MANAGEMENT OF URBAN INFRASTRUCTURES

By the end of the course, you'll understand:
- The principles behind smart urban infrastructure
- How data and technology can optimize city services
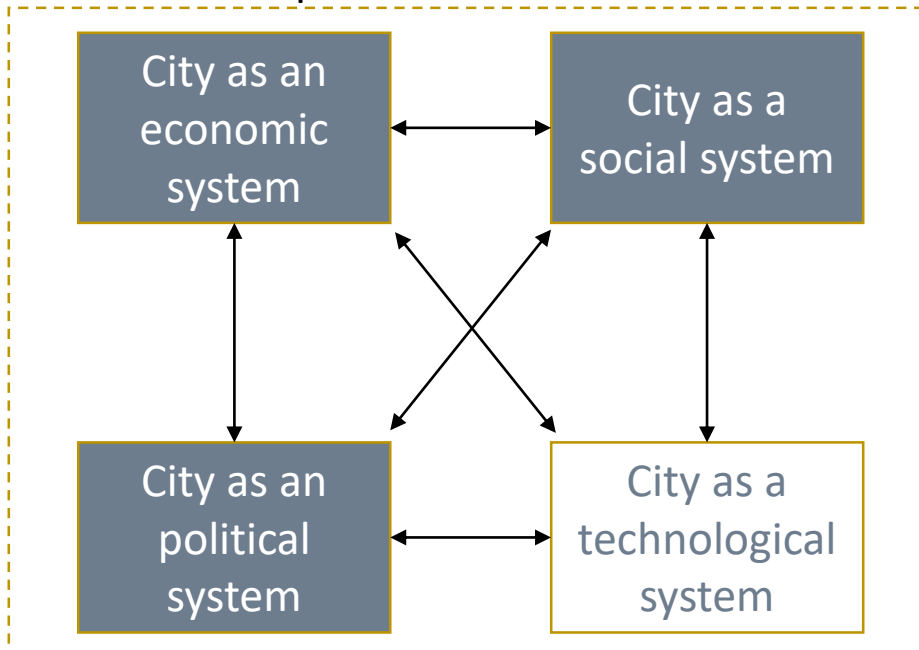- The challenges in deploying and managing smart city projects

Concept - Ohio Event

Smart Cities – Management of Smart Urban Infrastructures
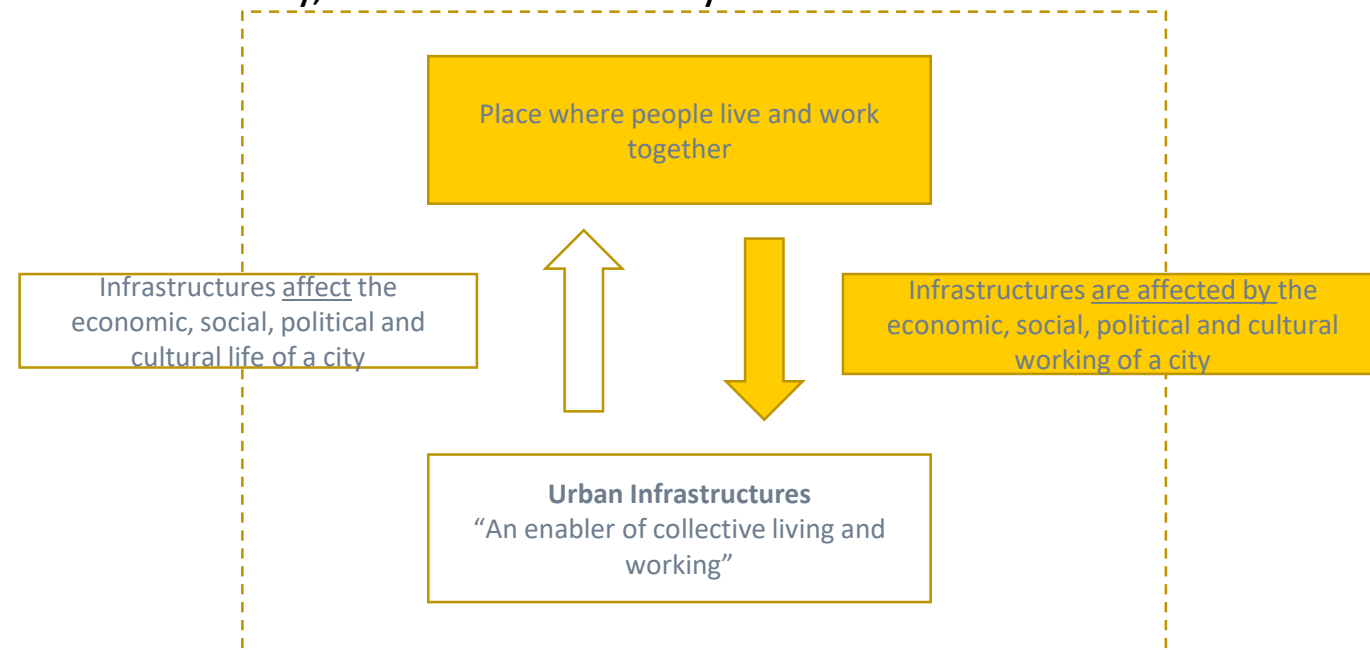**École Polytechnique Fédérale de Lausanne**

