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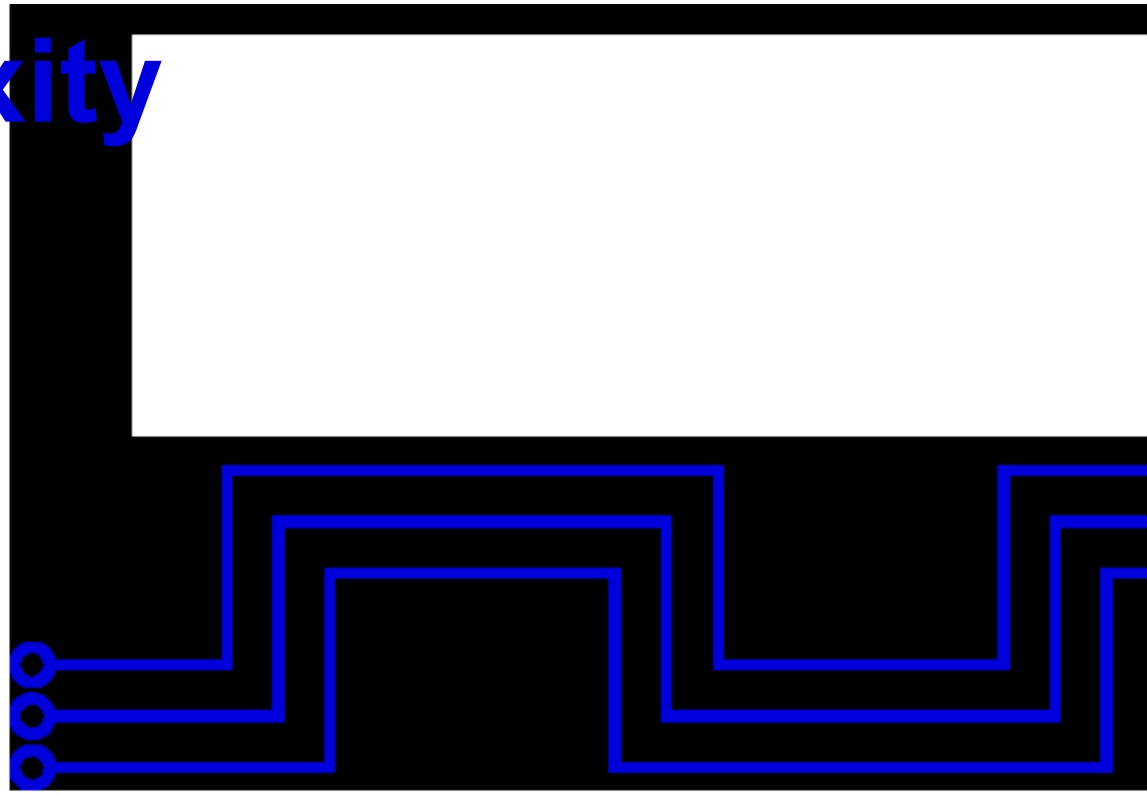
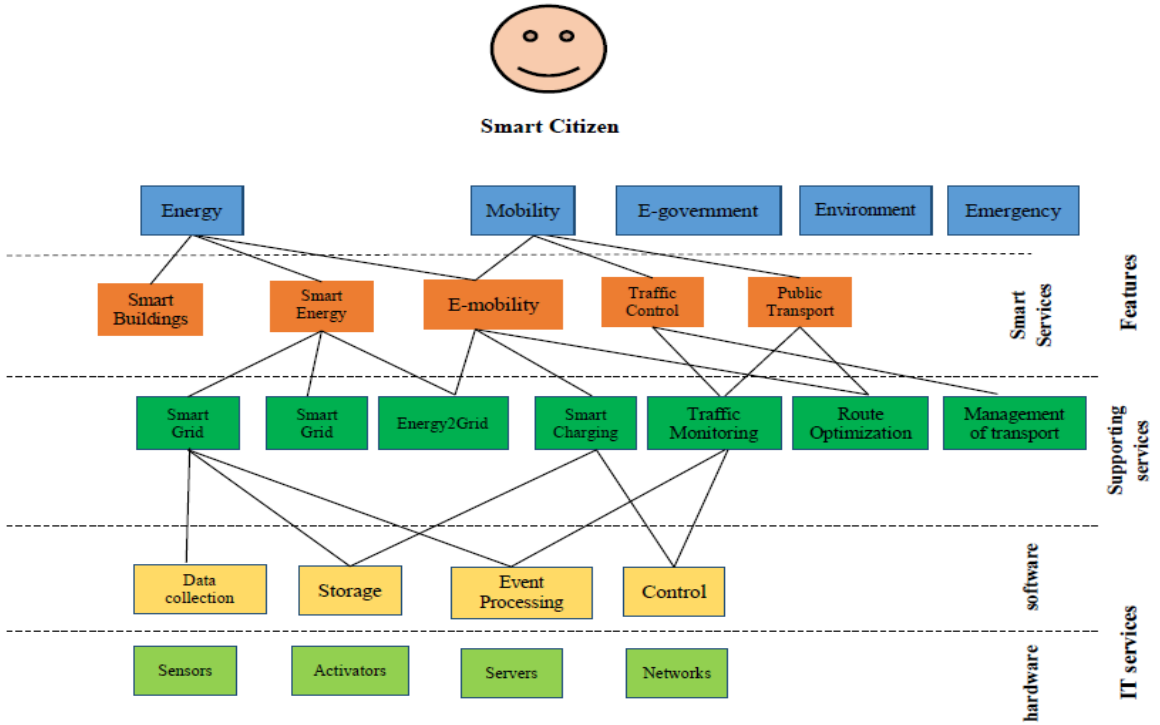
Smart City and Complexity

How to understand complexity of Services



Layer model of Smart City



Walletzky L., Buhnova B., Carrubbo L. (2018) Value-Driven Conceptualization of Services in the Smart City: A Layered Approach. In: Barile S., Pellicano M., Polese F. (eds) Social Dynamics in a Systems Perspective. New Economic Windows. Springer, Cham

