Combined Transport in the Alpine region: reasons behind a difficult acceptance and possible solutions to overcome them

F. Cavallaro *1, G. Sommacal 1, S. Božičnik 2, M. Klemenčič 2,
1 Eurac Research, Italy; 2 University of Maribor, Slovenia

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Aydın büyüktaş bends brains with dizzyingly distorted views of American landscapes.

Source: www.designboom.com, 2019

OUTLINE

1. The Alpine Region: infrastructural supply, transport demand, negative effects
2. Main results of AlpInnoCT: measures
3. Main results of AlpInnoCT: technology
4. Conclusions
The Alps play an important role as crossroad for freight and passenger transport in Europe.

4 TEN-T corridors:
- Baltic-Adriatic corridor
- Mediterranean corridor
- Scandinavian-Mediterranean corridor
- Rhine-Alpine corridor

- 100 intermodal terminals and 16 main corridors in the Alps
TRANSLAPINE FREIGHT TRANSPORT - EVOLUTION OF OVERALL AND NATIONAL VOLUMES

Total Volume (IT-FR + IT-AT + IT-CH)

Year | Road | Rail - Conventional Transport | UCT | ACT
--- | --- | --- | --- | ---
2000 | 66% | 22% | 9% | 3%
2001 | 65% | 22% | 9% | 3%
2002 | 68% | 21% | 9% | 3%
2003 | 68% | 19% | 9% | 3%
2004 | 68% | 19% | 9% | 3%
2005 | 68% | 19% | 9% | 3%
2006 | 68% | 17% | 12% | 4%
2007 | 68% | 17% | 12% | 4%
2008 | 68% | 16% | 12% | 4%
2009 | 67% | 16% | 13% | 3%
2010 | 67% | 16% | 14% | 3%
2011 | 67% | 16% | 14% | 3%
2012 | 66% | 16% | 15% | 3%
2013 | 66% | 16% | 16% | 3%
2014 | 66% | 16% | 15% | 3%
2015 | 66% | 16% | 16% | 3%
2016 | 67% | 16% | 16% | 3%
2017 | 68% | 16% | 15% | 3%

Source: iMonitraf!, 2019
TRANSPORTED TONS: MODAL SPLIT BETWEEN IT-CH, IT-AT AND IT-FR

Absolute Values/Modal split: 2017

**IT-CH:** \( \approx 39,000 \) kt; **IT-AT:** \( > 157,000 \) kt; **IT-FR:** \( \approx 44,000 \) kt

**IT-CH:** 70% by train and 30% by road

**IT-AT:** 30% by train and 70% by road

**IT-FR:** 8% by train and 92% by road
The Alps are a sensitive ecosystem, which has to be protected from the negative environmental and societal effects. Transport externalities include local and global air pollution, noise pollution, accidents, fragmentation of landscapes, congestion, water and soil pollution and urban effects. At the EU level, these costs count for about 4% of GDP. More than 90% of such costs are caused by road transport. They are identified but not internalized, except in Switzerland (partially).
The Alpine Region: infrastructural supply, transport demand, negative effects

Main results of AlpInnoCT: measures

Main results of AlpInnoCT: technology

Conclusions
What are the possible solutions that foster sustainable freight transport?

The development of tools that encourage the modal shift towards rail


Improvement of CT in the Alps

AlpInnoCT Project

Main aim: to make alpine CT more competitive
AlpInnoCT PROJECT – MAIN OUTPUTS

> critical analysis of the main policies, measures and technologies to a broader diffusion of CT in the Alps

**CT POLICIES**
(different levels)

- important support for the implementation of CT services

**PUSH MEASURES:** discourage road freight transport
(e.g. financial instruments or technical and regulatory constraints)

**PULL MEASURES:** support CT operations
(e.g. infrastructural development or financial support, …)

**CT PROJECTS**
(e.g. renewal of existing lines and terminals/construction of new ones/development of services that support the CT process)

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**Mont Blanc Tunnel:** Light Vehicle ETC
Source: [www.atmb.com](http://www.atmb.com), 2019

**Brenner Base Tunnel**
Source: [www.bbt-se.com](http://www.bbt-se.com), 2019
The Alpine Region: infrastructural supply, transport demand, negative effects

Main results of AlpInnoCT: measures

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Conclusions
TRANSHIPMENT TECHNOLOGIES