The City, a place where people live and work together
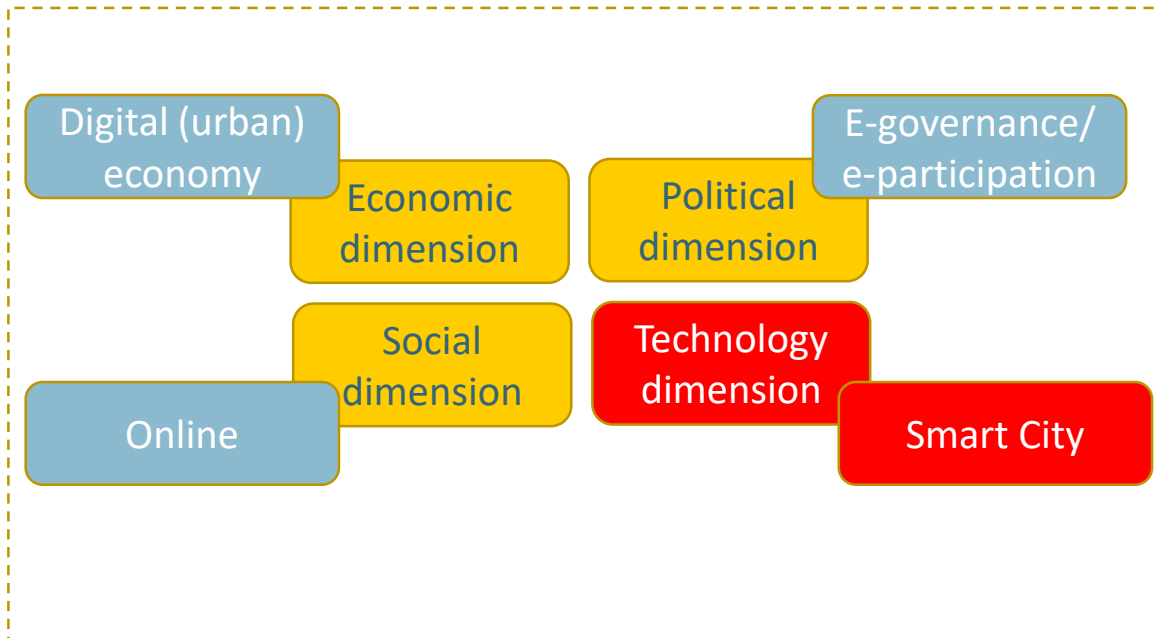
Different Perspectives

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┌──────────────────────────────────────────────────────┐
│  ┌──────────────┐          ┌──────────────┐           │
│  │  City as an  │ ◄──────► │  City as a   │           │
│  │   economic   │          │social system │           │
│  │    system    │          │              │           │
│  └──────────────┘          └──────────────┘           │
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│  ┌──────────────┐          ┌──────────────┐           │
│  │  City as an  │ ◄──────► │  City as a   │           │
│  │  political   │          │ technological│           │
│  │    system    │          │    system    │           │
│  └──────────────┘          └──────────────┘           │
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City, a Socio-Technical System