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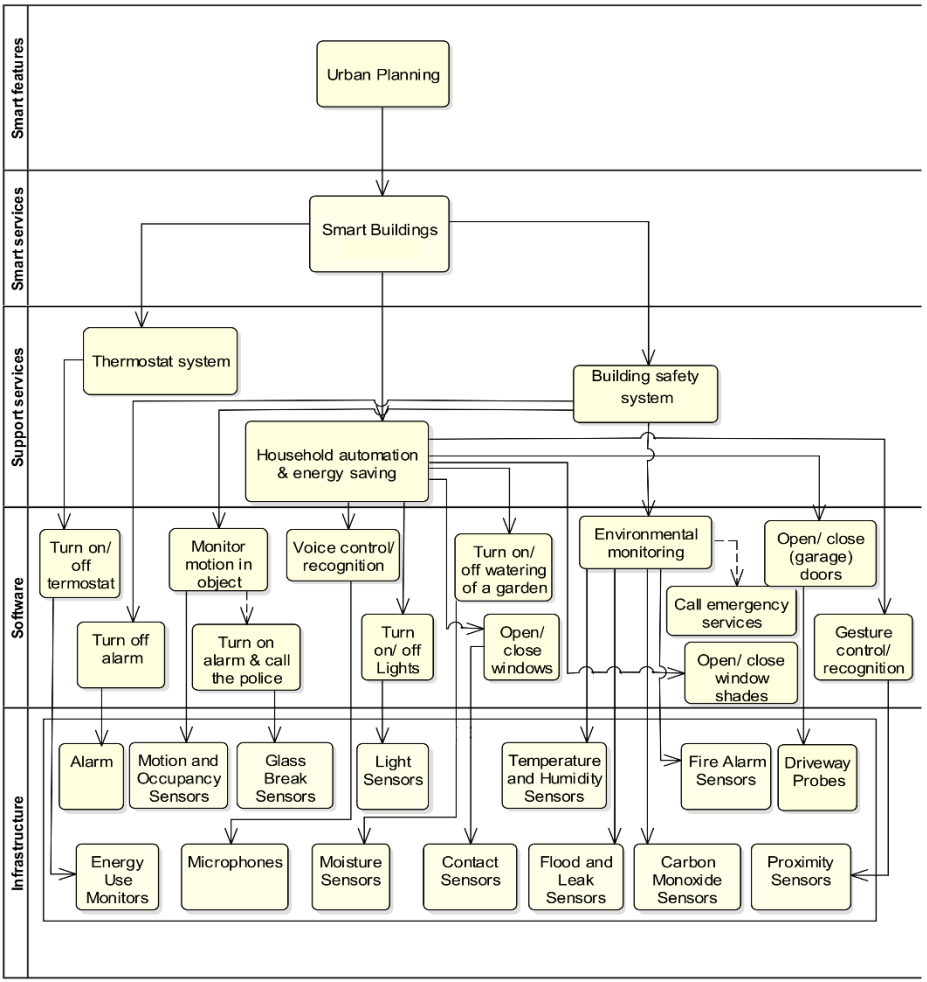
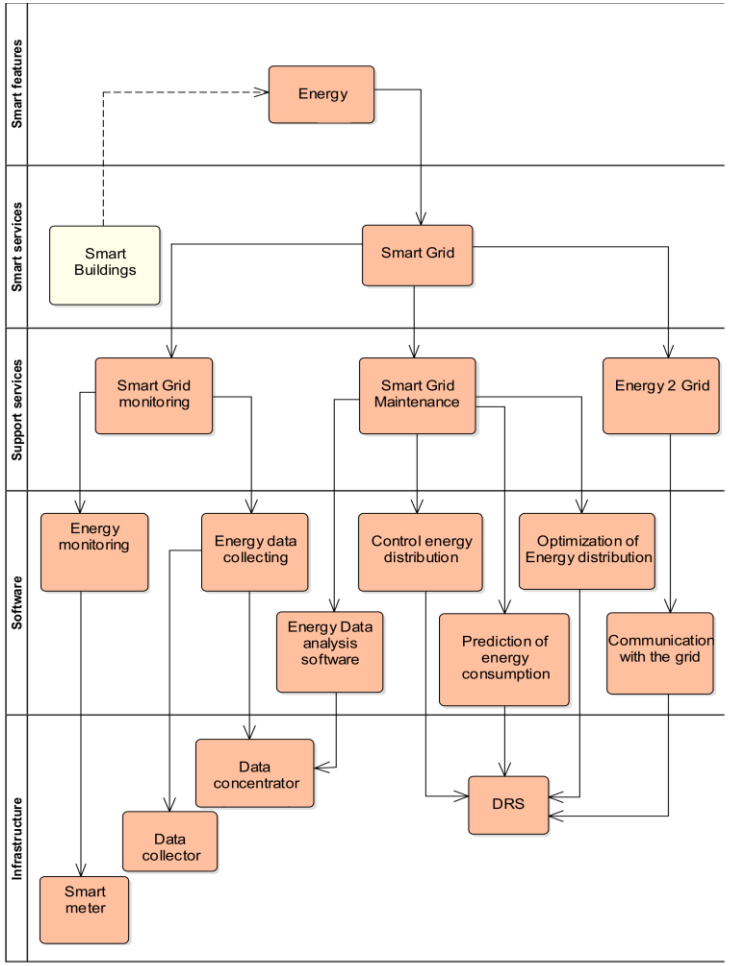
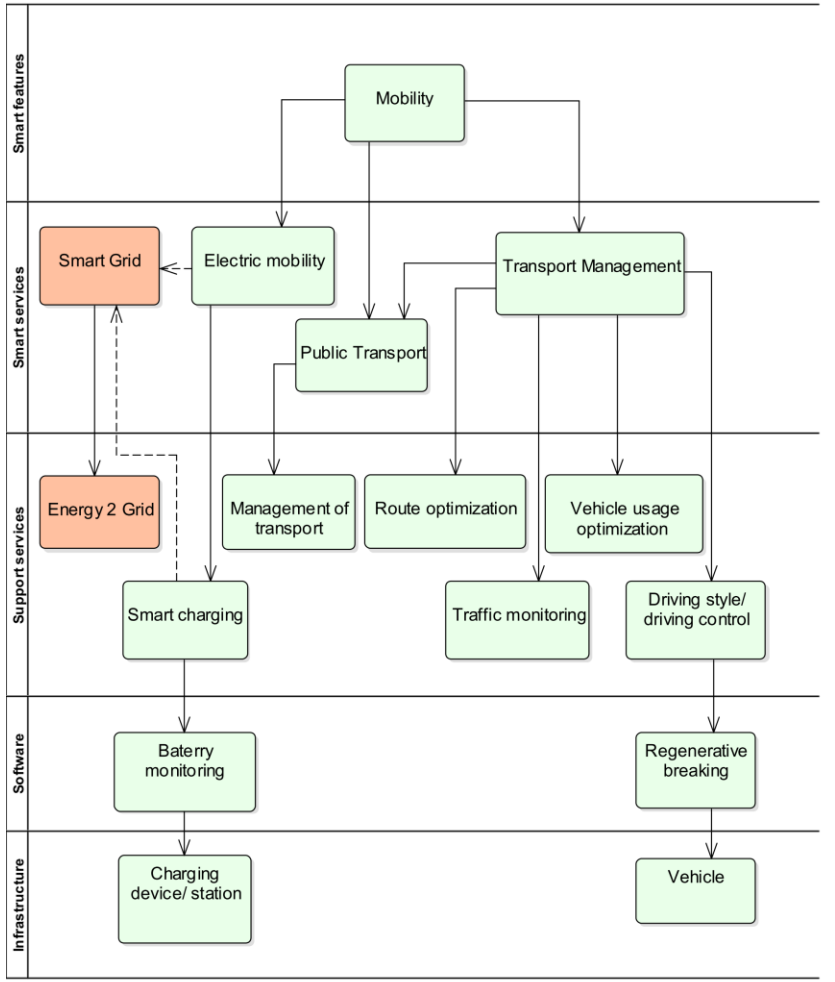
Detailed Layer analysis



