastructure:
  optic cables, szélessávú internet and wi-fi

• Intelligent public service management

• Intelligent transport (optimatization of local public transport).

• Intelligens tourism (new ICT applications in city marketing and info services).

• Intelligent municipal administration (e-government).
Smart city initiatives in Hungary
From intelligent Győr towards smart Győr

2001: Strategic and operative programme of intelligent Győr – one of the first city information strategies in Hungary.

2008: Integrated Development Plan of Győr – one of the measures: implementation of the former Intelligent Győr programme

2011: intelligent buses and passenger information system

2013: smart city of Győr: contract with E.ON Hungaria (smart grid and metering, energy efficiency)
Preparing the future

Integrated City Development Plans in Hungary

- vision & concept until 2030 and program for the 2014-2020 EU Structural Fund Period
- central government initiative
- centrally regulated: joint outline (content and partnership)
- mandatory for medium size cities (centrally financed)
- mandated financial resources for large cities and urban neighborhoods

CHANCE TO PLAN SMART CITY
Thank you for your attention!

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