

VTT TECHNICAL RESEARCH CENTRE OF FINLAND LTD



# Finnish Road Weather Maintenance Ecosystem

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## *Innovation capability*

SIRWEC 2016

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Dr. Aki Aapaoja

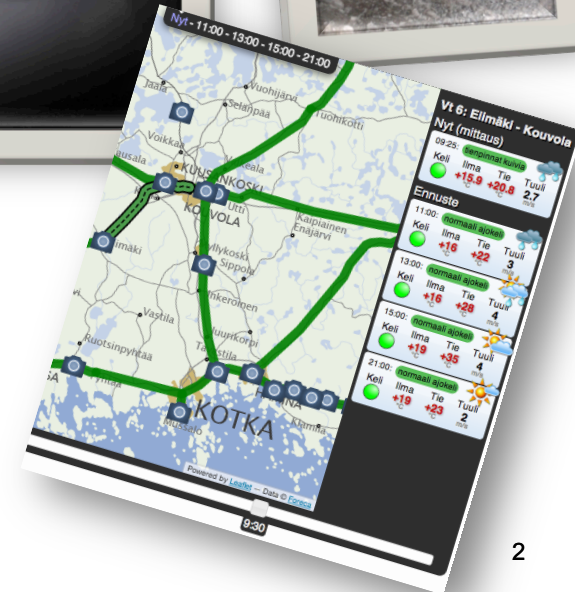
(with Raine Hautala, Zulkarnain & Tuomo Kinnunen)