Urban planning



Smart Energy



Mobility

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Breaking idea

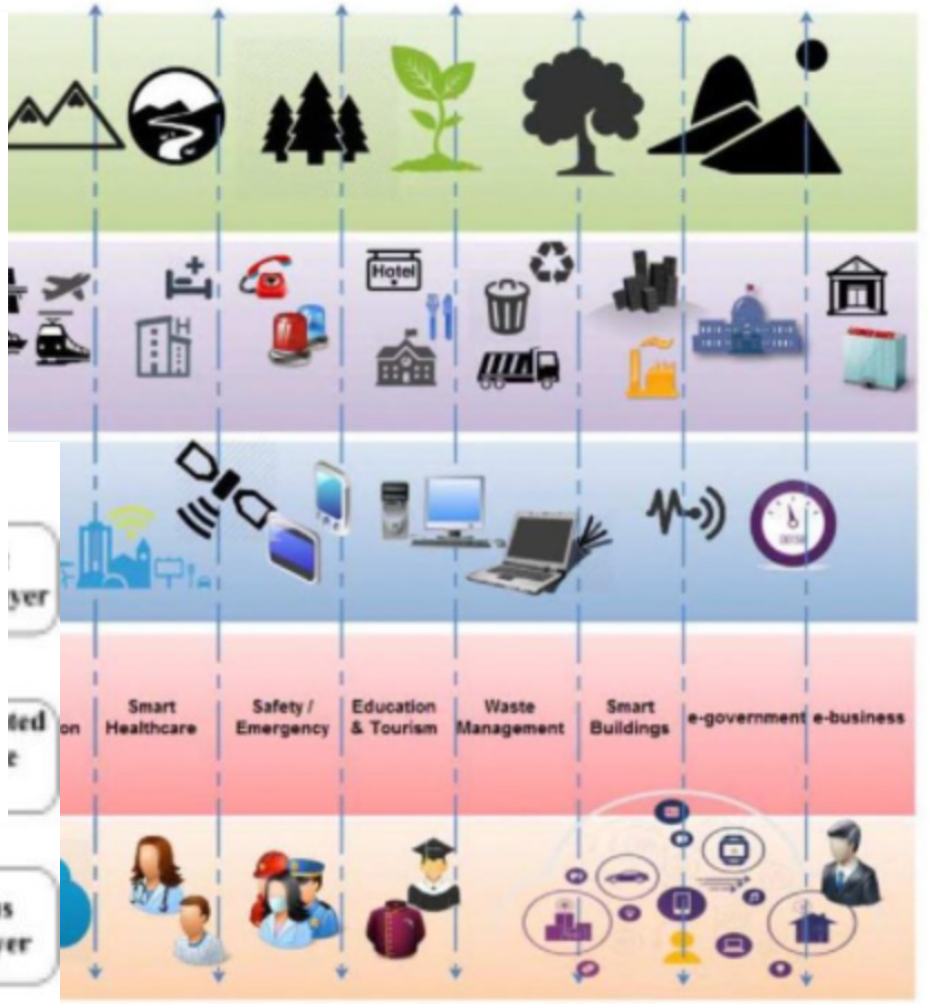
All models are trying to model multicontextual environment as one context

- Context is the facets of a situation, fictional or non-fictional, that inspire feelings, thoughts and beliefs of groups and individuals. It is the background information that allows people to make informed decisions. (https://www.studiobinder.com/blog/what-is-context-definition/)

Any change, modification or enlargement means redefinition of the model

We need to find a way how context can be part of the model

The journey continued



c multi-tier ICT architecture for smart city [31]

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The main requests to the model

Understandable to the most of actors (comm language)

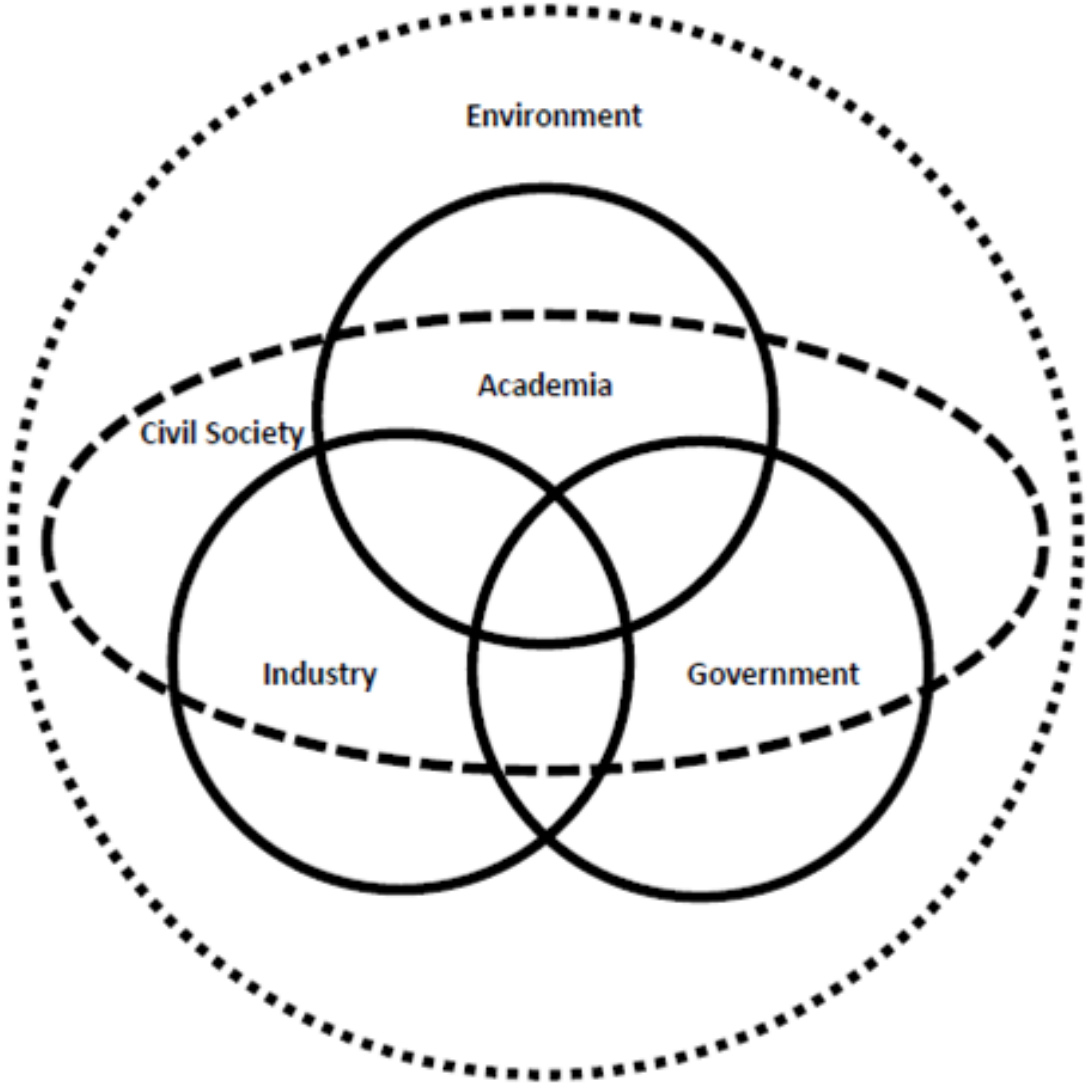
Reflecting the structure and de dencies of the servi

