Education - knowledge - innovations. Challenges and solutions for the transport industry (ALLIANCE EU Project)

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This project has received funding from the European Union’s Horizon 2020 research and innovation programme under grant agreement No 692426

TransBaltica 2017, 25-26 May
OUTLINE

- Motivation
- Transformational Technologies in Transportation (4+3)
- ALLIANCE Project Short Description
- First Phase of the ALLIANCE Project
- Knowledge Sharing Strategy of the ALLIANCE Project
- 1st Summer school "Sustainable Transport Interchanges. Freight transportation"
Motivation

- One of the strategic objectives of Latvian National Development Plan 2020 (Latvijas Nacionālais attīstības plāns, 2015) is to have **advanced research and innovation and higher education**

- The most progressive of world universities aspires to be '*third generation' (3GU)*, but it requires a new approach to strategy program development
Objectives of high education establishment (HEE) in the 3GU era are in contributing high quality teaching and research to the higher education system of the world, and in exploitation of know-how (Wissema, J. (2009). Towards the third generation university. Cheltenham, UK)
3rd Generation Universities

1. Exploitation of knowledge is the core business and becomes the third objective
2. Operate on an international, competitive market
3. Open universities, collaborating with many partners and institutions at various levels
4. Trans-disciplinary research and rise of University
5. Multicultural organizations; mass and elite education
6. Cosmopolitan University
7. No direct state financing. No state interference
8. Applied research from industrial and state grants

@Wissema, J. (2009). Towards the third generation university. Cheltenham, UK
World Economic Forum (2015)...

“65% of the future labor force will work in completely new job types that don’t yet exist”
Future Work Skills 2020

While all six drivers are important in shaping the landscape in which each skill emerges, the color-coding and placement here indicate which drivers have particular relevance to the development of each of the skills.

KEY

Drivers—disruptive shifts that will reshape the workforce landscape

Key skill needed in the future workforce

extreme longevity
Increasing global lifespans change the nature of careers and learning

computational world
Massive increase in sensors and processing power make the world a programmable system

superstructured organizations
Social technologies drive new forms of production and value creation

rise of smart machines and systems
Workplace robotics nudge human workers out of rote, repetitive tasks

new media ecology
New communication tools require new media literacies beyond text

globally-connected world
Increased global interconnectivity puts diversity and adaptability at the center of organizational operations

http://www.iftf.org/futureworkskills
The transformational technologies and that have potential to be transformational ones

- connected and automated vehicles, including shared use services
- unmanned aerial systems (drones)
- Internet of Things (including smart cities)
- cybersecurity
- NextGen
- 3-D printing
- and Big Data.

TRB's Transportation Research E-Circular 208: Transformational Technologies in Transportation: State of the Activities
This technical memorandum provides the review and findings of state of the activities conducted by CAVita relative to the transformational technologies identified by TRB.
# Impacts of Big Data on PT

## Planning Phase. Demand Modelling.

Authorities can
- generate more precise understanding of the customer demand on different routes
- map customer journeys across multiple modes of transportation – trains, buses, private modes of transportation etc
- use all this data to improve planning on the future public transport routes, frequency on existing routes and size of vehicles
- also optimally plan for additional services such as stores on the routes through better understanding of customer journey maps

## Operation phase

<table>
<thead>
<tr>
<th>Operation phase</th>
<th>Can improve forecasting and help to nudge behavior in ways that improve the reliability of transport infrastructure and increase its efficiency and utilization. In fact, some of this is already happening.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Optimization of transport infrastructure utilization</td>
<td>Can have an intimate understanding of customer journeys – start and end points involving different modes of public transport and even private modes of transportation. One of the most useful data source – social networks. It is very important to have fast and optimal response especially during unplanned events.</td>
</tr>
<tr>
<td>Event Response</td>
<td>Can predict: optimal maintenance requirements of the equipment (buses, trains etc.) at much faster rate upcoming faults at the individual component levels and to schedule maintenance of the equipment precisely at the right time</td>
</tr>
<tr>
<td>Predictive Maintenance</td>
<td>Can tailor communication to each rider via preferred communication channel</td>
</tr>
<tr>
<td>Personalized Services</td>
<td></td>
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</tbody>
</table>
Big Data in Logistics
The Data-driven Logistics Provider

Existing Customer Base

Customer Loyalty Management
Public customer information is needed against customer parameters in order to predict churn and retain customers.

