Ecosystems in Winter Road Maintenance and C-ITS

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Business ecosystem definition

“An economic community producing goods and services of value to customers, who are themselves members of the ecosystem. The member organisms also include suppliers, lead producers, competitors, and other stakeholders.

Over time, they coevolve their capabilities, and tend to align themselves with the directions set by one or more central companies. Those companies holding leadership roles may change over time, but the function of ecosystem leader is valued by the community because it enables members to move toward shared visions, align their investments, and to find mutually supportive roles.”

Types of ecosystems

Innovation Ecosystems
integrate exploration (knowledge) and exploitation (business) ecosystems

Knowledge Ecosystems
focus on generating new knowledge and technologies

Business Ecosystems
focus on creating customer value

Focal Company or Platform

LIVING LABS

AI
CONNECTIVITY
SENSORING

SMART ENERGY
AUTONOMOUS SYSTEMS
DIGITAL HEALTH

Source: Valkokari, 2015
A few points about Finnish winter maintenance

- Finnish road weather expertise is well-known and internationally recognized
- Companies, authorities, individual experts and research institutes hold a lot of know-how
  - This know-how and knowledge is a bit scattered
- Long tradition in operating with quality-driven winter maintenance management policy
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
Once upon a time in Finland…

Copyright: Pilli-Sihvola et al. (2015)
Boosting Innovations

Value co-creation: \[ \frac{\text{Function}_1}{	ext{Resource}_1} + \frac{\text{Function}_2}{	ext{Resource}_2} + \frac{\text{Function}_3}{	ext{Resource}_3} = \frac{\text{Service}}{	ext{Resource}_1 + 2 + 3} \]

Value stream:
- **System integrator** (i.e., platform provider)
- Service/technology provider
- Service/technology provider
- Service/technology provider
- Service/technology provider
- Service/technology provider

Value build-up:
- **Road & public authorities**
- Innovative procurement (pain-gain sharing)

Supply ➔ Demand ➔ End-customer

- **"Winter traffic mobility market"**
- **End-customer requirements and engagement**

Complex product system (fitting roles and responsibilities)
the area is full of small acts – Making hard to do one common vision

FIRWE
We are surrounded by ecosystems

“Fluent door-to-door supply chain enabled by autonomous operation and digitalization”

Marine transport and port operations

“Novel solutions for asset monitoring, logistics and safety & security”

Unmanned air, water, land and space systems

”Sustainable productivity for harvesting of natural resources through remote controlled and autonomous systems”

Mobile machinery

Urban transport

Quick and easy-to-use door-to-door mobility enabled by automated chain of different means of transportation

Inter-Urban transport

”Safe and fluent traffic with automated driving of commercial vehicles on highways ”

Rural transport

”Automated and combined people and goods transport solutions”
Big data and digitalization widens the ecosystems...

City

Communication infrastructure
• Vehicular sensors, camera, RWIS etc. information collecting

Mobile user interactions
• Processed traffic and road information for end users

Data infrastructure
• Collecting data
• Processing and aggregating data
• Application services

Transport infrastructure monitoring
• Real-time road traffic and condition monitoring

Vehicle on the move
• V2X communication
• In-vehicle processing
• Vehicular sensors

Road side units (V2I)

Satellite remote sensing and communication

Machine vision and vehicle data
• Real-time road traffic and condition monitoring

Rural

V2V / M2M communications

Road Weather Station

Communication infrastructure
• Vehicular sensors, camera, RWIS etc. information collecting
...when winter road maintenance is only a small piece in this puzzle
Why companies need to seek new business ecosystems?

- Servitization and customer centricity in value co-creation → “our customers are looking for someone to solve the problems, that are meaning-full for their customers”
- New partners (for creditability at market entry, access to resources and technologies) → “our customers perceive us as based on our current role and their experience”
- Traditional roles are disappearing → “our suppliers are our customers and vice versa”
- Enabling technologies and business models → “we need to break our current mind-set and way of thinking
- Own role is disappearing or new players entering to playground →” we can’t stay put, we need to look for new options”

Creating such value for end customers
- that you are not capable for doing alone
- your present networks are not the right ones
- you do not have access…
What are the companies’ challenges in ecosystem orchestration?

- Emerging new value opportunities requires destroying current values, understanding both dimensions
- Value is generated to actors at different times and in variant forms
- Relevant actors are new and their recognition and motivation
- Current business requires most of the time and resources
- New business model disrupts current business models, capabilities and networks (dependencies at ecosystems, competition with the current customer, internal organization and KPIs)
- Killing current business models requires courage
- Ecosystems cross the boundaries of traditional domains
Benefits of participating innovation ecosystems

- Creating market potential - building end-user relevant solutions
- Shared resources
- Learning from other companies
- Reducing the need to invest general internal competence or the latest “hype”
- Access to the latest scientific knowledge interpreted to applicable form
- Support for pilots and creating references & demonstrations
- Competence development
- Mobility
- Etc.
What should we (= companies) do?

- Understanding the logic of action of the whole ecosystem,
- Proactively aim to recognise the possibilities from emerging ecosystems
- Be open for different options and development paths, agile piloting
- Look for the core and differenting competences
- Focus on end customers (current as well as future) and the value ecosystems provides to them
- Agree on risk and revenue sharing within the ecosystem
- Be prepared to also the negative changes, parts of the current will destroy and changes of multiple actors are needed
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