ling the value analysis

Multicontextual

None of the studied models (including ours) does not fit to all points

Quadruple Helix



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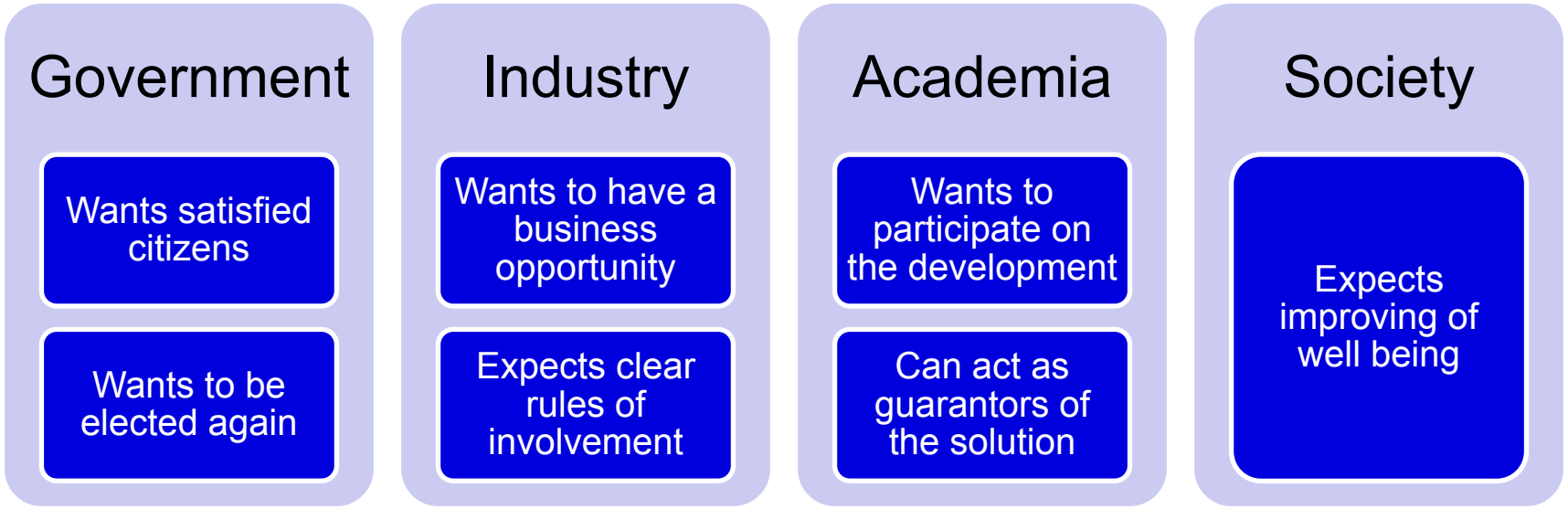
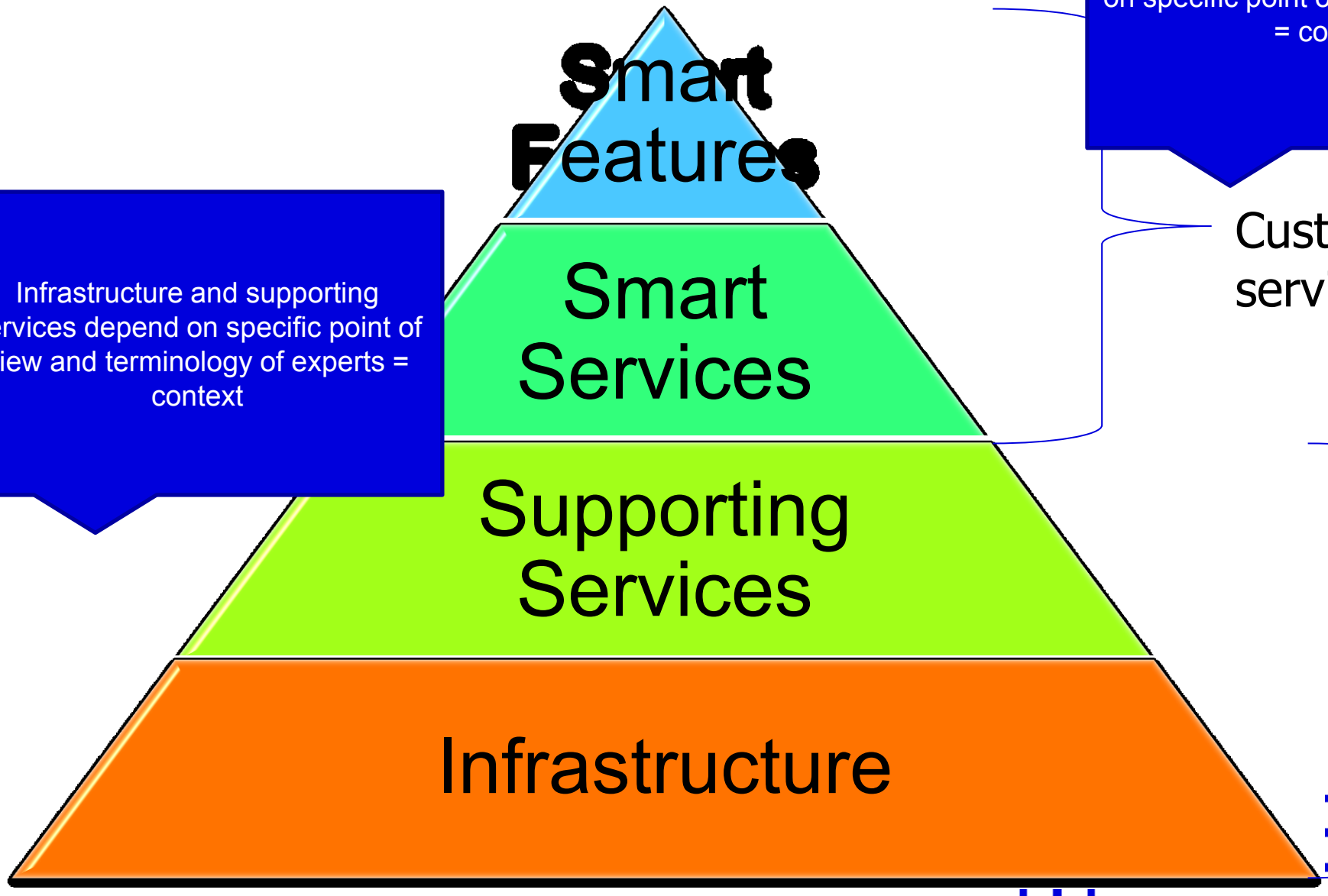
Penta Helix platform