High-tech / Pharma

Manufacturing / FMCG

Commerce Sector

Homes / SME

Service Improvement and Product Innovation
A comprehensive view on customer requirements and service quality is used to enhance the product portfolio.

Strategic Network Planning
Long-term demand forecasts for transport capacity are generated in order to support strategic investments into the network.

Operational Capacity Planning
Short- and mid-term capacity planning allows optimal utilisation and scaling of manpower and resources.

Financial Demand and Supply Chain Analytics
A mathematically based model on the supply chain data to determine their capability and investment decisions.

Crowd-based Pickup and Delivery
A large model of occasionally available common part or order online improvements using routes they would take anyway.

Risk Evaluation and Resilience Planning
By detecting and predicting events that are likely to affect operations, the resilience of transport services is ensured.

Market Intelligence for SME
Supply chain monitoring data is used to notice market intelligence reports for small and medium-sized companies.

Environmental Intelligence
Sensors attached to delivery vehicles provide real-time data on pollution, traffic density, noise, parking spot utilisation, etc.

1. Real-time Route Optimization
Delivery routes are dynamically calculated based on delivery sequences, traffic conditions, and truck status.

11. Address Verification
Fast personal verification of customer addresses which are transferred to a central address verification server provided to retailers and logistics agencies.

10. Flow of data
Flow of physical goods

© 2013 Deisenroth International

@Big Data in Logistics. DHL perspectives on how to move beyond the hype, December 2013
Challenges

- The relationship between the higher education and industry/business will deepen

- Industry/business plays multiple roles as
  - customer
  - key partner of higher education institutions
  - increasingly, as a competitor in specialist professional programs

- Research higher degree programs and applied research will increasingly be run in partnership with industry

- Research commercialisation will go from being a fringe activity to being a core source of funding for many universities’ research programs.
The more you share, the more you have.
HOW?

Significant role of technology providers, financiers, and a range of industry groups to create value providing services within the higher education value chain, such as

- content distribution
- commercialisation
- industry placements
- etc.

might be provided on a stand-alone basis

more likely are partnerships with institutions that bring market credibility and academic capability.
**Enhancing excellence and innovation capacity in sustainable transport interchanges**

**Scope**
- Link Transport and Telecommunication Institute (TTI) with University of Thessaly (UTH) and Fraunhofer Institute for Factory Operation and Automation (Fraunhofer)
- Provide knowledge to TTI research staff in the field of smart interconnecting sustainable transport networks
- Facilitate stakeholder collaboration and develop strong linkage among education, research and industry
- Create a doctoral programme in Transport Economics and Management at TTI

**Concept**
- Needs’ analysis of Latvia and the surrounding region of the Baltic sea (Lithuania, Estonia, Poland) on intermodal transportation terminals
- Consideration of the relations among policy makers, industry and education/research
- Development of a coherent educational/training program, structured around 3 pillars:
  - Organizational/governance
  - Operational/services
  - Service quality/customer satisfaction

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### Program’s thematic areas

<table>
<thead>
<tr>
<th>Governance and policy development</th>
</tr>
</thead>
<tbody>
<tr>
<td>Smart solutions</td>
</tr>
<tr>
<td>Decision-making</td>
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</tbody>
</table>

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**Partners**

This project has received funding from the European Union’s Horizon 2020 research and innovation programme under grant agreement No 692426

**www.alliance-project.eu**
Scope of ALLIANCE

- is the enabling of stimulating and strengthening the scientific and technological capacity of Latvia and the raising of the profile of the research staff and their institution, by providing knowledge in the field of smart interconnecting sustainable transport networks.

- This knowledge transfer will build the grounds for a common understanding of the main components affecting sustainable intermodality and support the selection and management of the most optimal and applicable solutions for transport interchanges. It will also facilitate stakeholder collaboration and the development of strong linkage among education, research and industry.

- Future research activities (out of project scope) related to multimodal transport networks will be enhanced in TTI, which will also push forward the institute’s scientific visibility and enlarge the region’s researchers’ and professionals’ horizons towards intermodality.
ALLIANCE Core Objective

- The knowledge transfer from two partners of international recognition, one as an innovation leader (Fraunhofer, Germany) and another as moderate innovator (UTH, Greece), who have expertise in smart solutions for sustainable intermodal transportation networks, and transport interchanges.

