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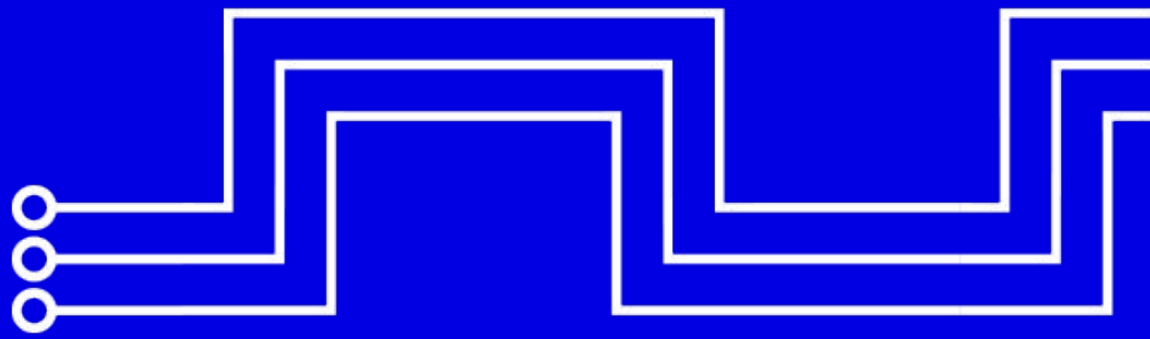
Smart City and complexity

Leonard Walletzký



When we want to speak about smart city

- Definition of Smart City
- Role and design of Services within the Smart City
- Modeling the services

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Definition of Smart City

Why do we need „correct" definition of Smart City?

Many cities claim to be smart

Obviously, the implementation of ICT plays key role in city „smartness"

Smart City Council definition:

- A smart city is one that has digital technology embedded across all city functions

But is it just usage of ICT that does the city smart?

Possible definitions

A smart city is a place where traditional networks and services are made more efficient with the use of digital solutions for the benefit of its inhabitants and business.

- European Commission definition - https://ec.europa.eu/info/eu-regional-and-urban-development/topics/cities-and-urban-developme

Smart City is the set of services, using ICT in non-trivial way that enables city management and whole society to meet the challenges of city development with the aim to improve its efficiency, habitation and sustainability, to bring its citizens the highest value possible, formulated in understandable value proposition.

- Lucie Ševanková: Analysis of the Smart City from IT management point of view, Master thesis, 2018, Dean's award

Main research questions

- Do the Smart City Services have any structure?
- How to design and realize Smart City services in the most efficient and complex way?
- What competencies and knowledge are necessary to understand complexity of services?
- What are necessary inputs, implementation processes, limits, forms of financing and other constrains to create valuable structure of services within Smart City?
- How to formulate the rules to create effective, flexible and complex Smart City, fulfilling the requests of administration, citizens and other related stakeholders?

Smart City Services

There are many different services, used in Smart City, with different role and customers

- Traffic control
- Route optimization
- Waste services
- Control systems
- Camera systems

We can find there many IT services, but in the basic level, we can recognize two main elements

- Software
- Hardware

How they are related or connected? What tasks do they really fulfill?

Is there any methodology we can use?

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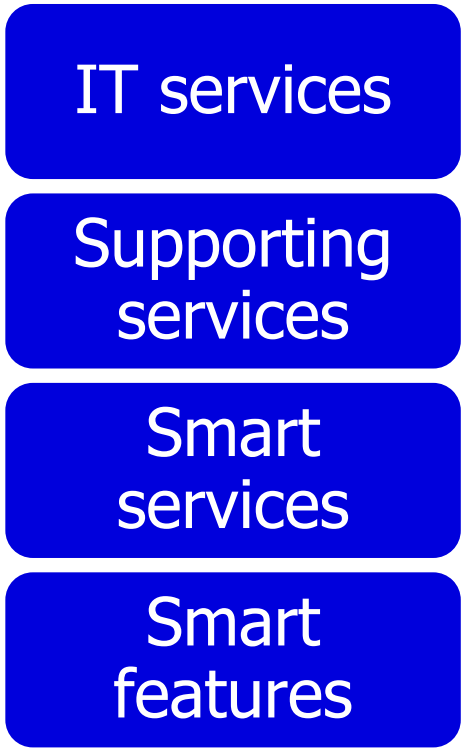
Help of Service approach

The key element of all services is:

- Value – usefulness or utility for the receiver of the service
- Value proposition – description of the value in the language of receiver

Based on this we divided the Smart City services to the layers depending on their value proposition.