Complexity of Smart City

- the environment of Smart City is not truly objective – it is a mix of different contexts, based on the interactions of actors in a stated moment
- the main problem is how to merge different perspectives described by the quadruple helix



New developed model



Smart feature and services depend on specific point of view of customer = context

Customer facing services

Infrastructure and supporting services depend on specific point of view and terminology of experts = context

Background services

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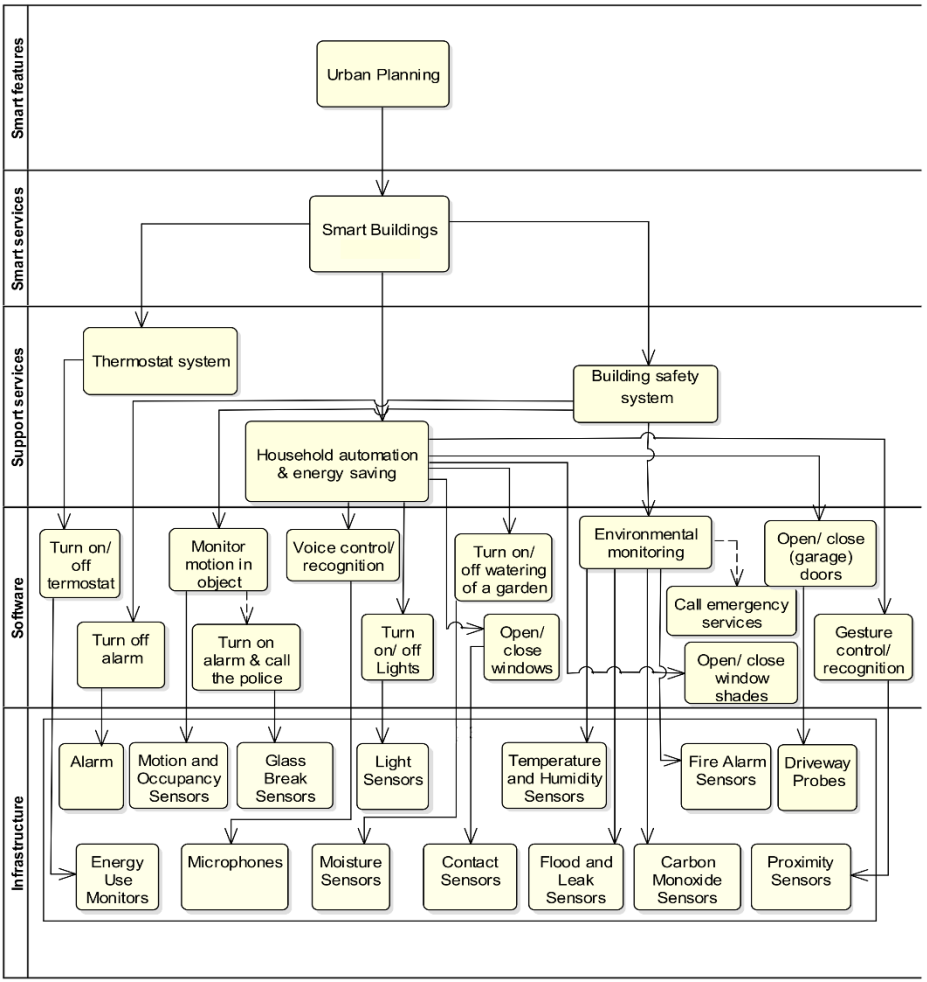
Detailed Layer analysis



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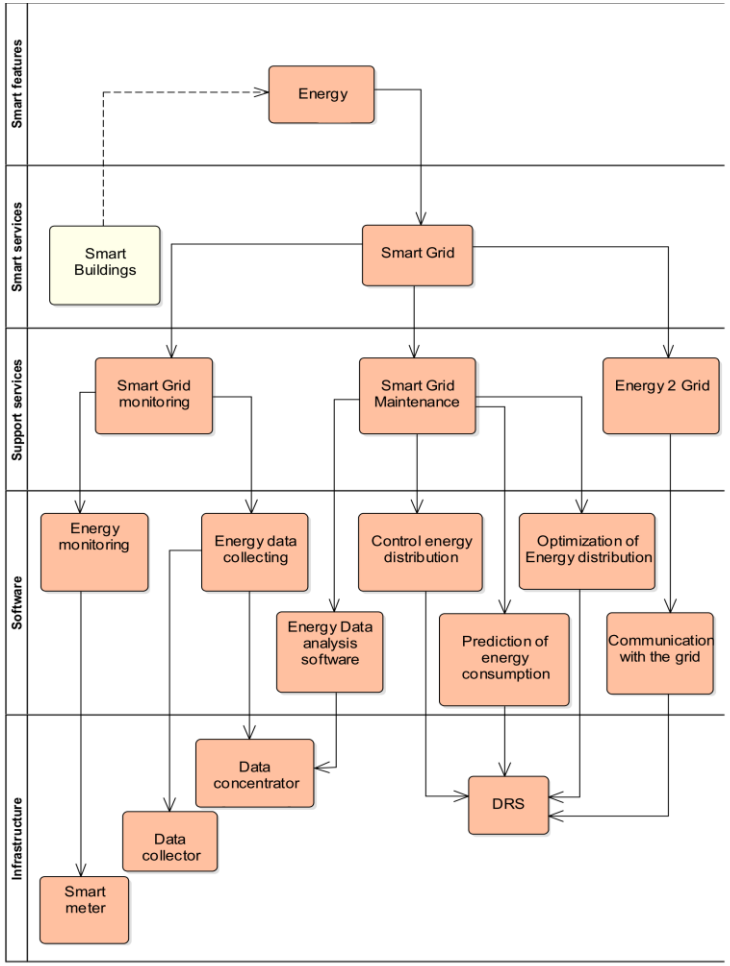
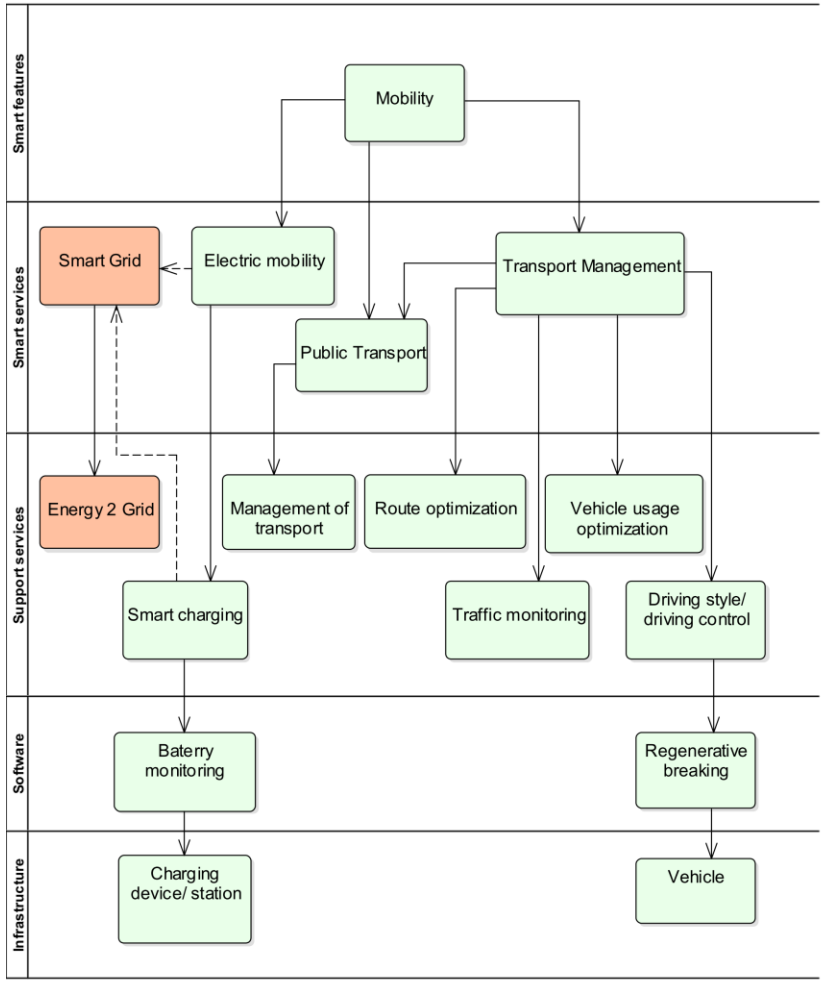