- Close collaboration of TTI with UTH and Fraunhofer will help to achieve the goals through the following activities:
  - Organization of young researchers’ seminars and workshops
  - Organization of summer schools for trainers and young researchers
  - Development of educational programme for graduate and post-graduate students
  - Development of training programme for trainers and practitioners
  - Provision of grants for participation as authors in peer reviewed conferences
  - Facilitation of Short-Term Staff Exchanges (STSEs) with the aim of international collaboration, mainly publications
  - Establishment of a guidance strategy for preparing scientific publications
  - Creation of an educational forum as on-line tool for distance learning and knowledge sharing.
ALLIANCE Specific Objectives

- Analysis networking gaps and differences between the research institutions of low performing Member States and regions and internationally-leading counterparts at EU level.

- This will set the scene for building the strategy (in WP2 and WP3) for formulating special curricula to be offered
  - as summer schools
  - life-long education
  - establishing a framework for knowledge sharing and scientific excellence
  - generating new innovative ideas for future research work through the project’s activities
  - through preparation of mutual research to be published in peer-reviewed journals and conferences with peer-reviewed publications.
First Phase of the Project

Step 1: Identify current state for Latvia and region

- Interconnecting transportation networks – Latvia & region
- Research, educational and training programs – Latvia & region

Step 2: Identify EU current state

- Interconnecting transportation networks – EU
- Research, educational and training programs – EU

Step 3: GAP analysis I

Step 4: GAP analysis II

Step 5: Planned development of Latvian transportation networks interconnections

Step 6: Knowledge and skills requirements for intermodal terminal development

Step 7: Validation of educational and training requirements for Latvian Institutions

Step 8: Research education and training program
ALLIANCE gap analysis

The gap analysis in this study is implemented in two levels to determine the gaps that might exist between:

1. The interconnecting networks in EU and the Latvia and the region, and
2. The interconnecting networks in EU and the Latvia and the region (i.e., Gap analysis I) and the existing research, educational and training programs in Latvia and the region.

The gap analysis for both the current interconnecting networks and the research, educational and training programs is performed with respect to three thematic areas:

   1) Governance and policy
   2) Smart solutions
   3) Decision-making

Each thematic area is divided in topics that are used to organize the collected information on transportation interchanges and facilitate the analysis by providing specific requirements per topic and thematic area.
Program’s thematic areas

<table>
<thead>
<tr>
<th>Governance and policy development</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transportation Planning</td>
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<tr>
<td>Traffic Simulation</td>
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<tr>
<td>Impact Assessment</td>
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<tr>
<td>Risk Estimation</td>
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<tr>
<td>Economic Analysis</td>
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<tr>
<td>LCSA</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Smart solutions</th>
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<tbody>
<tr>
<td>MSMC-DM</td>
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<tr>
<td>Business Model</td>
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<table>
<thead>
<tr>
<th>Decision-making</th>
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</thead>
<tbody>
<tr>
<td></td>
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<tr>
<td>Thematic area</td>
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<tr>
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<tr>
<td>Governance</td>
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<tr>
<td>Smart solutions</td>
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<td></td>
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<tr>
<td>Decision-making</td>
</tr>
<tr>
<td>Thematic Area</td>
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<tr>
<td>Stakeholders</td>
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<td>Policy</td>
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<td>Ownership</td>
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<tr>
<td>Management</td>
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<tr>
<td></td>
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<tr>
<td>Operation</td>
</tr>
</tbody>
</table>
|              | -                                                                      | Development of education material on integrated coordination and operation of mega infrastructure facilities with special reference to interchanges and the utilization of technological advances.

Yellow shaded cells refer to freight transport.
<table>
<thead>
<tr>
<th>Thematic Area</th>
<th>Topic</th>
<th>Gap I</th>
<th>Educational requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Information</strong></td>
<td>Limited multimodal information.</td>
<td>Exploration and utilization of technologies to respond to transport information based needs.</td>
<td></td>
</tr>
<tr>
<td><strong>Services</strong></td>
<td>Limited integrating ticketing.</td>
<td>Development of course that integrates public transport with smart solutions (technology and policy oriented) and potential sustainability impacts. Incorporation in the program topics with interchange and terminal design and planning with reference to their special characteristics and safety issues.</td>
<td></td>
</tr>
<tr>
<td><strong>Physical properties</strong></td>
<td>Limited access for all.</td>
<td>Development of education materials on transport planning and design of intermodal terminals for all users to satisfy user needs and fulfill sustainability principles.</td>
<td></td>
</tr>
<tr>
<td><strong>New consolidation/distribution and logistics cooperative concepts</strong></td>
<td>Individually planned urban consolidation centers. Limited business and transport operational planning.</td>
<td>Development training materials for case studies of planning urban consolidation centers.</td>
<td></td>
</tr>
<tr>
<td><strong>Information technologies</strong></td>
<td>Limited cooperation between publicly owned and operated Intelligent Transport Systems and enterprise-level software for supply-chain management, trip planning and fleet management.</td>
<td>Study of ITS characteristics and utilization in case studies for the effective supply chain management and trip planning.</td>
<td></td>
</tr>
<tr>
<td><strong>Smart transshipment</strong></td>
<td>Limited use of alternative, friendly to environment and energy technologies.</td>
<td>Review of policies related to alternative fuels and propulsion technologies, and estimation of environmental impacts for intermodal terminals.</td>
<td></td>
</tr>
</tbody>
</table>
### GAP Analysis II