- Do they serve for final user (citizen, administration) or are they just „inputs" for other services?



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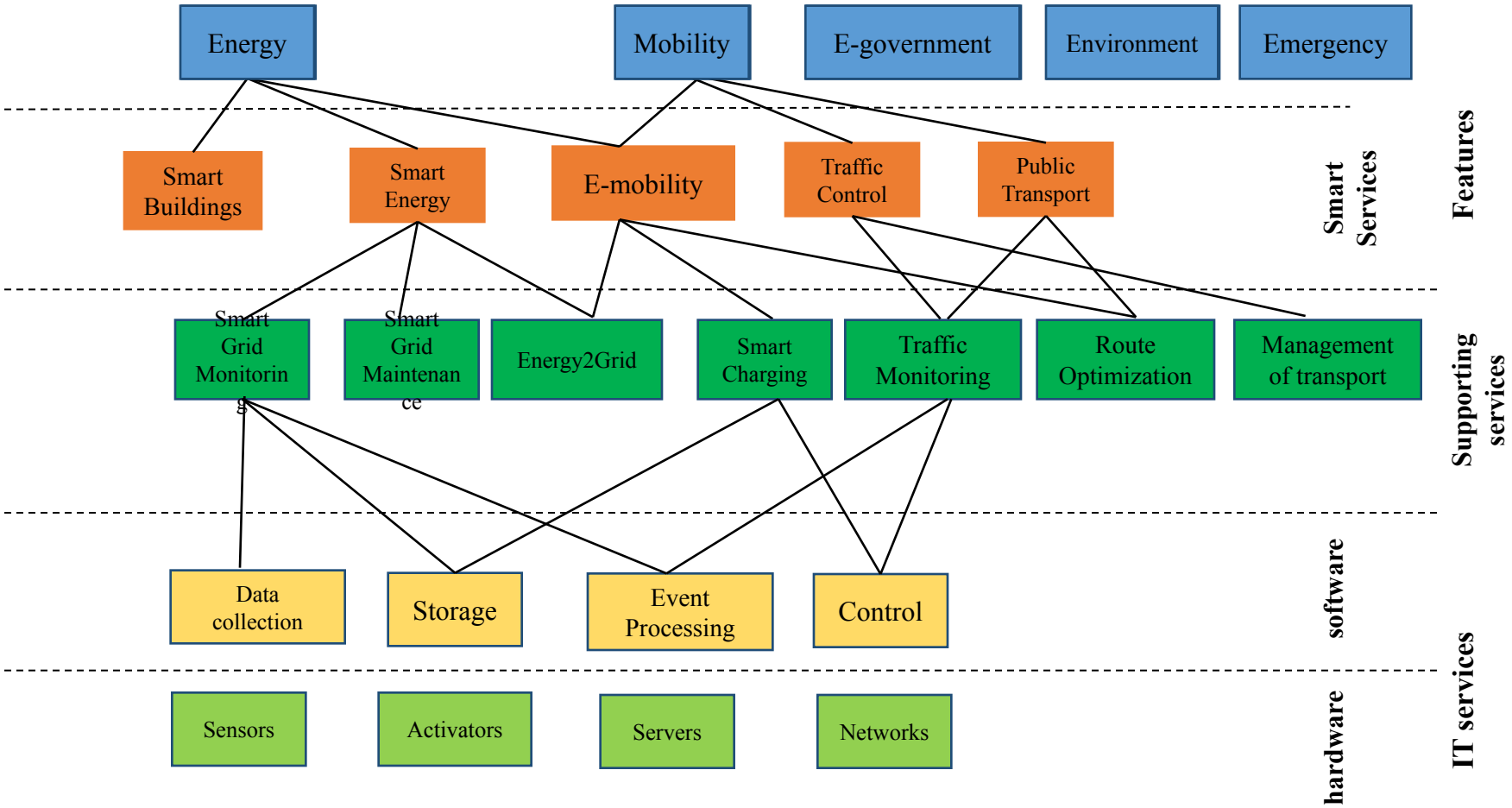
Layered model Smart City