Smart Energy



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How to model such complex environment?

We need to have universal tool to catch multicontextual relations

It should contain

- Analysis of perception
- Analysis of stakeholders´ motivation
- Analysis of service provision

The main questions

- Do we really understand the models?
- Are the models readable for others?
- What if we need to communicate with people from other domains?
- And what if we need to achieve understanding across domains?
- How we can model in multidisciplinary way?

Solution is to go back to our roots and ask

- What are we modeling?
- The answer is – objects from the real world
- Where are we modeling?
- The answer is - in our mind!
- How does any person build own mind model?

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How do we model reality in our heads?

We identify...

Object-s

...we find interesting

Relationship-s find...

...between our...

Object -s

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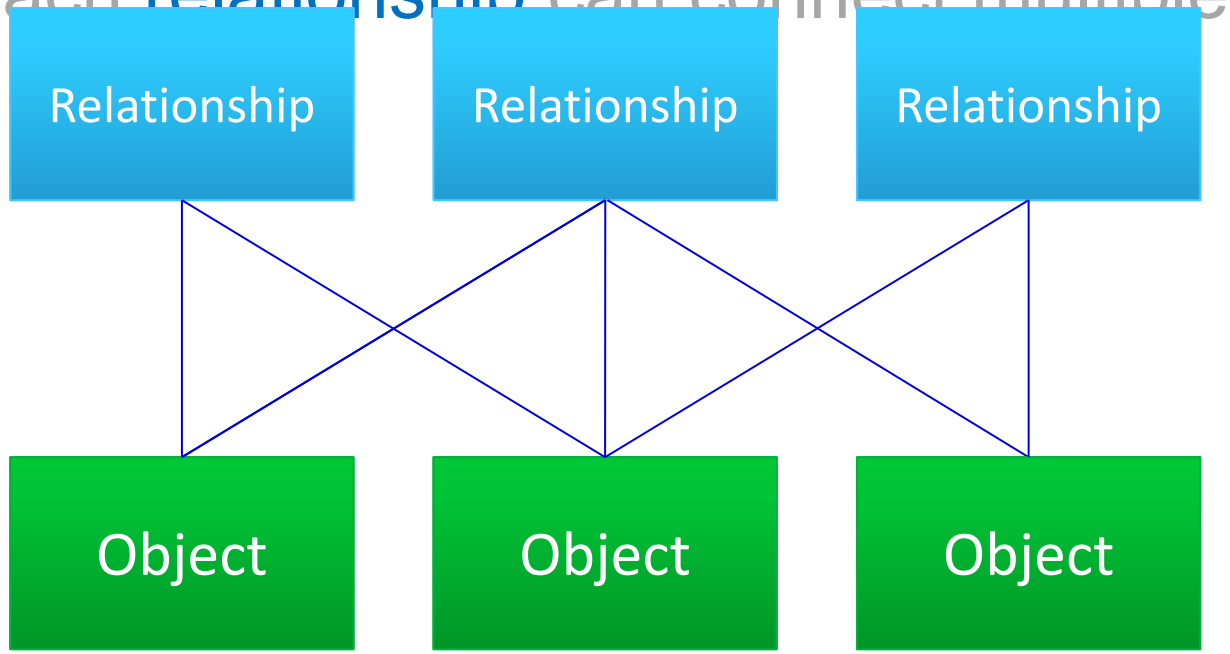
Each relationship can connect multiple objects...



...and each object can be present in multiple connections.

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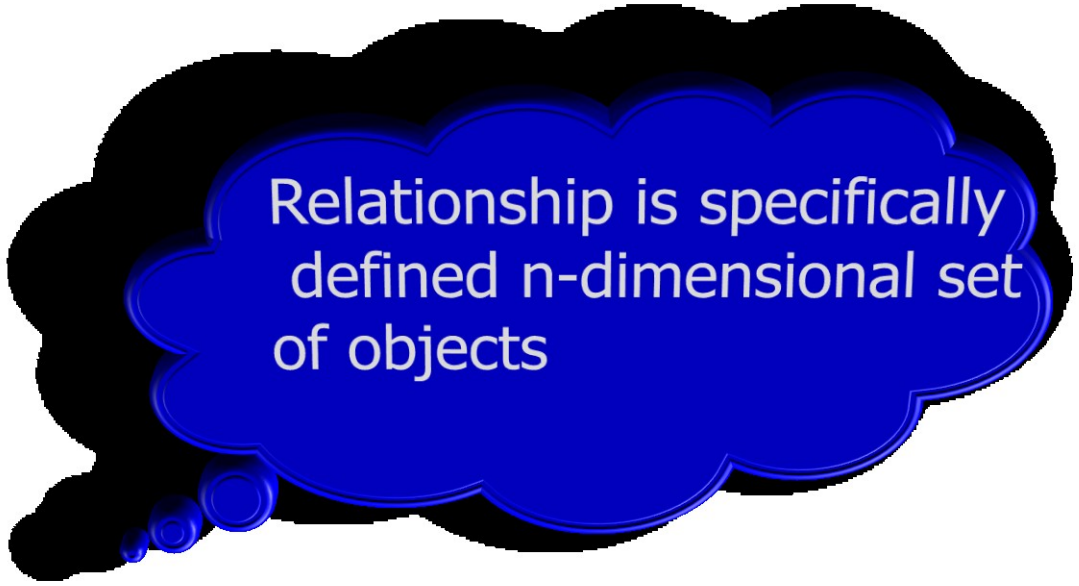
Each relations



...and each object can be present in multiple connections.