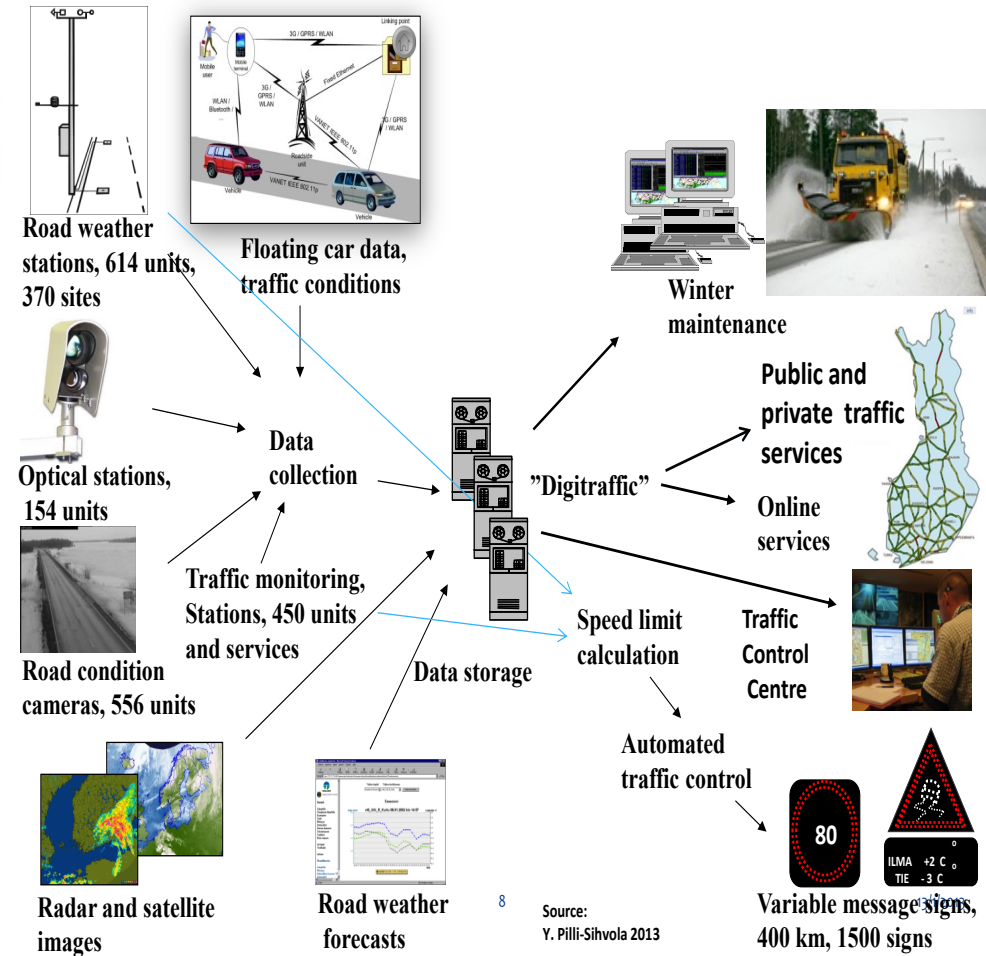
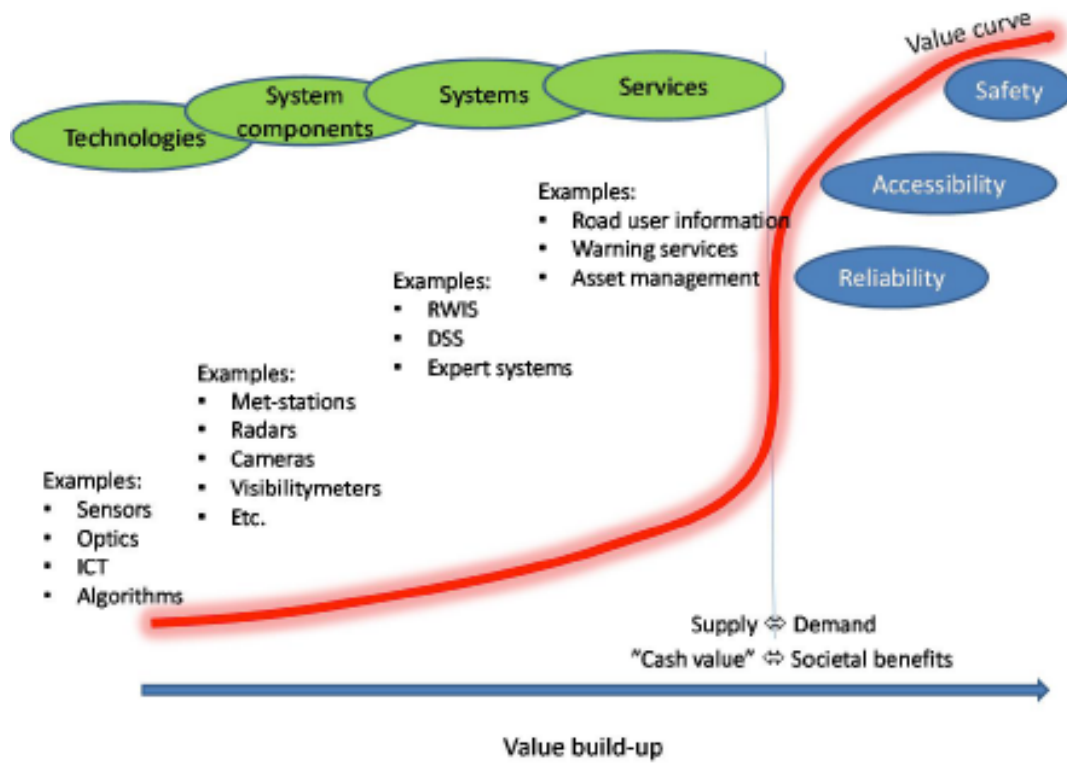
# FIRWE – Finnish Road Weather Maintenance



- Potential for significant benefits for road operators, maintenance decision makers, road authorities and road users
  - better awareness and more proactive measures
  - reduced operational maintenance costs and lighter environmental footprint
  - improvements in traffic safety and traffic management
- Team: **Vaisala, Arctic Machine, Foreca, Teconer and VTT in cooperation with other Finnish public & private sector actors**