<table>
<thead>
<tr>
<th>Thematic Area</th>
<th>Topic</th>
<th>Gap I</th>
<th>Educational requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Decision-making</td>
<td>Interchange status assessment and users’ feedback</td>
<td>Not obligatory. Insufficient information for decision-making: only few surveys, data not reliable; no network assessment at the strategic level, etc. Limited data sharing.</td>
<td>Development of integrated course material that will focus on assessment practices with focus on interchanges and life cycle impacts (society, environment and economy) by including users’ satisfaction.</td>
</tr>
<tr>
<td>Decision-support methods</td>
<td>Limited sharing of data.</td>
<td>Incorporation of novel data collection methods and exploitation of big data opportunities in decision-making and analytics of freight transport.</td>
<td></td>
</tr>
</tbody>
</table>

Grey shaded cells refer to freight transport

http://alliance-project.eu/
Transport Courses

Following the gap analysis II, the requirements per thematic area are linked with educational areas and transportation courses:

- **Identification of educational areas**: 20 educational areas were created for passenger and freight transportation interchanges given the existing research, educational and training programs offered at research and educational institutes at EU level.

- **Conversion to courses**. The 20 educational areas are combined based on their content (where applicable) to shape 12 courses for passenger and freight transportation interchanges.

- These 12 courses are used for training and education in Latvia

http://alliance-project.eu/deliverables/
<table>
<thead>
<tr>
<th>Thematic Area</th>
<th>Topic</th>
<th>Gap I</th>
<th>Educational requirement</th>
<th>Educational areas</th>
</tr>
</thead>
<tbody>
<tr>
<td>Governance</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stakeholders</td>
<td>-</td>
<td>Incorporation of organizational and business models in course material.</td>
<td>1. Building business models for passenger transport interchanges</td>
<td></td>
</tr>
<tr>
<td>Policy</td>
<td>Legal framework does not focus on interchanges.</td>
<td>Improvement of course content on transport legal frameworks with reference to EU and partial coverage of interchanges and environmental legislation. Special attention on interchanges and environmental legislation in the courses oriented on EU transport policy issues.</td>
<td>2. Development and implementation of sustainability and transport policies in the EU region</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Not harmonized policy for interchanges.</td>
<td>Improvement of course content on transport legal frameworks with reference to EU, freight transport and environmental legislation</td>
<td>3. Development and implementation of freight transport policies in the EU region</td>
<td></td>
</tr>
<tr>
<td>Ownership</td>
<td>Limited involvement of several authorities.</td>
<td>Incorporation of courses oriented on public private partnerships (PPP) models and mega infrastructure financing schemes in educational and training the program.</td>
<td>4. Public Private Partnerships in transport: Theory and schemes</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Limited business models development.</td>
<td>Incorporation of innovative business models in course material.</td>
<td>5. Building business models for freight transport interchanges</td>
<td></td>
</tr>
<tr>
<td>Sustainable development</td>
<td>Limited incorporation of interchanges in regional and national development plans.</td>
<td>Incorporation in the program of topics with integrated development plans with reference to sustainable development and the environment.</td>
<td>6. Sustainable passenger transportation planning</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Limited incorporation of interchanges in regional and national development plans.</td>
<td>Incorporation in the program topics with integrated development plans with reference to sustainable development and the environment.</td>
<td>7. Sustainable freight transportation planning</td>
<td></td>
</tr>
<tr>
<td>Management</td>
<td>Interchange Management Plan not including all aspects of interchange functionalities and interests.</td>
<td>Development of material on integrated coordination and operation of mega infrastructure facilities with special reference to interchanges and the utilization of technological advances.</td>
<td>8. Operation and management of urban public transport systems</td>
<td></td>
</tr>
<tr>
<td></td>
<td>-</td>
<td>Incorporation of innovative business and management models in course material.</td>
<td>9. Operation and management of urban freight transport systems</td>
<td></td>
</tr>
<tr>
<td>Operation</td>
<td>Limited coordination among modes and operators.</td>
<td>Incorporation of transport operations education and training materials that will focus on multimodal systems.</td>
<td>10. Multimodal transport optimization for passenger transport</td>
<td></td>
</tr>
<tr>
<td></td>
<td>-</td>
<td>Development of education material on integrated coordination and operation of mega infrastructure facilities with special reference to interchanges and the utilization of technological advances.</td>
<td>11. Multimodal transport optimization for freight transport</td>
<td></td>
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</tbody>
</table>