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Relationship

nteres

Category

Operation

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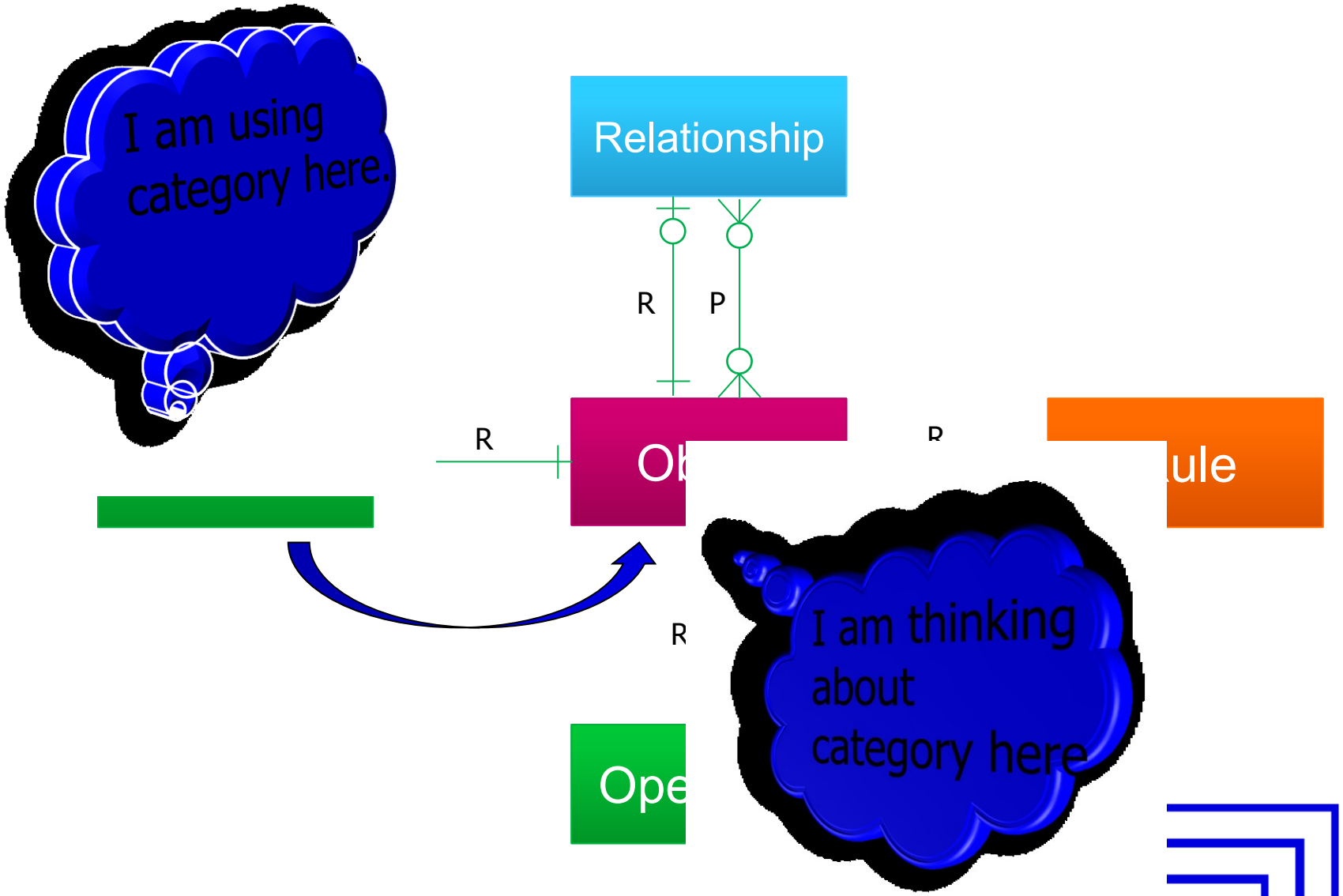
MENTION – USE duality



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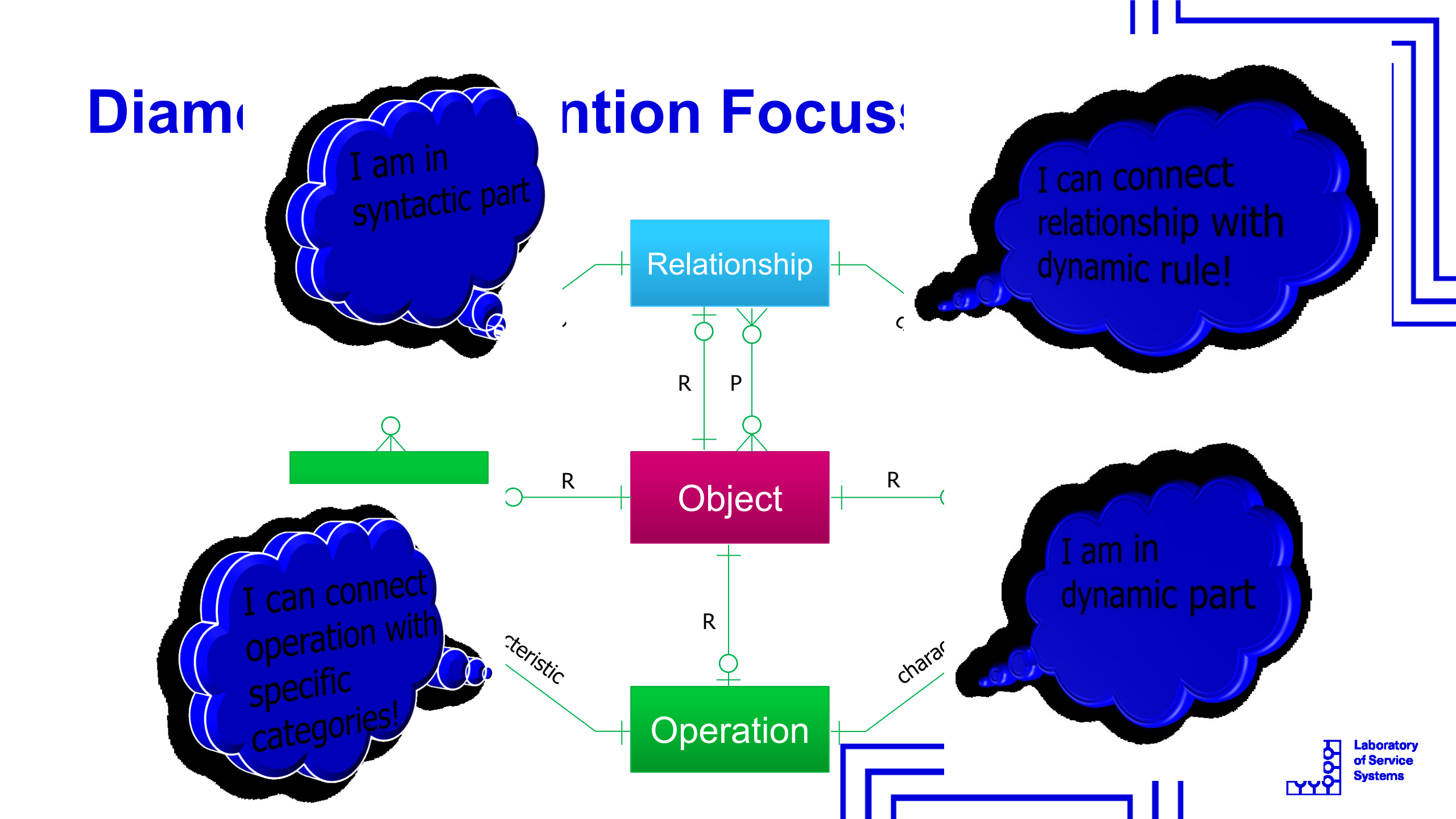
Diam(ntion Focus