Place where people live and work together

Infrastructures <u>affect</u> the economic, social, political and cultural life of a city

Infrastructures <u>are affected by</u> the economic, social, political and cultural working of a city
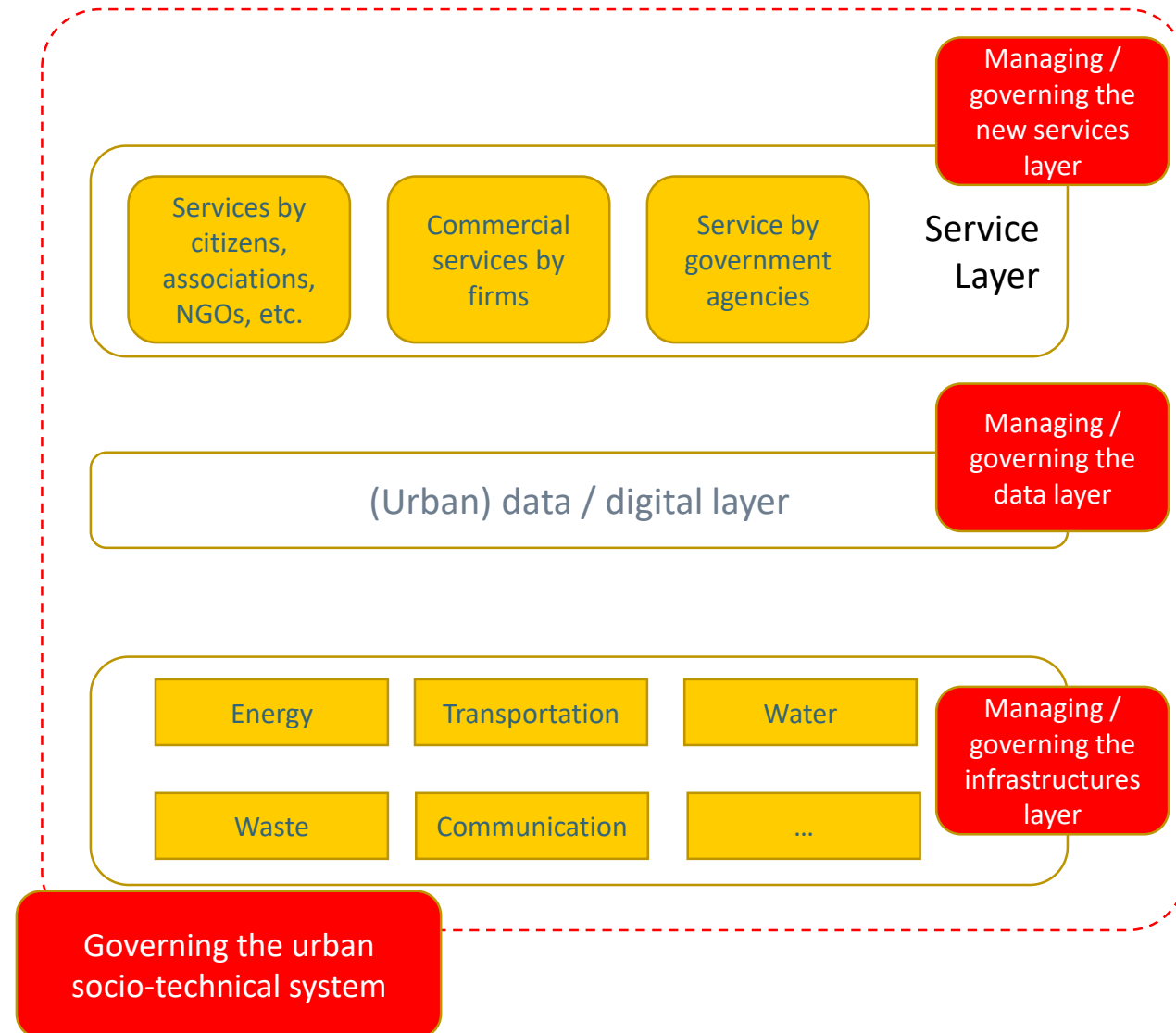
Urban Infrastructures
"An enabler of collective living and working"

Digitization – Perspectives and New Challenges

Smart City means different things depending on your perspective

Digital (urban) economy

Economic dimension

E-governance/ e-participation

Political dimension

Social dimension

Technology dimension

Online

Smart City

Four new challenges

Managing / governing the new services layer

Service Layer

Services by citizens, associations, NGOs, etc.

