Better winter road weather information saves money, time, lives and environment

ID: 0035

SIRWEC 2012
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Bio of Pekka

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Road Policy Engineer, R&D Manager Finnish Road Administration S-E district
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Adjunct professor, Technical University of Tampere, dept. of logistics and business information management, *transport and logistics*
VTT in brief

Customer sectors
- Biotechnology, pharmaceutical and food industries
- Electronics
- Energy
- ICT
- Real estate and construction
- Machines and vehicles
- Services and logistics
- Forest industry
- Process industry and environment

Focus areas of research
- Applied materials
- Bio- and chemical processes
- Energy
- Information and communication technologies
- Industrial systems management
- Microtechnologies and electronics
- Technology in the community
- Business research

VTT’s operations
Research and Development ■ Strategic Research ■ Business Solutions ■ Ventures ■ Expert Services ■ Corporate Services

Personnel 2700 ■ Turnover 245 M€
VTT on the map
Outline

- Background
- Method & goals
- The “market”
- The “goodness” measurement
- The research review map
- Observations & conclusions
Background

- Adverse winter weather conditions cause loss of life, well-being and material property
- Weather information services can mitigate these losses
  - Free publicly available forecasts and warnings
  - Tailored services
  - 24/7 road weather centres
  - Decision Support Systems (DSS)
    - Assist decision makers and maintenance operators
- Weather information services can improve efficiency
  - Optimising the use of materials (e.g. salt)
  - Better utilisation of personnel
  - More rapid response to changing conditions
Approach

- Benefits of winter road weather information in road transport
- Literature review of existing research results starting from the year 2000
- Segmentation of positive impacts by user groups and types of benefits
- Goals:
  - To identify what benefits have been studied the most and where more research might be needed
  - Where are the biggest benefits found?
- Result: a summary framework of identified benefits
The “market”

Extreme weather accident risk indicators for EU-27 road system
<table>
<thead>
<tr>
<th></th>
<th>Present costs due to extreme weather, including all phenomena (ca. 2010)</th>
<th></th>
<th></th>
<th></th>
<th></th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Accidents</td>
<td>Time costs</td>
<td>Physical infra</td>
<td>Maintenance</td>
<td>Freight &amp; logistics</td>
</tr>
<tr>
<td>Road</td>
<td>&gt;10 bill.</td>
<td>0.5-1.0 bill.</td>
<td>ca. 1 bill.</td>
<td>ca. 0.2 bill.</td>
<td>1 – 6 bill.</td>
</tr>
<tr>
<td>Rail</td>
<td>&gt;0.1 bill.</td>
<td>&gt;10 mill.</td>
<td></td>
<td>&gt;0.1 bill.</td>
<td>5 – 24 mill.</td>
</tr>
<tr>
<td>IWT</td>
<td>ca. 2 mill.</td>
<td>na</td>
<td>na</td>
<td>na</td>
<td>0.1 - 0.3 mill.</td>
</tr>
<tr>
<td>Short sea</td>
<td>&gt;10 mill.</td>
<td>na</td>
<td>na</td>
<td>na</td>
<td>0.2 - 1 mill.</td>
</tr>
<tr>
<td>Aviation</td>
<td>na</td>
<td>&gt;0.6 bill.</td>
<td>na</td>
<td>na</td>
<td>0.5 – 2.3 mill.</td>
</tr>
<tr>
<td>Light traffic</td>
<td>&gt;2 bill.</td>
<td>-</td>
<td>na</td>
<td>na</td>
<td>-</td>
</tr>
<tr>
<td>TOTAL</td>
<td>&gt;12 bill.</td>
<td>&gt;1 bill.</td>
<td>ca. 1 bill.</td>
<td>&gt;0.3 bill.</td>
<td>1-6 bill.</td>
</tr>
</tbody>
</table>

The EU-27 grand total more than 15 bill. € p.a.
Method to evaluate the "goodness" of the system

<table>
<thead>
<tr>
<th></th>
<th>Public good / socio-economic CBA</th>
<th>PPPs / CBA + CFA</th>
<th>Private good / CFA</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Future</strong></td>
<td></td>
<td></td>
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<tr>
<td><strong>Present</strong></td>
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<td></td>
<td></td>
</tr>
<tr>
<td><strong>Past</strong></td>
<td>Weather info-services for end-users</td>
<td>RWIS</td>
<td></td>
</tr>
<tr>
<td></td>
<td>RWIS</td>
<td>Weather info-services</td>
<td>In-Vehicle Applications</td>
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<tr>
<td></td>
<td>VMS</td>
<td>Technological change</td>
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<tr>
<td>User groups</td>
<td>Function</td>
<td>Societal benefits</td>
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<td>-----------------------------</td>
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<tr>
<td></td>
<td>Road use</td>
<td>Road maint.</td>
<td>Traffic mgmt.</td>
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<td>Road users</td>
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<tr>
<td>Private drivers &amp; travelers</td>
<td>5</td>
<td></td>
<td></td>
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<tr>
<td>Pedestrians &amp; bicyclists</td>
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<td></td>
<td></td>
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<tr>
<td>Professional drivers</td>
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<tr>
<td>Fleet managers</td>
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<tr>
<td>Passenger</td>
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<tr>
<td>Freight</td>
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<tr>
<td>Maintenance</td>
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<tr>
<td>Emergency services</td>
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<tr>
<td>Infrastructure service providers</td>
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<tr>
<td>Maintenance contractors</td>
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<td></td>
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<tr>
<td>Authorities</td>
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<td></td>
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<tr>
<td>Road authority</td>
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</tbody>
</table>
Observations

- The “market” is changing from socio-economics to business economics?
- There can be a shift from safety to reliability? From traffic to logistics?
- Some “holes” in the recent research coverage
Conclusions

- Summary framework on weather information impacts:
  - Safety impacts have been studied and identified extensively
  - Studies on benefits to fleet management and logistics are lacking
  - Studies on benefits to pedestrians and bicyclists are few
- Across the board, qualitative studies outnumber quantitative studies
VTT - 70 years of technology

Thank you!