Grey shaded cells refer to freight transport.
<table>
<thead>
<tr>
<th>Thematic Area</th>
<th>Topic</th>
<th>Gap I</th>
<th>Educational requirement</th>
<th>Educational areas</th>
</tr>
</thead>
<tbody>
<tr>
<td>Smart solutions</td>
<td>Information</td>
<td>Limited multimodal information.</td>
<td>Exploration and utilization of technologies to respond to transport information based needs.</td>
<td>12. Information systems for passenger intermodal terminals</td>
</tr>
<tr>
<td></td>
<td>Services</td>
<td>Limited integrating ticketing. Existing services do not offer travelers real-time information across all stages of a multimodal trip Possible conflicts between vehicles and pedestrians. Not sufficient security level.</td>
<td>Development of course that integrates public transport with smart solutions (technology and policy oriented) and potential sustainability impacts. Incorporation in the program topics with interchange and terminal design and planning with reference to their special characteristics and safety issues.</td>
<td>13. Integrated ticketing and time table coordination 14. Design and safety principles of transport terminal infrastructure</td>
</tr>
<tr>
<td></td>
<td>Physical properties</td>
<td>Limited access for all. Insufficient cycling and walking facilities. Environmental concerns vary depending on facilities’ age.</td>
<td>Development of education materials on transport planning and design of intermodal terminals for all users to satisfy user needs and fulfill sustainability principles.</td>
<td>15. Passenger terminal design</td>
</tr>
<tr>
<td></td>
<td>New consolidation/distribution and logistics cooperative concepts</td>
<td>Individually planned urban consolidation centers. Limited business and transport operational planning.</td>
<td>Development training materials for case studies of planning urban consolidation centers.</td>
<td>16. Urban freight terminals design</td>
</tr>
<tr>
<td></td>
<td>Information technologies</td>
<td>Limited cooperation between publicly owned and operated Intelligent Transport Systems and enterprise-level software for supply-chain management, trip planning and fleet management.</td>
<td>Study of ITS characteristics and utilization in case studies for the effective supply chain management and trip planning.</td>
<td>17. Information technologies for intermodal freight transport</td>
</tr>
<tr>
<td></td>
<td>Smart transshipment</td>
<td>Limited use of alternative, friendly to environment and energy technologies.</td>
<td>Review of policies related to alternative fuels and propulsion technologies, and estimation of environmental impacts for intermodal terminals.</td>
<td>18. Smart transshipment and alternative transport fuels</td>
</tr>
</tbody>
</table>
### Sustainable Transport Interchange Program - STIP

<table>
<thead>
<tr>
<th>Code</th>
<th>Course</th>
<th>Code</th>
<th>Course</th>
</tr>
</thead>
<tbody>
<tr>
<td>C0</td>
<td>Research methodology and teamwork setup</td>
<td>C7</td>
<td>Information systems for intermodal freight transportation</td>
</tr>
<tr>
<td>C1</td>
<td>The European policy on intermodal transportation</td>
<td>C8</td>
<td>Design of passenger transport interchanges</td>
</tr>
<tr>
<td>C2</td>
<td>Building business models for intermodal transport interchanges</td>
<td>C9</td>
<td>Design of freight transport interchanges</td>
</tr>
<tr>
<td>C3</td>
<td>Sustainable development and transportation planning</td>
<td>C10</td>
<td>Smart technologies for efficient logistics</td>
</tr>
<tr>
<td>C4</td>
<td>Operation and management of intermodal transport systems</td>
<td>C11</td>
<td>Decision making methodologies</td>
</tr>
<tr>
<td>C5</td>
<td>Optimization of intermodal transport systems</td>
<td>C12a</td>
<td>Data collection methods: Surveys</td>
</tr>
<tr>
<td>C6</td>
<td>Intelligent services for passenger transportation</td>
<td>C12b</td>
<td>Data collection methods: Historical and observed data</td>
</tr>
</tbody>
</table>
Key points of Knowledge Sharing Strategy

✓ Knowledge sharing is the process of exchanging knowledge (skills, experience, and understanding) among different target groups.

