Key facts:

- City systems need to adapt to overcome mounting and varied challenges, with a focus on citizens
- ICT facilitates intelligent system management through sensing and analytics
- Interoperability across systems poses a critical hurdle towards achieving this at the city level
- Semantic models enable shared meaning between human and virtual entities

Integrating Data and Analytics through Semantic Modelling for Connected Cities

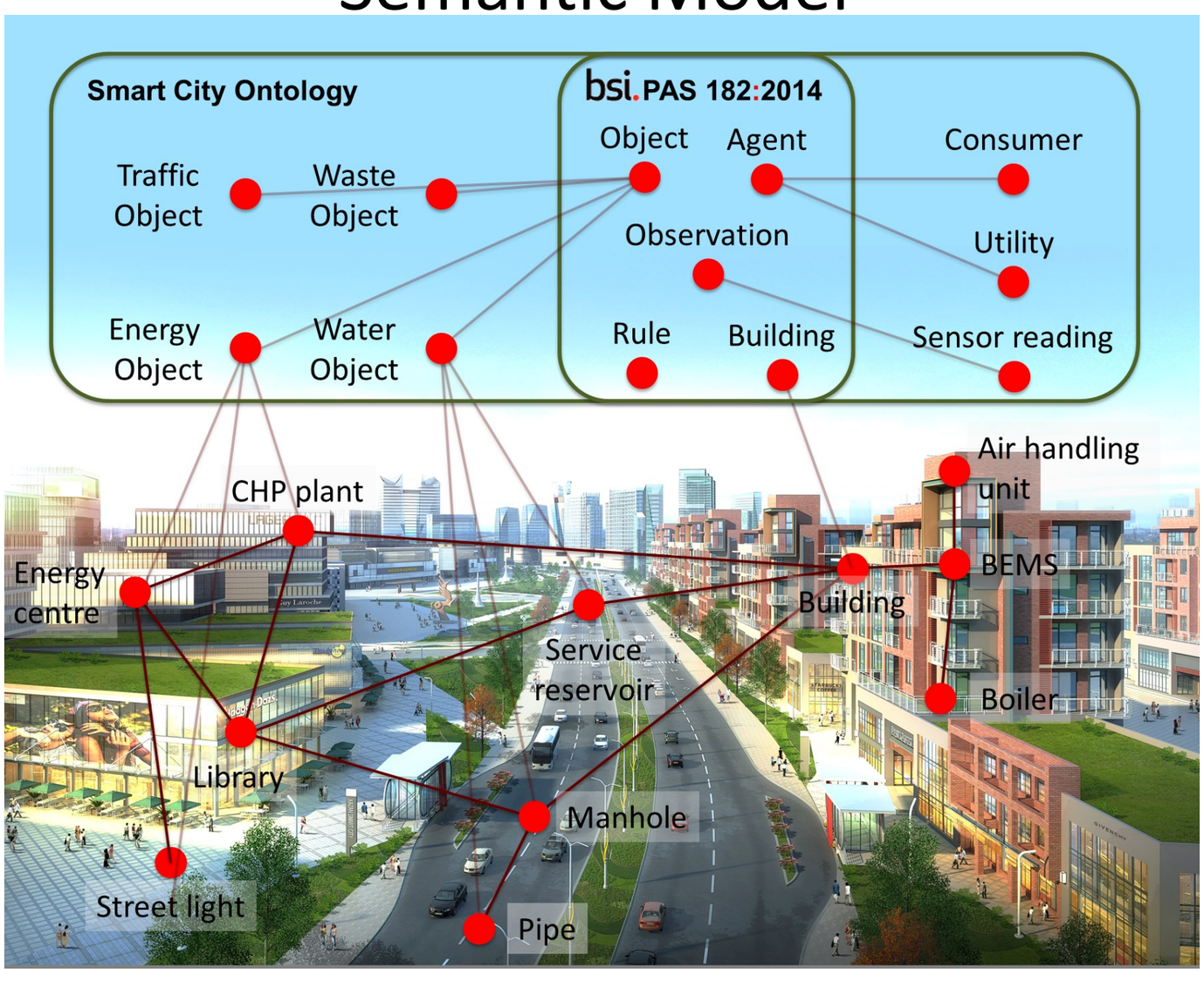
Research Questions:

1. What are the challenges and management scenarios faced by a city's systems and what is required of an integrating layer to enable ICT solutions to these?
2. How can ontological representations achieve this integration of heterogeneous resources?
3. How well do ontologies support the cross-sectoral optimisation of these scenarios compared to alternatives?
4. Can the criticisms of ontology development and application to the domain be mitigated through a facilitating framework?
5. Given this evidence and other arguments around ontologies, what benefits can they offer this domain?

City Data

- Building descriptions
- People's movement patterns
- Energy asset information
- Traffic and transport data
- Environmental data
- Space usage data
- Real time consumption data
- Social media streams

Semantic Model



Analytics

- System optimisation
- Decision support
- City dashboards
- Citizen engagement apps
- 3D web visualisation
- Data mining
- Rule engine
- Fuzzy logic engine
- City monitoring tool

Methodology:

-Literature review
-Domain models & analytics
  -Building energy
  -District energy
  -Water value chain
-Generic model & framework
-Validation of ontologies, analytics and software
-Test implementation across 11 pilot sites

Research outputs:

-Knowledge on the suitability of ontologies for meeting this challenge
-Smart city ontology framework
-Integrated domain ontologies:
  -BEMS
  -District energy
  -Water management
-Contribution to ISO water modeling standard

Ontological Representations Towards Integrated Smart City Development and Data Analytics

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