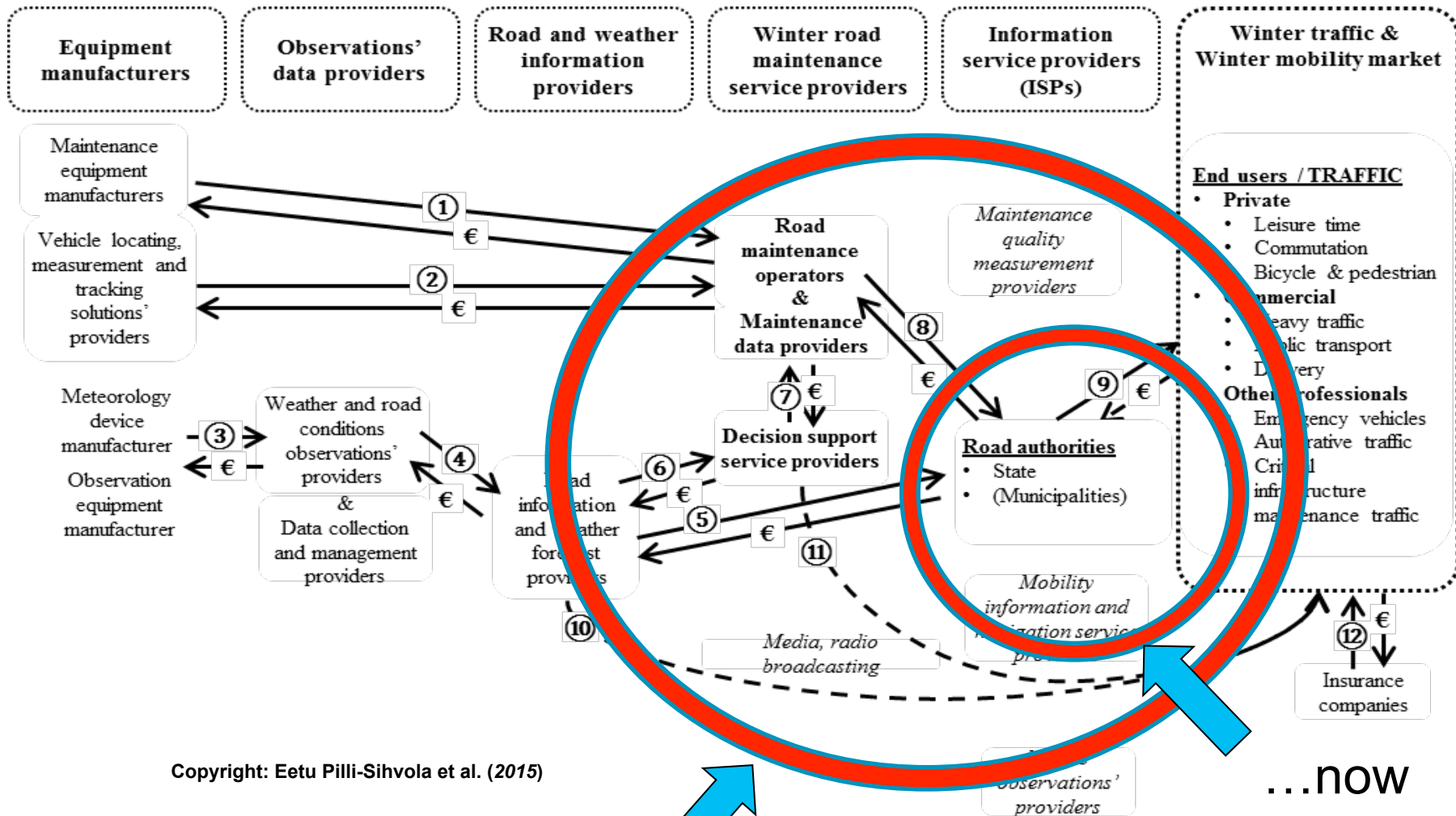


# Value build-up



Source: Yrjö Pilli-Sihvola

# ...Gandevoradaysime