



Smart Transportation Alliance

2016 Annual Conference & Innovation Awards

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Thematic Session 1:

Key Challenges for Transport
Infrastructures in the Smart Mobility
Era

2016 Annual Conference & Innovation Awards

Roundtable

- **Dr José Manuel Vassallo**, *Associate Professor of Transport Economics at the Technical University of Madrid*
- **Mr Patrick Le Pense**, *Manager at ArcelorMittal Flat Carbon Europe*
- **Ms Elena de la Peña**, *Deputy Director General for Technical Affairs at the Spanish Road Association*
- **Mr Wolf P. Zeplin**, *Member of the Board at Heintzmann Italia SpA*



SMART FINANCING

Dr José Manuel Vassallo, *Associate Professor of
Transport Economics at the Technical University of
Madrid*

Funding vs. Financing

- **FUNDING** refers to whom pays the project in the end:
 - Users
 - Taxpayers
 - Beneficiaries (land owners, etc.)
- **FINANCING** refers to the original sources to invest:
 - Public budget
 - Infrastructure funds or state-own corporations
 - Private sources (equity, debt, etc.)

Funding vs. Financing

MECHANISMS		FUNDING (ULTIMATE PAYER)		
		TAXPAYERS	BENEFICIARIES	USERS
ORIGINAL FINANCING	PUBLIC BUDGET	Conventional approach		
	GOVERNMENT-OWNED CORPORATION			
	PRIVATE CORPORATION	Shadow and Availability Payment approaches		Concession approach

- **SMART FINANCING can be split into:**
 - **Smart funding** (pricing, value capture, cross subsidies)
 - **Smart budget financing**
 - **Smart private financing**
 - **Smart governance**
 - **Smart procurement and contracting**

Smart Funding

- **SMART FUNDING** requires:
 - **Integrated ticketing** across modes
 - **Pricing approaches** to get the most from the users with most willingness to pay
 - Implementing **intelligent technologies**
 - **Value capturing** positive externalities
 - **Harmonizing taxes** across modes



Smart Budget Financing

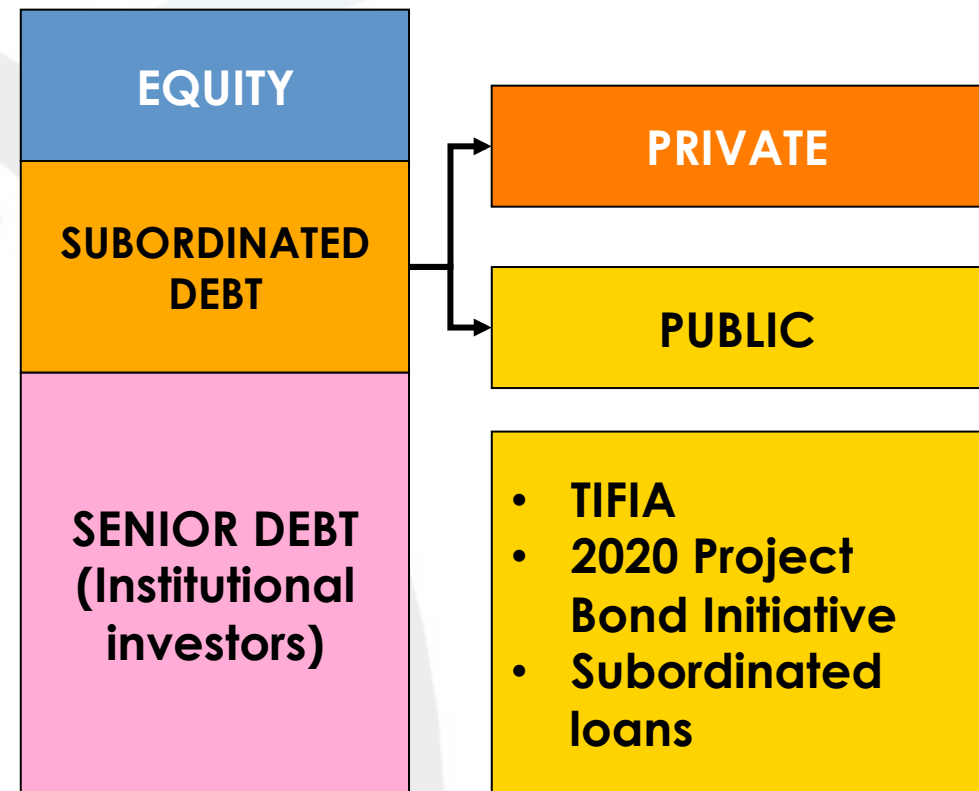
- **Smart BUDGET FINANCING** requires:
 - Being based on **a rational selection and prioritization** of projects
 - Safeguarding **financial sustainability** over time
 - Ensuring **the right maintenance and operation** of the assets
 - **Granting** the resources for **regional and local investment**