✓ The purpose of the ALLIANCE Knowledge Sharing Strategy is the clear definition of the activities, beneficiaries, and tools which will be implemented in order to support effective knowledge sharing and transfer the practices.

✓ To Define

✓ ALLIANCE project knowledge sharing beneficiaries
✓ Tools of knowledge sharing and matrix of coverage
✓ Framework for knowledge sharing evaluation and impact assessment

## Knowledge sharing target groups: External

<table>
<thead>
<tr>
<th>Target groups</th>
<th>Potential interests</th>
</tr>
</thead>
<tbody>
<tr>
<td>Local and regional authorities</td>
<td>In adopting coherent decision-making frameworks based on international good practice experience</td>
</tr>
<tr>
<td>Transport and terminal operators</td>
<td>In adopting innovative approaches for the design of interchange terminals, using ICT tools, developing strategies for the integration of land use planning, and applying flexible management and business models</td>
</tr>
<tr>
<td>Transport policy makers and influencers</td>
<td>In guidelines for the provision of information to travellers and professional drivers, development of innovative approaches for the design of efficient interchanges and their implementation framework, integration of a coherent framework regarding all involved stakeholders</td>
</tr>
<tr>
<td>SMEs, business and industry</td>
<td>In the establishment of successful business models</td>
</tr>
<tr>
<td>General public/demand side users</td>
<td>In the development of advantageous transportation in terms of accessibility, timing, safety and security, cost, comfort etc.</td>
</tr>
</tbody>
</table>
## Knowledge sharing target groups: Internal

<table>
<thead>
<tr>
<th>Target groups</th>
<th>Potential interests</th>
<th>Expected benefits and impacts</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Academic staff</strong></td>
<td>Knowledge necessary to raise the quality of teaching of PhD and master students in predefined research area</td>
<td>Prepared set of studying courses and knowledge, which could be supported by qualified academic staff.</td>
</tr>
<tr>
<td><strong>Research staff</strong></td>
<td>Innovative research topics, common publications, new areas of collaboration, new projects</td>
<td>Raise a number of scientific publication, new projects areas, new consulting services for the local and regional authorities, private companies etc.</td>
</tr>
<tr>
<td><strong>PhD, master students</strong></td>
<td>New knowledge regarding interchange terminals, new master and PhD research topics, double supervising of PhD and master thesis</td>
<td>Qualified young academic and research staff in topic of interchanges terminals with different aspects.</td>
</tr>
<tr>
<td>Knowledge sharing tools</td>
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<td>----------------------------------------------------------------------------------------</td>
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<tr>
<td><strong>Education /Training programs</strong></td>
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</tr>
<tr>
<td>The main output of ALLIANCE. The obtained education and training programme will be based on the knowledge from UTH and Fraunhofer, which cover the gap of the currently existing study and training programmes in TTI, Latvia; the surrounding BSR</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Summer schools</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Provides intensive learning in project partner promises with involving the experts in the preselected areas from all three ALLIANCE partners</td>
<td></td>
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</tr>
<tr>
<td><strong>Short-Term Staff Exchanges</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The STSEs aim - international collaboration in preparing exploitation of background research, publications, PhD, master thesis supervising, additional study</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>e-resources (website, e-platform)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>New knowledge regarding interchange terminals, new master and PhD research topics, double supervising of PhD and master thesis. Additionally, the knowledge about writing highly cited research articles, publication ethics etc. will be provided</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Collaborative research activities</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>In order to make knowledge sharing more intensive and reach scientific excellence for TTI, it is necessary to implement direct activities, which involve the following: collaborative publication in scientific journals with high impact factor participation in international conferences double supervising for PhD and Ms students special issue of T&amp;T Journal with best research results from common teams special session in the frame of International Conferences</td>
<td></td>
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</tr>
</tbody>
</table>
**Knowledge Sharing Tools**
- e-resources
- Summer schools
- Short-Term Staff Exchanges
- Educational/Training programs
- Collaborative research activities