in Finland....

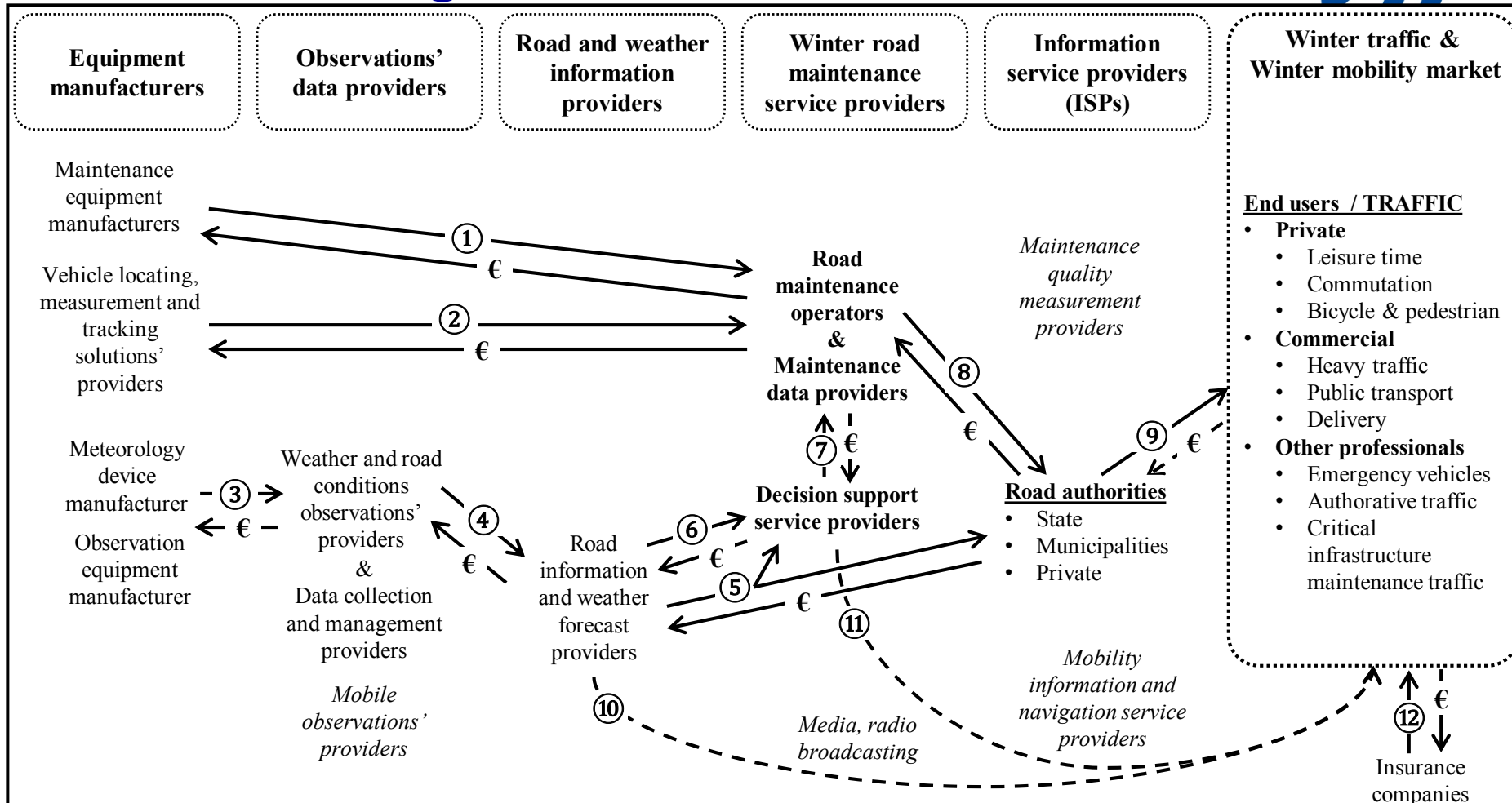


Copyright: Eetu Pilli-Sihvola et al. (2015)