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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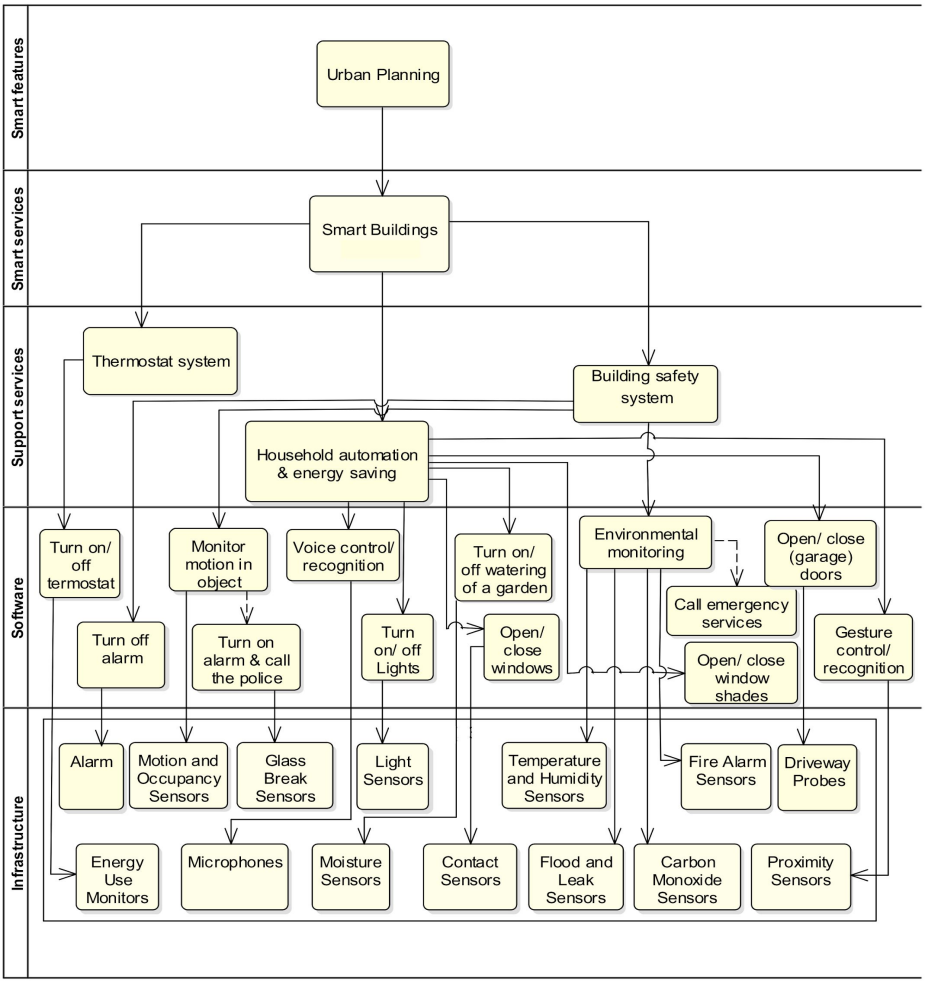