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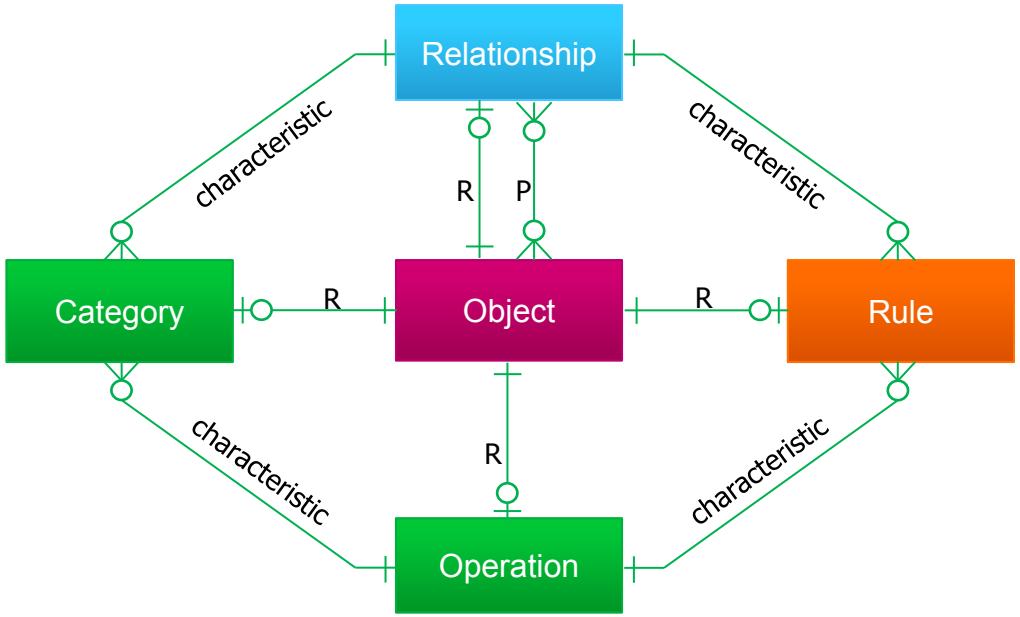
Diamond of Attention Focussing

- Objects and relationships between them
- Mention-use duality
  - Modelling a modelling tool
  - Referring to itself



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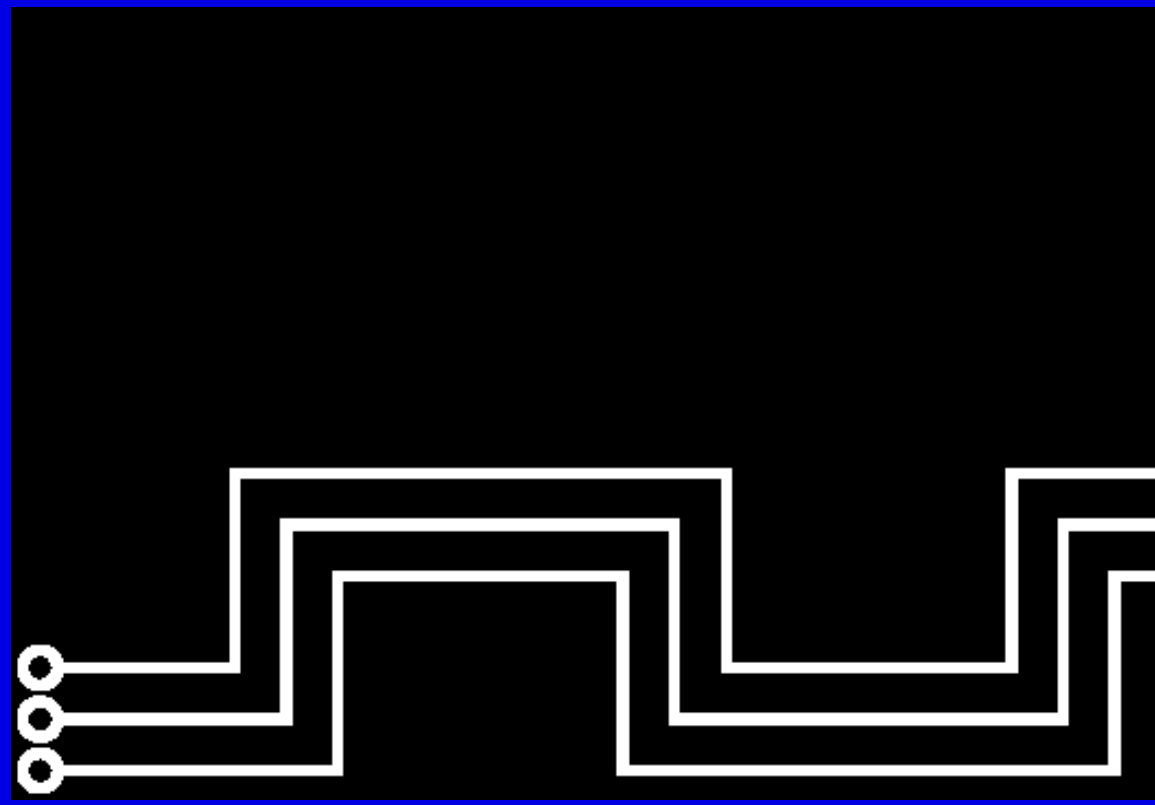
Example – Smart Street



Road (street) - Objects and relationships

Name	Relationship	Name
Car	Is on	Road
Bus	Is on	Road
Bicycle	Is on	Road
Pedestrian way	Is on	Road
Driving lines	Are dividing	Road
All vehicles	Are using	Driving lines
Trafic on the road	contains	All vehicles
Trafic lights	Are managing	Traffic on the road

What do we need to do?

Define categories

- To what categories do presented objects belong to?

Define examples of operations that can be performed

- Remember they are related to the category, not to the object

Define Rules

- they are related to relations, not to categories

Conclusion

- Complexity of Smart City, Quadruple Helix
- Diamond See
- Example of Smart Street