---

**ALLIANCE project impact**

- Increase of papers indexed in Scopus, Web of science by 50%
- Increase of number of jointed papers written by the international team of researchers at least twice
- Increase of number of joint publications written in cooperation with Latvian business entities at least twice
- Increase of the number of PhD students who have worked in TTI till 2020 by 50%
- Increase of the research work for industry by 20%
  - TTI journal development
    - Increase H-index to 8
    - Change the quality of the journal in following categories: Computer Science - from Q4 to Q3; Engineering - from Q3 to Q2
    - Increase SJR by 15%
    - Increase indicator cites per document by 15%
    - Increase indicator “international Collaboration” by 20%

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**TTI Strategy and Research programme for 2016-2020 impact**

<table>
<thead>
<tr>
<th>[172] Private sector investment in research and development in 2020 reaches at least 48% of the total investment in research and development (private sector investment in research and development, as a percentage of the total investment)</th>
<th>Base value (year)</th>
<th>2014</th>
<th>2017</th>
<th>2020</th>
<th>2030</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>37 (2010)</td>
<td>42</td>
<td>46</td>
<td>48</td>
<td>51</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>[173] Number of researchers employed in the private sector, as a percentage of the total, full-time equivalent</th>
<th>Base value (year)</th>
<th>2014</th>
<th>2017</th>
<th>2020</th>
<th>2030</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>16.2 (2010)</td>
<td>18</td>
<td>21</td>
<td>23</td>
<td>27</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>[174] Number of students obtaining degrees or qualifications at universities and colleges, thousands</th>
<th>Base value (year)</th>
<th>2014</th>
<th>2017</th>
<th>2020</th>
<th>2030</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>24.8 (2011)</td>
<td>23.9</td>
<td>24.1</td>
<td>24.6</td>
<td>28.6</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>[175] Higher education (percentage of the population aged 30 to 34 with higher education)</th>
<th>Base value (year)</th>
<th>2014</th>
<th>2017</th>
<th>2020</th>
<th>2030</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>36 (2012)</td>
<td>37</td>
<td>38</td>
<td>40</td>
<td>&gt;40</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>[176] European patents granted, applied for by researchers residing in Latvia</th>
<th>Base value (year)</th>
<th>2014</th>
<th>2017</th>
<th>2020</th>
<th>2030</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>11 (2011)</td>
<td>13</td>
<td>18</td>
<td>26</td>
<td>35</td>
</tr>
</tbody>
</table>

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**National Development Plan of Latvia**

- HR policy
- Cooperation
- Funding
- Sustainable development

- Funding from H2020 approved projects
- Patents/licenses
- Agreements on commercialization of TTI research and Consulting projects
- Overall research income

- Total number of researchers (amount, FTE)
- Average age of researchers
- Scientific articles published in the SCOPUS, Web of Sciences (per 1 FTE)
- Number of PhD student defended
- Number of MS student graduated
- The number of new scientists supported for implementing Postdoc research

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*All values are hypothetical for demonstration purposes.*
## Activities

<table>
<thead>
<tr>
<th>No.</th>
<th>Activity</th>
<th>Location</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Training school within UTH’s Graduate Program during the 3rd Conference on Sustainable Urban Mobility</td>
<td>Volos, Greece</td>
<td>May, 2016</td>
</tr>
<tr>
<td>2</td>
<td>Young Researchers’ Seminar and Train the Trainers Seminar during the 16th International Conference on Reliability and Statistics in Transportation and Communication</td>
<td>Riga, Latvia</td>
<td>October, 2016</td>
</tr>
<tr>
<td>3</td>
<td>International Logistics Doctoral Student Workshop organized by Fraunhofer</td>
<td>Magdeburg, Germany</td>
<td>June, 2017</td>
</tr>
<tr>
<td>4</td>
<td><strong>ALLIANCE 1st Training School</strong></td>
<td><strong>Riga, Latvia</strong></td>
<td><strong>July, 2017</strong></td>
</tr>
<tr>
<td>5</td>
<td>ALLIANCE Special Session during the 17th International Conference on Reliability and Statistics in Transportation and Communication</td>
<td>Riga, Latvia</td>
<td>October, 2017</td>
</tr>
<tr>
<td>6</td>
<td>ALLIANCE Special Session during the European Transport Research Arena Conference (TRA)</td>
<td>Vienna, Austria</td>
<td>April, 2018</td>
</tr>
<tr>
<td>7</td>
<td>ALLIANCE Special Session during the 4th Conference on Sustainable Urban Mobility</td>
<td>Volos, Greece</td>
<td>May, 2018</td>
</tr>
<tr>
<td>8</td>
<td><strong>ALLIANCE 2nd Training School</strong></td>
<td><strong>Riga, Latvia</strong></td>
<td><strong>July, 2018</strong></td>
</tr>
<tr>
<td>9</td>
<td>Special Session and ALLIANCE Final Conference during the 18th International Conference on Reliability and Statistics in Transportation and Communication</td>
<td>Riga, Latvia</td>
<td>October, 2018</td>
</tr>
<tr>
<td>10</td>
<td>Short-Term Staff Exchanges (STSEs)</td>
<td><em>To be defined</em></td>
<td>2016-2018</td>
</tr>
<tr>
<td>11</td>
<td>Provision of grands for participation as authors of peer reviewed publications in conferences</td>
<td><em>To be defined</em></td>
<td>2017-2018</td>
</tr>
</tbody>
</table>
1st Summer school: “Sustainable Transport Interchanges Program (STIP) Part I: Freight Transportation”