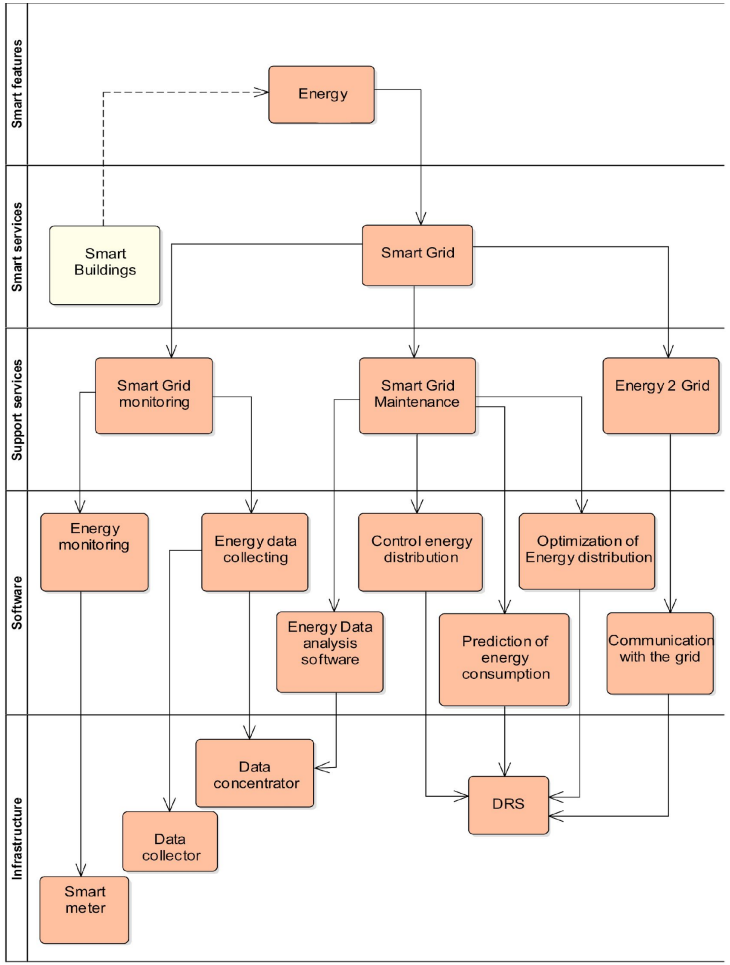
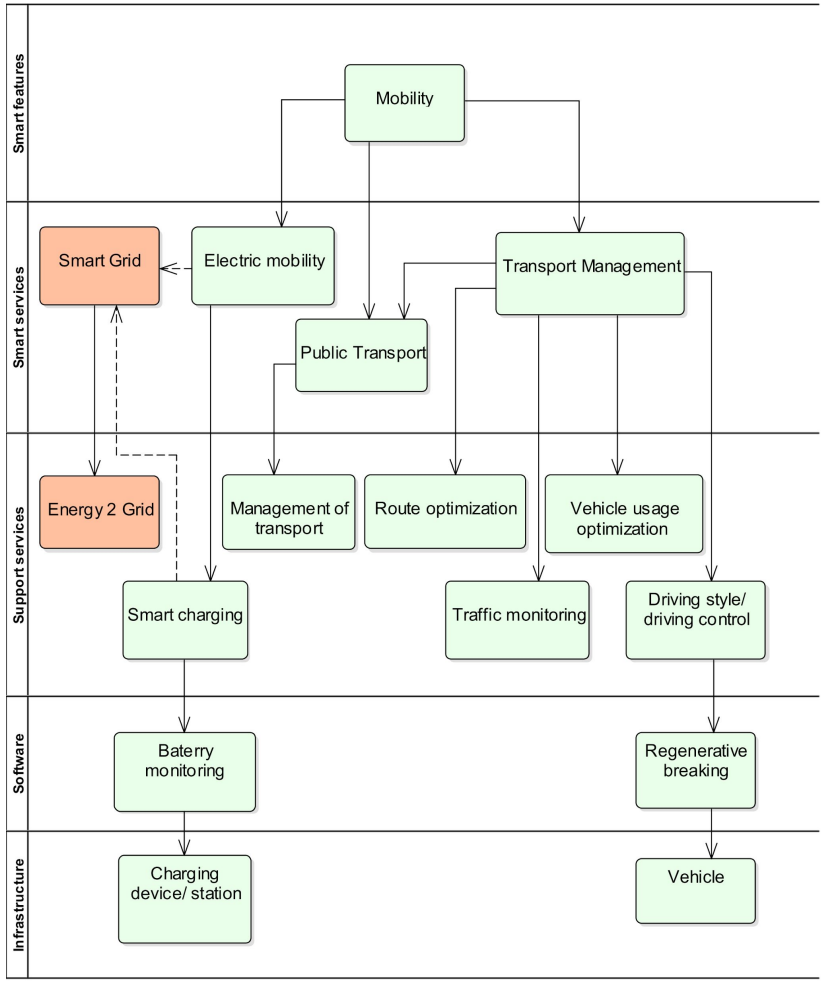
Detailed Layers‘ analysis