Commercial services by firms

Service by government agencies

Managing / governing the data layer

(Urban) data / digital layer

Managing / governing the infrastructures layer

Energy

Transportation

Water

Waste

Communication

…

Governing the urban socio-technical system
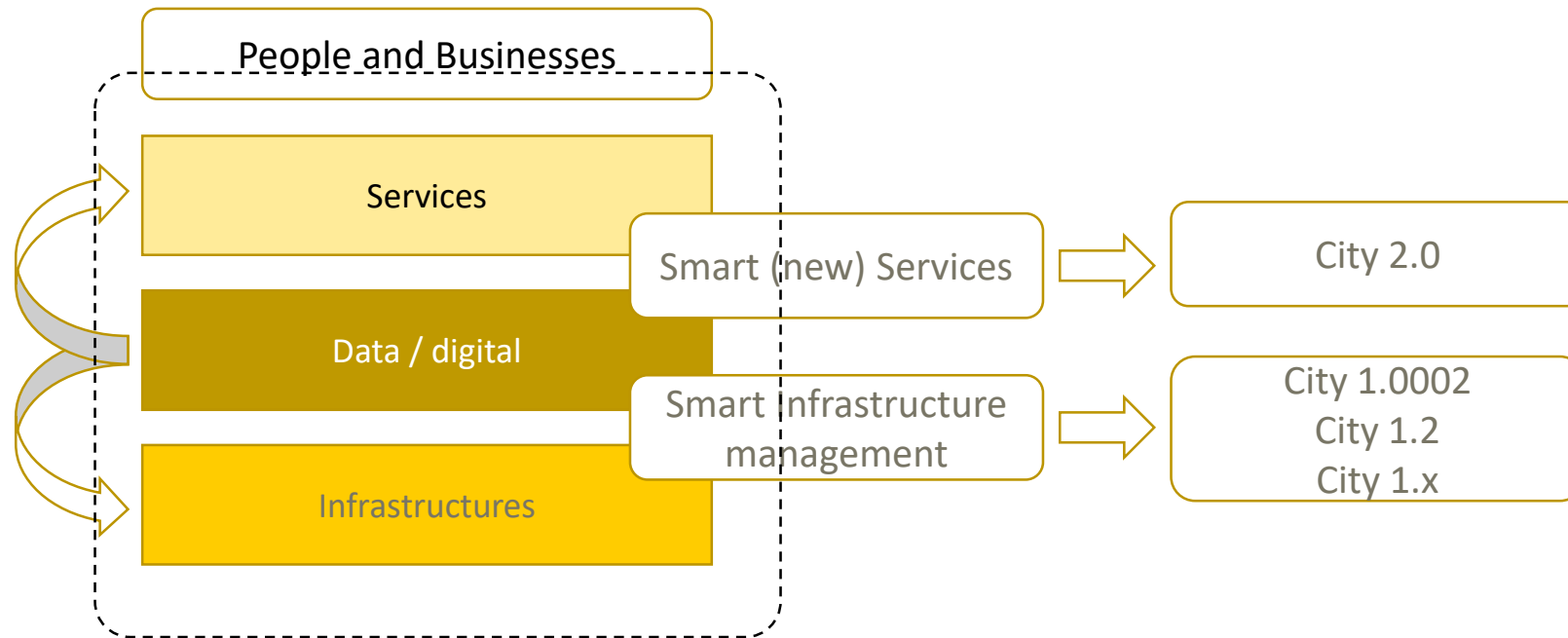