HORIZONTAL LOADING

- Rotational wagon
- Parallel Loading and unloading
- Loading from the ramp at train end
- Special semitrailer and bogie

VERTICAL LOADING

- Piggyback systems, reachstackers, forklifts

- Development on certain domestic or cross-border relations or on individual terminals.
- Different requirements for infrastructure, operation, transshipment and rolling stock
- Opportunities as well as disadvantages in terms of flexibility, handling time, costs and investment
OPERATIONAL REQUIREMENTS

ROLLA – ROLLING MOTORWAY

- Individual loading and unloading is time and cost consuming (e.g. RoLa, railrunner)

FLEXIWAGON

- Resting time of the driver on the train

RAILRUNNER

- Appropriate for smaller terminal
- On bigger terminals two or more technologies may co-exist

MOBILER/CONTEINERMOVER/SIDELIFTER
TRANSHIPMENT REQUIREMENTS

**ISU**
- Bigger terminals with cranes and reach stackers enable vertical transshipment of containers, swap bodies and cranable semitrailers.

**NIKRASA**
- Additional equipment is needed for transshipment of non-cranable semitrailers.
- Longer handling time (120 minutes for a train).

**MODALOHR**
- Requirements for heavily modified terminals and special wagons is needed.
- Technologies are more flexible and transhipment is faster.

**CARGOBEAMER**
- Parallel loadings/unloadings enable faster train headway (60 minutes to set up a train).
ROLLING STOCK REQUIREMENTS

MEGASWING

- Loading made by the **truck driver**
- Fast and simple transshipment
- Flexible

CARGOSPEED

- **Easy handling** of non-craneable trailers
- Cost saving due to horizontal loading, **no craning needed**, but investment in underground lift needed
TOWARDS AUTOMATISATION

NETHS

• Minimizing or even **eliminating shunting** (for swapbodies and containers)

METROCARGO

• Simultaneous **transshipment, sorting and storage**
• **Less space required** (30m long, comprises two levels and can handle any standard container)

IUT
## Train Capacity According to the Length and Weight

<table>
<thead>
<tr>
<th>Technology</th>
<th>Loading unit (LU) - t</th>
<th>Wagon tare t</th>
<th>Total* t</th>
<th>Max weight t</th>
<th>Max LU per train n</th>
<th>Length of wagon** m</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Payload</td>
<td>Tare</td>
<td>Total</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Modalohr</td>
<td>20</td>
<td>7.2</td>
<td>27.2</td>
<td>40.7</td>
<td>95.1</td>
<td>1,800</td>
</tr>
<tr>
<td>CargoBeamer</td>
<td>20</td>
<td>7.2</td>
<td>27.2</td>
<td>31.0</td>
<td>58.2</td>
<td>1,800</td>
</tr>
<tr>
<td>ISU</td>
<td>20</td>
<td>7.2</td>
<td>27.2</td>
<td>34.3</td>
<td>88.7</td>
<td>1,800</td>
</tr>
<tr>
<td>Megaswing</td>
<td>20</td>
<td>7.2</td>
<td>27.2</td>
<td>43</td>
<td>97.4</td>
<td>1,800</td>
</tr>
<tr>
<td>NiKRASA</td>
<td>20</td>
<td>7.8</td>
<td>27.8</td>
<td>34.3</td>
<td>89.9</td>
<td>1,800</td>
</tr>
<tr>
<td>Cargospeed</td>
<td>20</td>
<td>7.2</td>
<td>27.2</td>
<td>24</td>
<td>51.2</td>
<td>1,800</td>
</tr>
</tbody>
</table>

* Double pocket wagon (2 LUs + wagon) for Modalohr, ISU, Megaswing, Nikrasa; Single pocket wagon (1 LU + wagon) for CargoBeamer and Cargospeed

** Adopting a double pocket wagons T3000e for ISU, 6 axled Sgns for Megaswing, T3000 for Nikrasa.

Source: Mertel et al., 2012 (modified).
# HANDLING, INVESTMENT AND INFRASTRUCTURAL COSTS FOR DIFFERENT TYPES OF UCT