Urban planning

Smart Energy

Mobility

Walletzky L., Buhnova B., Carrubbo L., Kazickova, T., Ge, M. (2020) Layered Landscape of ICT and Citizen Services in the Smart City

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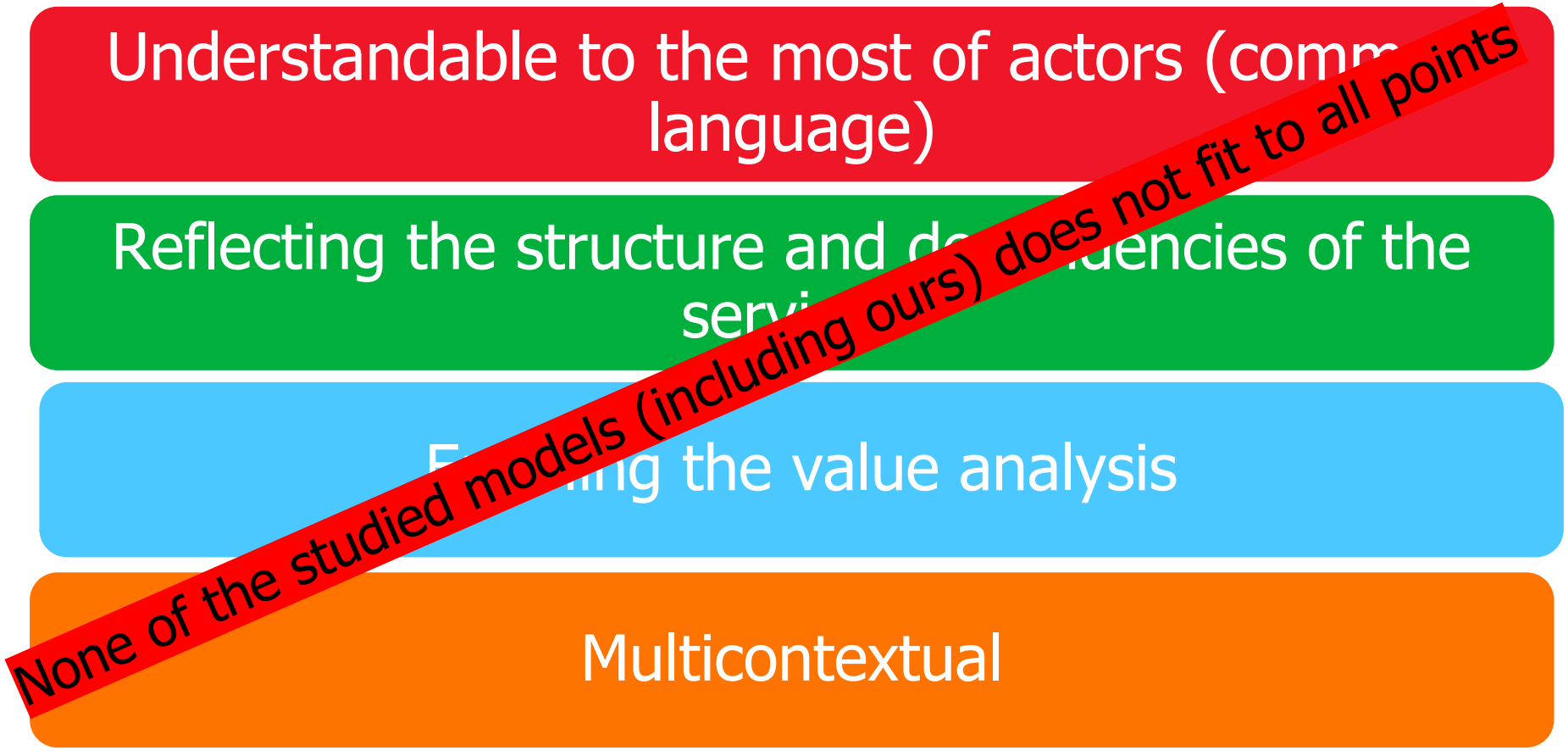
The journey continued…..