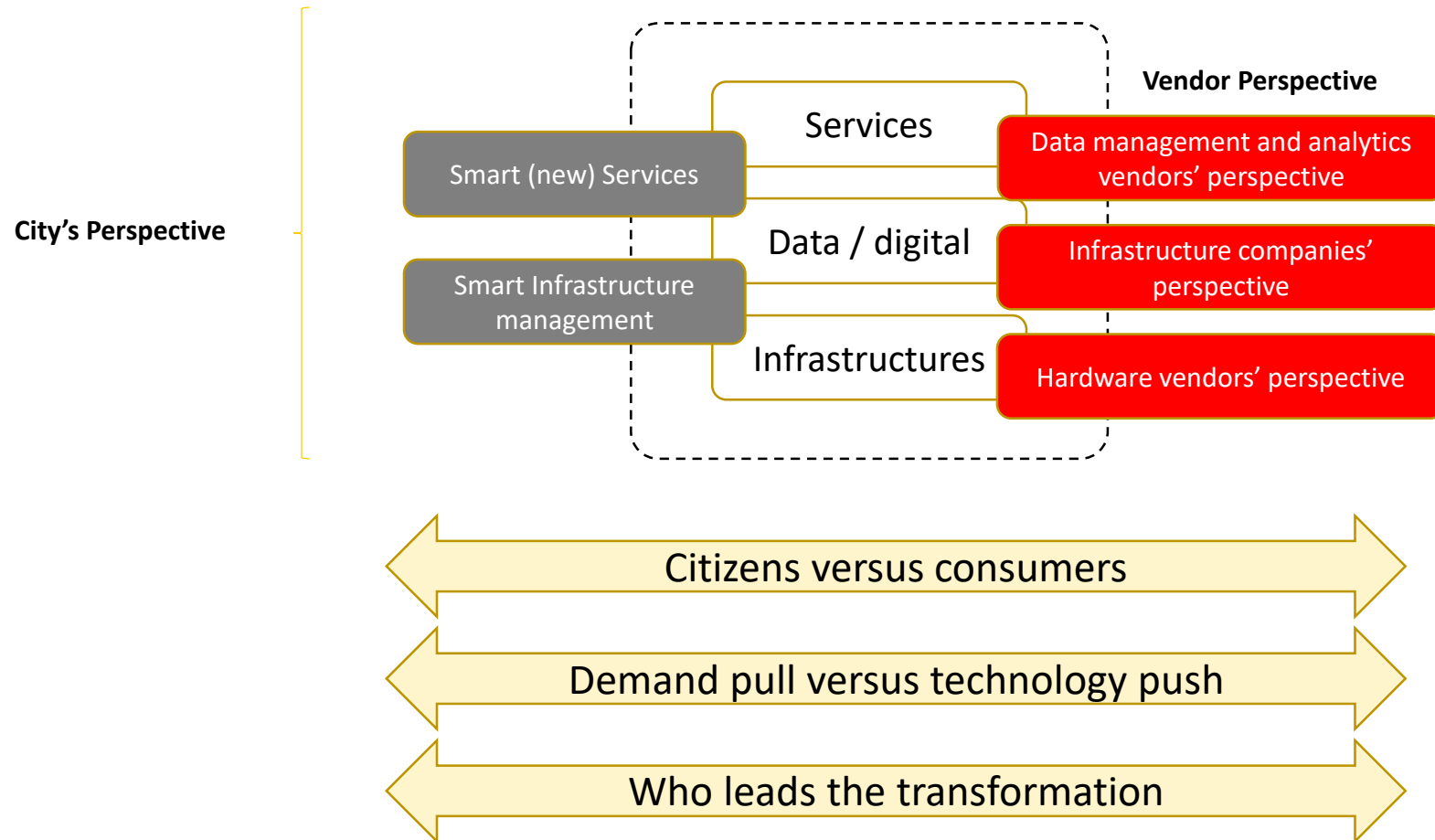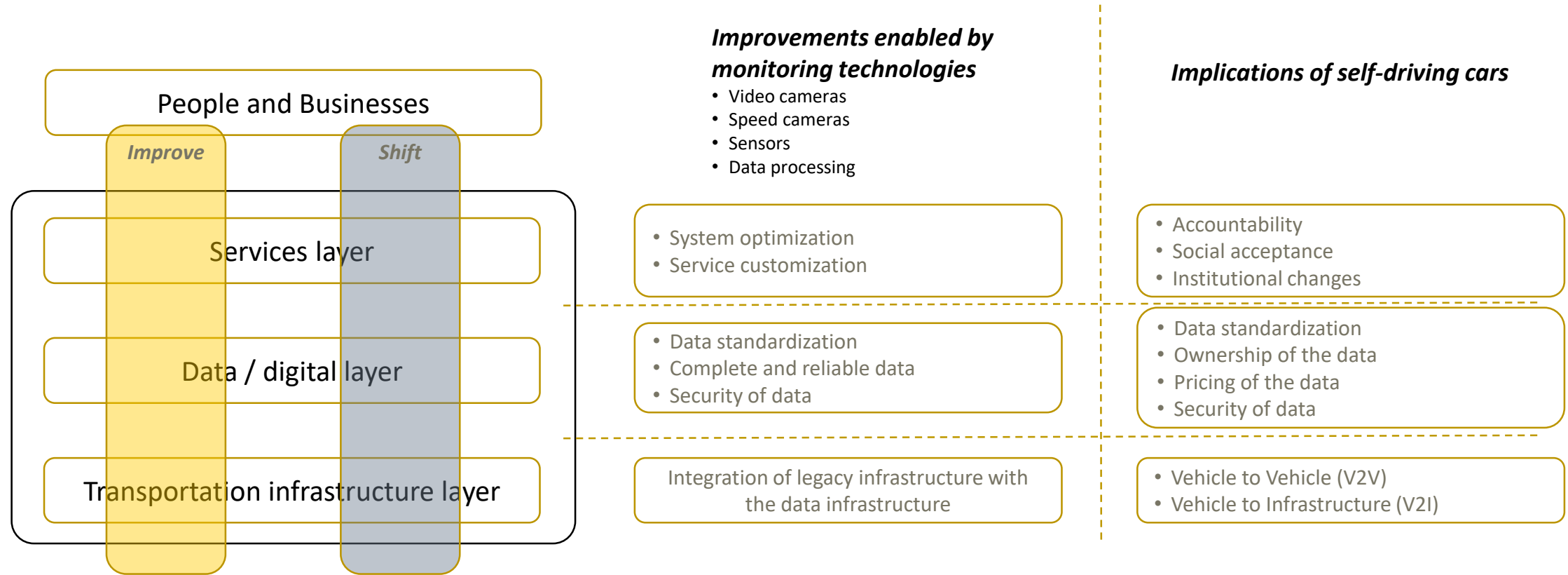
Infrastructure is essential, Services deliver the impact