<table>
<thead>
<tr>
<th>Technology</th>
<th>handling (€/LU)</th>
<th>costs per LU (€)</th>
<th>Cost of wagon and additional equipment (€)</th>
<th>Transhipment infrastructure and equipment (€)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Modalohr</td>
<td>80</td>
<td>74,000</td>
<td>385,000 (Wagon for 2 parking spaces)</td>
<td>7,700,000 (per site)</td>
</tr>
<tr>
<td>CargoBeamer</td>
<td>75</td>
<td>67,000</td>
<td>400,000 (Wagon+2 pallets)</td>
<td>10,000,000 – 20,000,000 (per site)</td>
</tr>
<tr>
<td>ISU</td>
<td>unknown</td>
<td>60,000</td>
<td>180,000 (Double pocket for 2 parking spaces)</td>
<td>60,000 (for the intermediate frame with lifting straps and two loading ramps)</td>
</tr>
<tr>
<td>Megaswing</td>
<td>unknown</td>
<td>30,000</td>
<td>unknown</td>
<td>30,000</td>
</tr>
<tr>
<td>NiKRASA</td>
<td>50</td>
<td>unknown</td>
<td>215,000 (Double pocket for 2 parking spaces including transhipment adapter)</td>
<td>Minimum 60,000 (2 Terminal platform facilities – Origin and destination terminal – due to performance transhipment of block trains requires additional platform)</td>
</tr>
<tr>
<td>Cargospeed</td>
<td>unknown</td>
<td>unknown</td>
<td>180,000 (Double pocket for 2 parking spaces)</td>
<td>Unknown</td>
</tr>
<tr>
<td>Reachstackers</td>
<td>50</td>
<td>unknown</td>
<td>180,000 (Double pocket for 2 parking spaces)</td>
<td>Max 500,000</td>
</tr>
</tbody>
</table>

Source: Alpine Convention, 2016; Mertel et al., 2012.
OUTLINE

- The Alpine Region: infrastructural supply, transport demand, negative effects
- Sustainable freight transport
- Main results of AlpInnoCT project
- Conclusions

Source: www.designboom.com, 2019
CONCLUSION #1

NEED TO DEVELOP:

➢ COMMON POLICIES AT DIFFERENT LEVELS TO SUPPORT THE IMPLEMENTATION OF CT SERVICES
➢ A STRONGER CONNECTION BETWEEN LOGISTIC ASPECTS AND SPATIAL PLANNING (mountain areas)
➢ INTEGRATED (AND BALANCED) ADOPTION OF PUSH AND PULL MEASURES
➢ AN IMPROVEMENT OF THE SUPPLY CHAIN MODEL AS COMMON BASIS OF UNDERSTANDING AND DECISION-MAKING
➢ TARGETED INVESTMENTS
➢ THE INTRODUCTION OF NEW TECHNOLOGIES (digitalisation, automatization) AND PROCESSES CAN INCREASE THE COMPETITIVENESS OF CT
➢ THE REDESIGN OF FUNDING GUIDELINES IN A MORE STRUCTURED WAY AND THE IMPLEMENTATION OF TASK-ORIENTED SUBSIDIES FOR CT
CONCLUSION #2

➢ DIFFICULT ACCEPTANCE OF PUSH MEASURES BY STAKEHOLDERS

➢ PULL MEASURES ALONE CAN BE DETRIMENTAL IN TERMS OF EMISSIONS (DUE TO THE INCREASE OF TRAVEL DEMAND)

➢ DEFICIENCY IN FUNDING RELATED TO CT

➢ AMBITIOUS GOALS AT THE POLITICAL LEVEL (compared to real numbers)
CONCLUSION #3

THE INCREASE OF CT VOLUMES IN THE ALPINE REGION TOWARDS RAIL MAY BE ACHIEVED ONLY BY THE COMBINATION OF THE TECHNICAL AND POLITICAL MEASURES

Technical solutions - HUPAC Group
Source: http://www.hupac.ch/, 2018

Political issues
Source: https://economia.tesionline.it, 2019

Brenner Corridor
Source: www.ilsole24ore.com, 2019
Thank you for your attention!

Eurac Research, Institute for Regional Development
Federico Cavallaro, Giulia Sommacal
Drususallee/Viale Druso 1
39100 Bozen/Bolzano ITALIA
T +39 0471 055 355
federico.cavallaro@eurac.edu
giulia.sommacal@eurac.edu
www.eurac.edu

University of Maribor-Faculty of Civil Engineering, Transportation Engineering and Architecture
Stane Božičnik, Mitja Klemenčič
Smetanova ulica 17
2000 Maribor - Slovenia
T +386 (2) 22 94 311
stane.bozicnik@um.si
mitja.klemencic@um.si
http://www.fgpa.um.si

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