The concept of layers was not alone

The same idea was presented by multiple authors

And we have investigated a lot of models…

The main requests to the model



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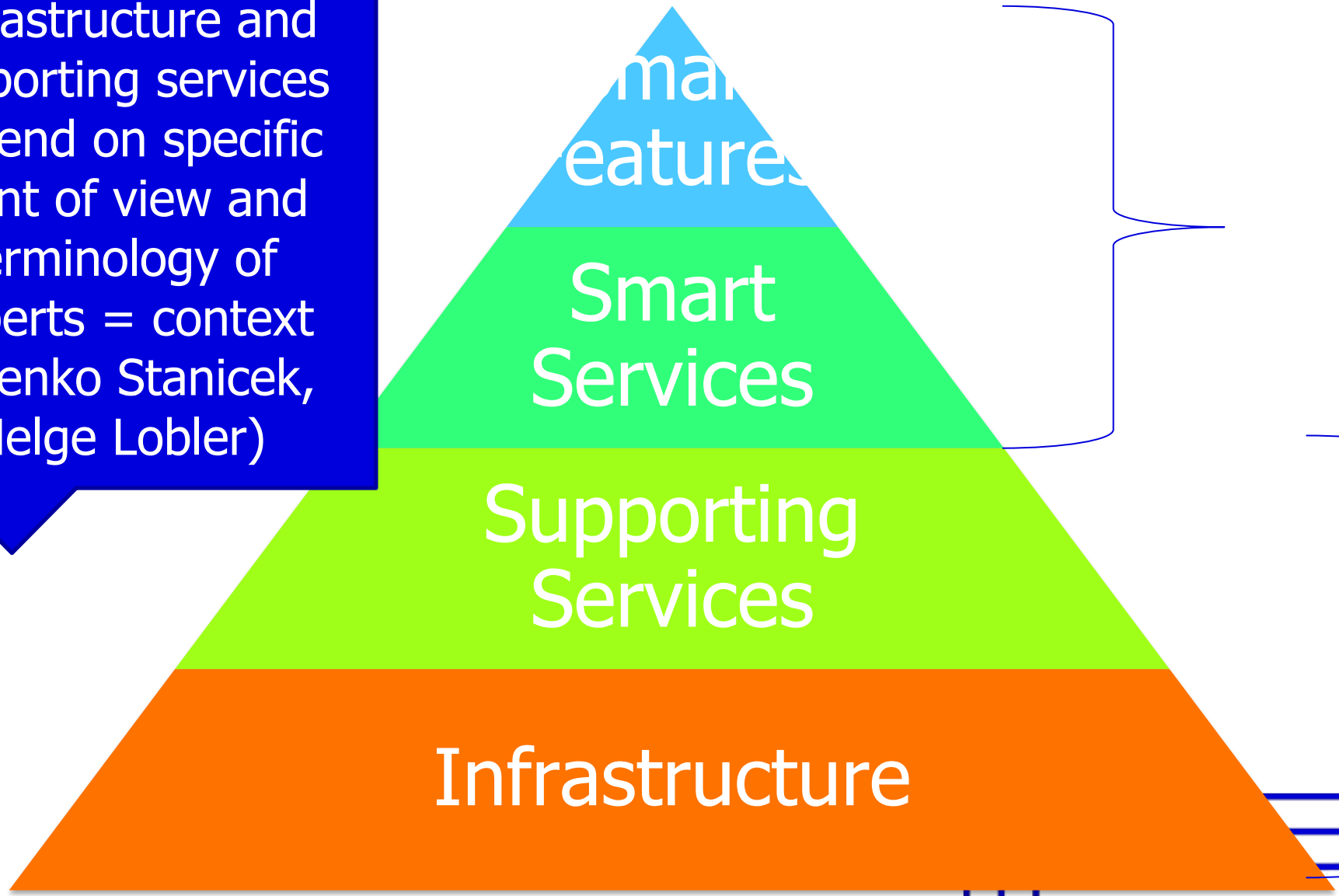
Layered model 2.0

Infrastructure and supporting services depend on specific point of view and terminology of experts = context (Zdenko Stanicek, Helge Lobler)



Customer facing services

Background services

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We defined the new views that redefine the structure