Smart Private Financing

- **Smart PRIVATE FINANCING:**

- Rational **risk allocation**
- Drawing resources from **long-term institutional investors**
- Drawing resources from **infrastructure funds**





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Smart Governance

- Define and **allocate roles**
 - **Planning**
 - **Regulation**
 - **Contracting**
 - **Technical monitoring**
 - **Disbursing financial resources**
- Promote **Innovative institutions**
 - **Infrastructure agencies?**
 - **Infrastructure funds?**
 - **Infrastructure regulator?**



Smart Procurement and Contracting

- **SMART PROCUREMENT AND CONTRACTING** should:
 - Promote **innovation**
 - **Avoid overoptimistic offers**
 - **Allocate risks** in the right way
- Steps should be taken to:
 - **Coordinate** EU, national, regional and local **procedures**
 - **Learn from** past **experience** (either good or bad)
 - Implement **capacity building programmes** that support both public authorities and transport operators



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SMART SUSTAINABILITY

Mr Patrick Le Pense, *Manager at
ArcelorMittal Flat Carbon Europe*

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The Current Situation

- Modern societies demand efficient, climate-resilient and socially-meaningful transportation infrastructures
 - Transportation networks must satisfy high mobility demands;
 - At the same time with the lowest possible environmental impacts & CO₂ emissions;
 - While being financially responsible with public funds
- **Innovation is critical to succeed**

The Current Situation

- People and goods are moving further & faster around the globe
 - This touches all transportation modes:
Road, Rail, Air and Sea Ports





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Energy Efficient Solutions

- Possible solutions include:
 - Reduction of energy embodied in the physical structures through re-use and recycling;
 - Implementation of low energy systems across the life-cycle;
 - Energy harvesting from the infrastructure itself to the extent of self-sufficient production.
- Aspects influencing energy consumption from vehicles, vessels and aircrafts:
 - Infrastructure design taking into account maintenance & operation;
 - Implementation of LCC robust methodologies



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Moving Forward

- We must achieve:
 - Better integration of infrastructure in its natural environment
 - Reduced intrusion of noise, air pollution and vibration to promote acceptance by civil society
- Dedicated “Green Corridors”
- Redesign cross-modal urban transport networks & ecosystems to support softer modes of transport



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Sustainability All Along the Way

- Parameters like **durability** and **“permanent” material approaches** are being more relevant
 - Innovative systems and processes for construction are key
 - Long-lasting, climate-resilient and more environmentally-aware construction materials
- Self-healing and self-cleaning technologies (e.g. applied to coatings, pavements or bridges) will also enhance faster and better-planned quality control systems.