will be held on 16-22 July, 2017, in Riga, TTI, Latvia.

• The common vision for the Summer Schools is the preparation of a new generation of transportation researchers and professionals in the area of Transport Interchanges

• The objectives are:
  • to enable the international networking of young transport researchers
  • to train young researchers on specialized topics, defined as vivid for Baltic States through intensive courses

• The outcomes of these Summer Schools are scientific excellence, along with skills and ability to put science into practice
What does the 1st Summer School cover?

- The offered courses are:
  1. The European policy on intermodal transportation
  2. Sustainable development and transportation planning
  3. Building business models for intermodal transport interchanges
  4. Operation and management of intermodal transport systems
  5. Optimization of intermodal transport systems
  6. Design of freight transport interchanges
  7. Information systems for intermodal freight transportation
  8. Smart technologies for efficient transport logistics
  9. Decision making methodologies
  10. Data collection methods
  11. Research methodology and team work setup

Main Aspects on Following Slides (Project Materials)…
Transportation in an era of change

Harmonization of the legal framework amongst EU countries
Coherent cooperation among stakeholders
Integration of efficient interfaces
Integration of planning & financing processes

Intermodality

Road transport

Challenges

Solutions

@ Module C1
The role of interchanges in urban planning

- The pyramid of urban interchanges elements -

Source: Adamos et al., 2015

@ Module C3
Background

Elements of Freight Transport Interchanges

**Accessibility**
- Connection with other transport interchanges
- Connection with the regional transport system

**Infrastructure**
- Cover the needs of handling and transhipment of freight
- Provide material and technical equipment to serve current and future trends

@ Module C6
Methodology

Source: Adamos et al., 2015

@ Module C3

Interchange design, operation
Alliance

Building business models for intermodal transport interchanges

Different points of view on a business model

Participants?

Benefit?

Creation of value?

Rate of return?

- legally
- financially
- process-oriented
- ecological
- organizational
- technological
- functional
A freight village is the hub of a specific area where all the activities related to transport, logistics and goods distribution, both for national and international transit, are carried out, on a commercial basis.

- at least two different transport modes
- accommodation of other services
- managed by various operators/providers
- promotes cooperative activities to achieve synergies

(Cassone & Gattuso, 2010)
Logistical information systems. Classification

- Procurement
- Production
- Storage
- Distribution
- Sale

Planning system
- Planning
- Organisation & provision
- Control & regulation
- Monitoring

- Supply Chain Management Planning System
- Advanced Planning and Scheduling System
- Enterprise Resource Planning Systems
- Transport Management System
- Customer Relationship Management System
- Warehouse Management System
- Manufacturing Execution System
- Supply Chain Event Management System

Data
- Warehouse System

Real System
- Auto-ID-, localization and sensor technologies

@ Module C7
Smart Technologies for Efficient Transport Logistics

The technologies discussed are relevant to the basic logistics processes in logistics operation - e.g.:

Situation Analysis based on Image processing and localisation

Collision detection based on image processing, object identification and localisation

3D-Scanning of goods for storage and transport planning

Identification of incoming goods: RFID-tagged transport items / Barcodes

Identification of outgoing goods: RFID-tagged transport items / Barcodes

@ Module C10
Decision-making framework

Illustration of D-M processes in intermodality

Source: CLOSER, 2012
Academics and business contributions to innovations should be balanced

“Innovation has nothing to do with how many R&D dollars you have. … It’s not about money.

It’s about the people you have, how you’re led, and how much you get it”

Steve Jobs...
Thank you very much!
and
Welcome to TTI
and
www.alliance-project.eu

Jackiva.l@tsi.lv

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E-pasts: info@tsi.lv Skype: infoTSI www.tsi.lv