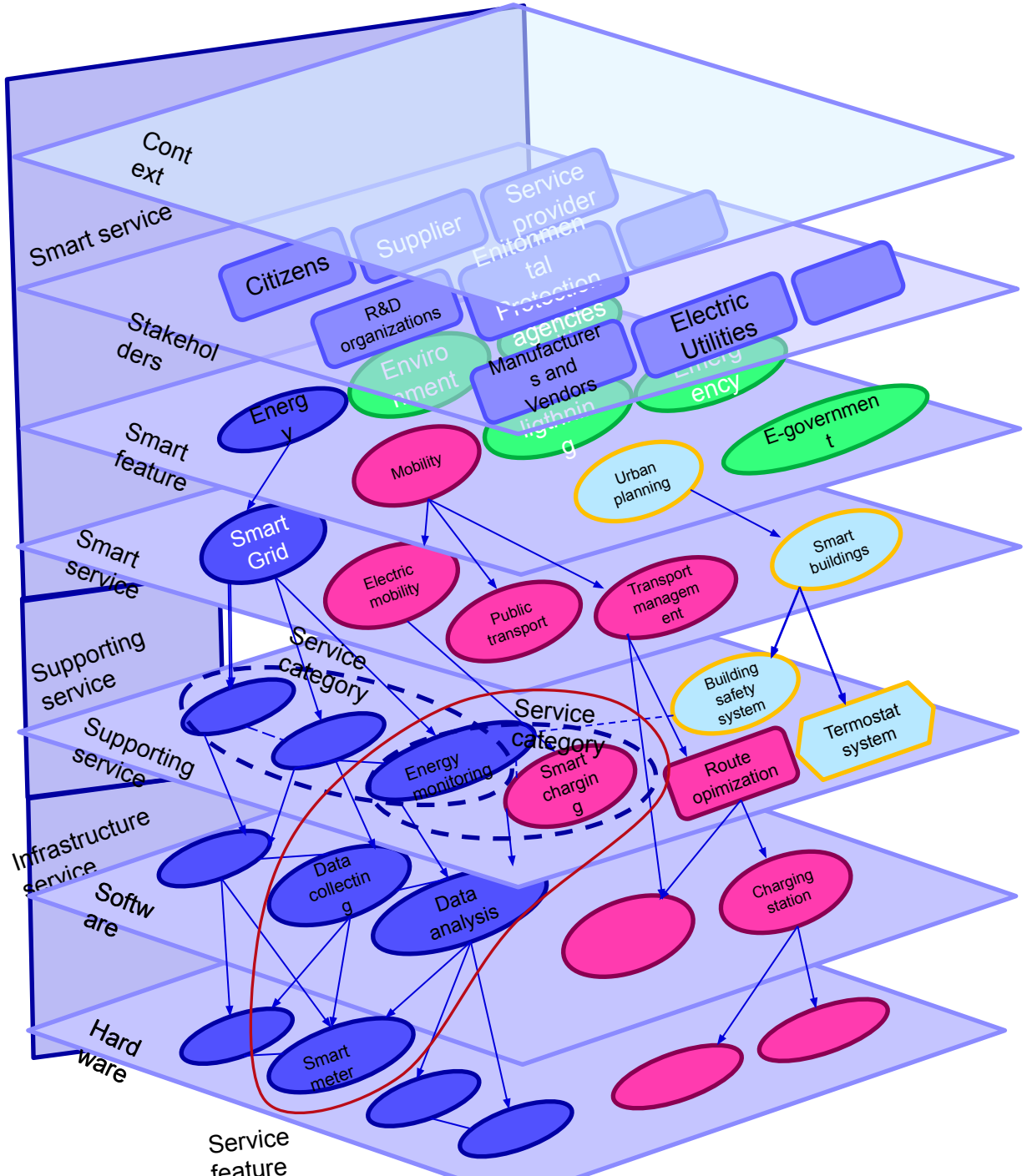
Context view

- Enables to change the structure of the services defined on the current context

Stakeholders (Actors) view

- Enable to reconfigure the structure of the services according to a view of particular stakeholder
- Technically it is „just" another context, but
  - We want to exclude it as the special case
  - We need to cover the situation if one stakeholder appears in more than one context

The new model



We also defined two special groups of services (can be taken as projects):

Customer-facing services

- Service category – the group of the related services belonging into same layer

- Service package – the group of related services belonging into different layers

Background services

Associatio
Interconnection/dependency line
Service category
Service package line

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The features of the model

Understandable to the most of actors (common language)

Reflecting the structure and dependencies of the services

Enabling the value analysis

Multicontextual

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Advantages of the Layered model 2.0

- The structure is complicated, but still understandable to all stakeholders
- The fact, that Customer facing services seems to constant in the most (or all) contexts helps a lot
- It covers not only current state, but it is possible to add new services, contexts, and views
- It gives the researcher the global view to Smart City Services structure

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Next steps

The Layered model 2.0 will be used to develop Service Catalogue for Smart Cities

The services will be analyzed from following perspectives:

- What is the request that gave the impuls(es) to create the service?
- What goal (related to what stakeholder) does the service fulfill?
- What stakeholders are involved into service design and provision?
- What are related services from different contexts?

The main task is to find a common methodology how to describe services in service catalogue to help the municipalities with their development, maintenance and improvement

Current implementation of presented ideas

The methodology is currently used in the implementation of new SMART methodology on ministry of local development of Czech Republic

The acceptance of service approach in this methodology on the state level is the significant breakthrough of Layered model

More details will be presented on Informatics colloquium November 9th