Battle for control between the City and Vendors

Examples

Examples

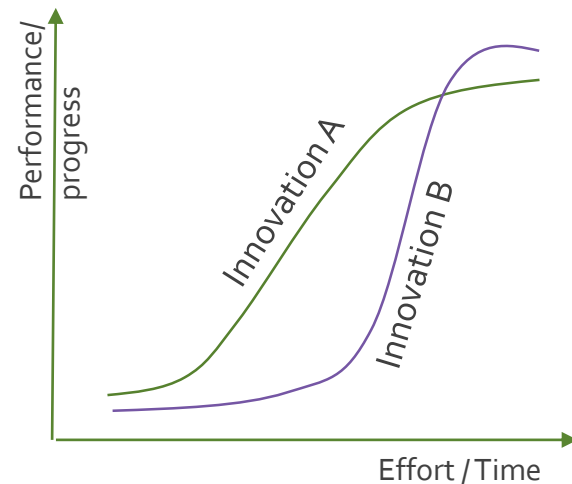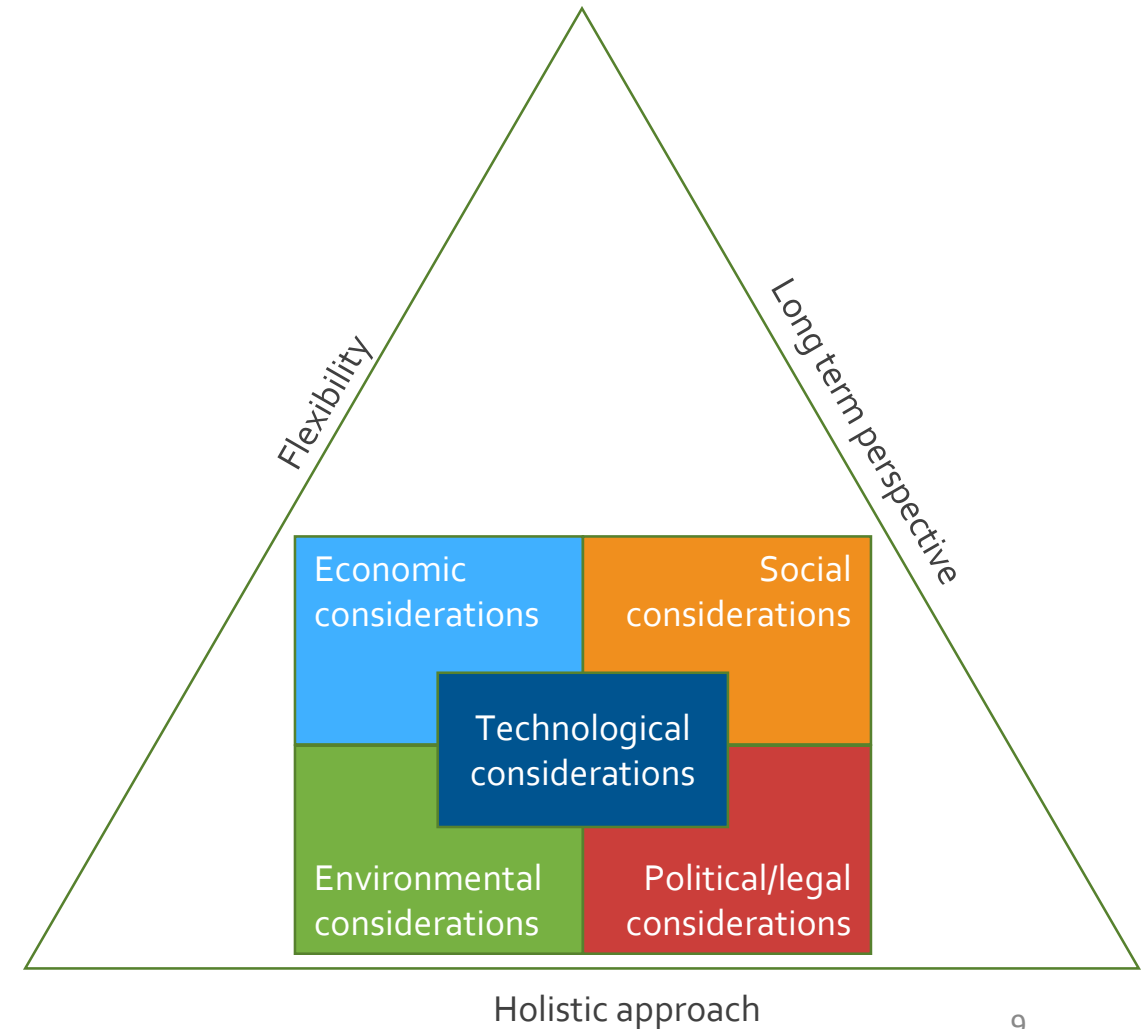### People and Businesses

Improve   **Shift**

- Services layer
- Data / digital layer
- Transportation infrastructure layer

Improvements enabled by monitoring technologies
- Video cameras
- Speed cameras
- Sensors
- Data processing

- System optimization
- Service customization

- Data standardization
- Complete and reliable data
- Security of data

Integration of legacy infrastructure with the data infrastructure

Implications of self-driving cars

- Accountability
- Social acceptance
- Institutional changes

- Data standardization
- Ownership of the data
- Pricing of the data
- Security of data

- Vehicle to Vehicle (V2V)
- Vehicle to Infrastructure (V2I)

Transition is Complex

Feedback loops > Complexity

Socio-system

The socio-Technical system

Technical-system

- Interdependency of sub-systems
- Path-dependency
- Irreversibility

Path-dependency <> Long-term perspective

Performance/progress

Innovation A

Innovation B

Effort / Time

Transition Triangle

Flexibility

Long term perspective

Economic considerations

Social considerations

Technological considerations

Environmental considerations

Political/legal considerations

Holistic approach

Map the participants

People and Businesses

Services layer

Data / digital layer

Infrastructure layer

10

Redefining
solutions

TNL