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Adaptation to Climate Change

- The effects of climate change are real:
 - Transportation infrastructure is not always ready to cope with extreme weather conditions;
 - Impacts can be revealed as major incidents that occur more often; or
 - Small and incremental changes that over the years deteriorate and erode the quality of transportation infrastructures.
- Adaptation of infrastructure requires taking in account every stage of the infrastructure management process:
 - Planning & Design;
 - Construction;
 - Operation & maintenance
- Designing **Smart Transportation Infrastructures** is paramount to achieving “**climate-resilient**” infrastructure



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SMART MOBILITY

Ms Elena de la Peña, *Deputy Director
General for Technical Affairs at the
Spanish Road Association*

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Current Situation

- Transportation Infrastructures are a key player in a changing world and are becoming more competitive and cohesive everyday
 - People and goods are moving further & faster around the globe
 - This movement touches all modes of transport: Road, Rail, Air and Sea ports

Current Situation



- Intermodal terminals should be “smartly” designed & equipped
 - In Freight: Cooperative systems, seamless transshipment and smart route design lead to the sector’s optimisation



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- Intelligent infrastructures are needed to:
 - Process mass real-time information, and to
 - Provide the most effective transportation services to businesses and citizens





“Bricks” Infrastructure Becoming Smart

- Technological innovations include:
 - Remote sensing,
 - Advance analytics,
 - Automated operations,
 - Crowdsourcing, and
 - Integrated scheduling and control
- Traditional “bricks” infrastructure can now be used more effectively, and operated & maintained more efficiently



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Integrated Transport “Info-structure”

- Communications can occur in several forms:
 - V2I (vehicle to infrastructure)
 - I2V (infrastructure to vehicle) and V2V (vehicle to vehicle), and
 - I2I (infrastructure to infrastructure)



Integrated Transport “Info-structure”



- Availability of open & quality transportation data
 - Provide performance improvement and increase efficiency
- Location-based and traffic-related allow built-in data privacy & security solutions



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The Future of Smart Mobility

- Population Trends:
 - 53% currently lives in urban areas
 - By 2050 this is expected to reach 67%
- Most cities are poorly equipped to cope with the transportation challenges ahead:
 - Needs are evolving with an increased demand for urban mobility
 - More intelligent infrastructure is needed to cope with extended mobility requirements
- There cannot be a **Smart City** without **Smart Mobility**, and **Smart Mobility** isn't possible without **Smart Infrastructure**



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SMART SAFETY AND SECURITY

Mr Wolf P. Zeplin, *Member of the
Board at Heintzmann Italia SpA*



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The Current Situation

- Transport accidents remain an issue:
 - In the developed countries it is an on-going challenge, and
 - In the developing world it is a major tragedy
- Accident data are increasingly alarming:
 - Road accidents are expected to become the biggest killer of children between 5 and 15 by 2015 in Sub-Saharan Africa
 - Outstripping malaria and AIDS

The Current Situation

1. More than **1 Million** people die worldwide in road accidents.
2. Fatal accidents with people being **permanently handicapped** have increased.

The Current Results

- **EU 12 = 30 % reduction**
- **EU 15 = 52 % reduction**
- **EU 27 = 40 % reduction (2000 – 2011)**
- **EU 27 = 42 % reduction (2011 – 2014)**
of fatal accidents



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The Current Situation

- In 2011 30.300 people died **42 % less than in 2000**

The aim of the European Commission is:

By 2020

- **Reduction by 50 % for fatal accidents**
- **Resulting in another 8 % in 5 years**



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The Current Situation

1. In the EU, Germany, Italy and Austria are on top of the list with about 4,5 accidents per thousand of population.
2. Other EU countries are in the range of 1,5 to 3,5 accidents per thousand of population.



Key Points for Smart Safety and Security

“Smart safety and security” on roads demands

Education

Social Responsibility

Infrastructure

Smart and Intelligent Accident Restraint Systems

When Innovation Leads to Safety



- Solutions acting directly on the transportation infrastructure are gaining ground
- Advantages:
 - Rapid implementation, providing immediate social benefits
- Safety monitoring & data collection methods, must move towards non-intrusive and non-destructive inspection and testing systems

When Innovation Leads to Safety

- Innovation in transportation has been usually driven by safety
 - Either by individual events or by soaring death rates
- Transportation infrastructures are changing this trend by anticipating risks, but further progress must be made