Before...

...now

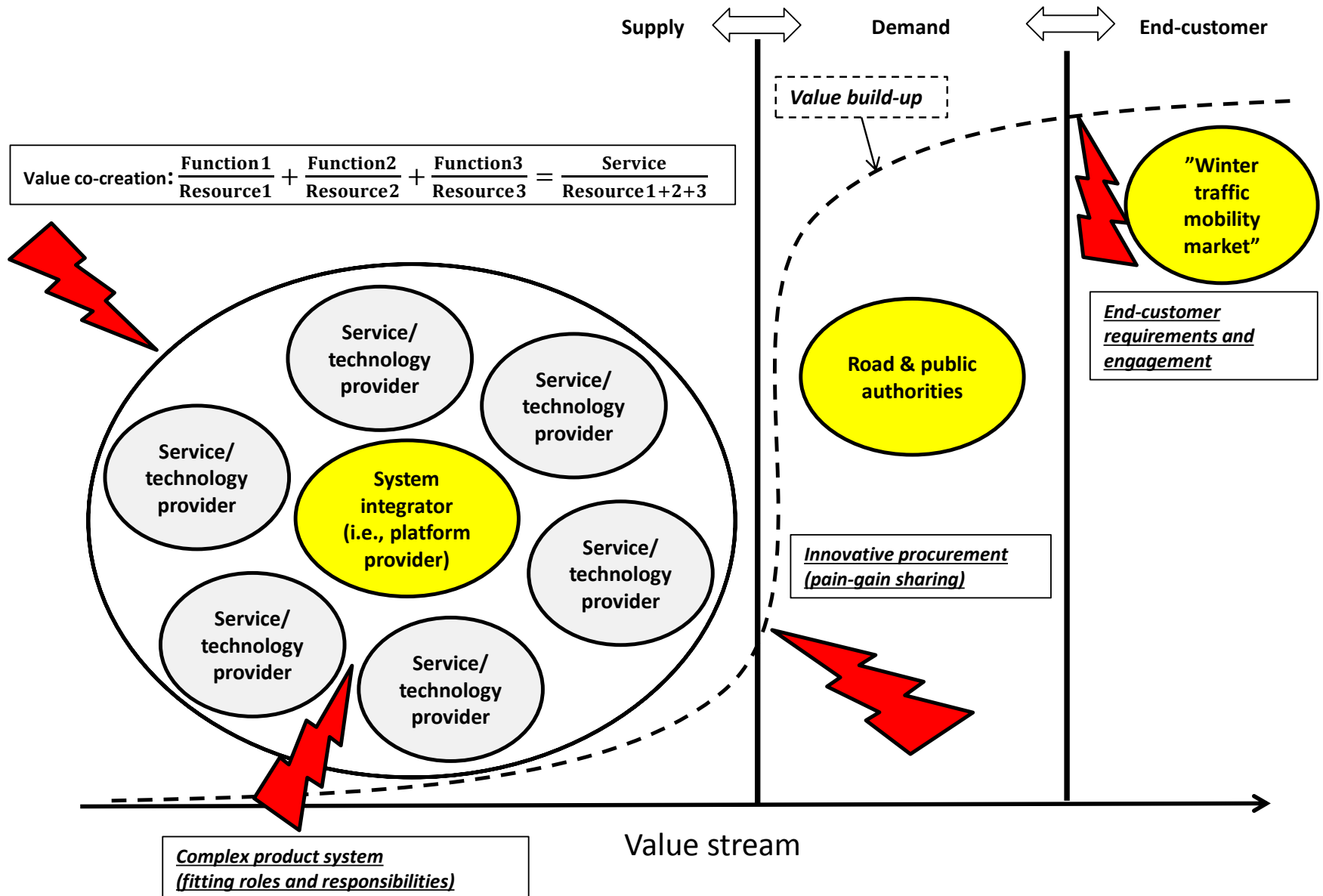
# The current challenges in the road maintenance



- Personifaction and vague roles
- Short-term view
- Public-private procurement
- Network governance

1. Winter road maintenance equipment
2. GPS and vehicle technology solutions
3. Meteorology and observation devices
4. Observation data
5. Public road weather and condition forecasts
6. Additional road weather information services
7. Emergency and road weather information services
8. Road maintenance services
9. Safe road conditions for winter traffic
10. Weather and winter road condition information
11. Winter mobility information
12. Motor insurance

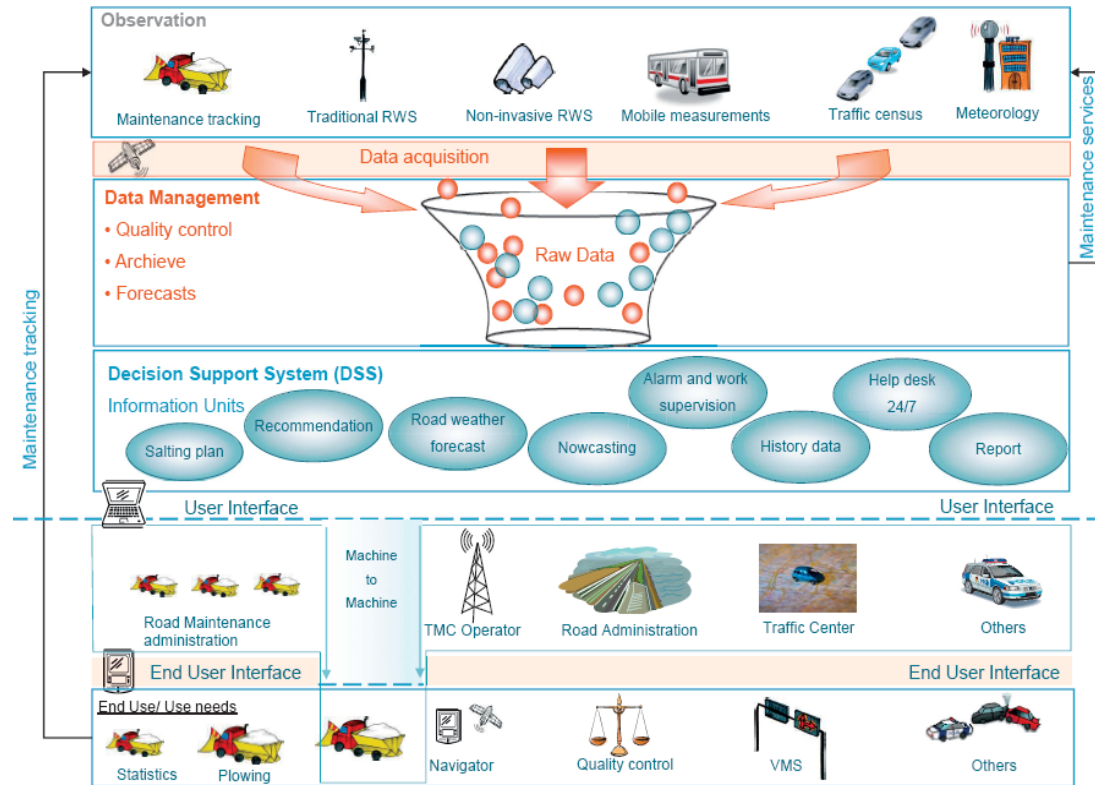
# Boosting Innovations



# Benefits and achievements (so far...)



- Automatic data collection solutions for maintenance equipment and operations (**Arctic Machine**)
- Advanced (long-term) forecasting methods for weather and driving conditions (**Foreca**)
- Mobile friction measuring solutions (**Teconer**)
- Measurement solutions, road maintenance decision support system and data integration (**Vaisala**)
- Socio-economic impact assessments, value networks, coordination (**VTT**)



Source: Vaisala



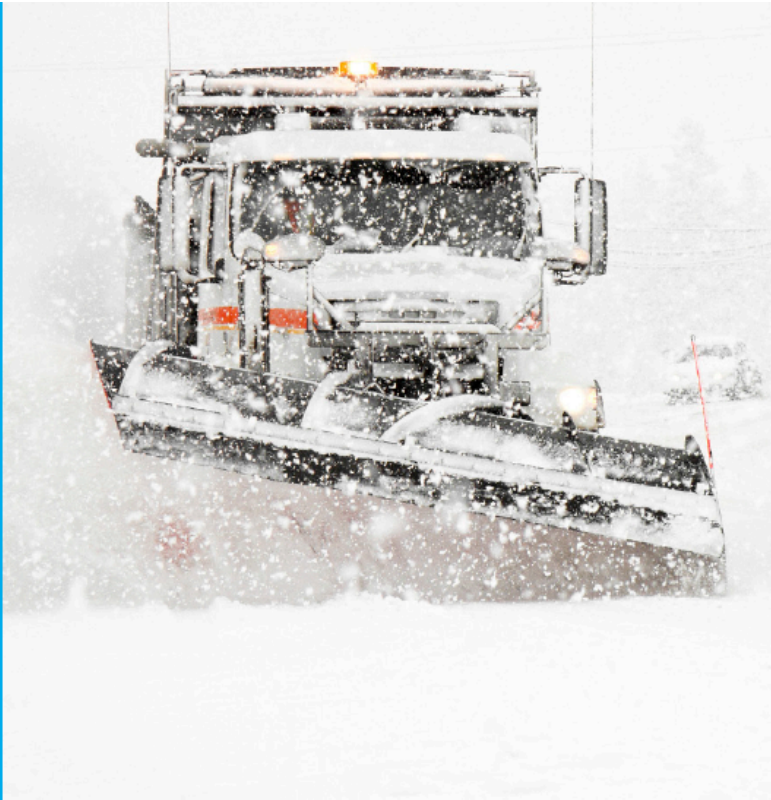
# Recommendations for the innovation policy



1. Focus on the long-term collaboration:
  - a) utilizing public and independent research institutions to spread the publicly beneficial information
  - b) testing and piloting as a part of productization and operative activities (road authorities as enablers)
  - c) measurement and assessment of the impacts as a natural part of the systematic developments
  - d) Win-win – situation (risk-revenue sharing)
2. Innovative project delivery and procurement methods (e.g., project alliancing)
3. Bringing all the views together and combining skills, services, and public interests in manner that delivers maximum benefit-cost ratio
4. The selection of ecosystem stakeholders should be based on competence, capability, and expertise
5. The vital role of the road authorities between the service providers and end-customers
6. Funding agencies should provide funding and support for agile piloting, best-practice monitoring tools and innovative procurement methods







**Thank You!**

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**Finnish winter road  
management – the evolving  
business ecosystem**

BECSI WP2 project report

Pekka Leviäkangas | Aki Aapaoja | Raine Hautala |  
Tuomo Kinnunen



**Download the report:**

**<http://www.vtt.fi/inf/pdf/technology/2015/T208.pdf>**



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