

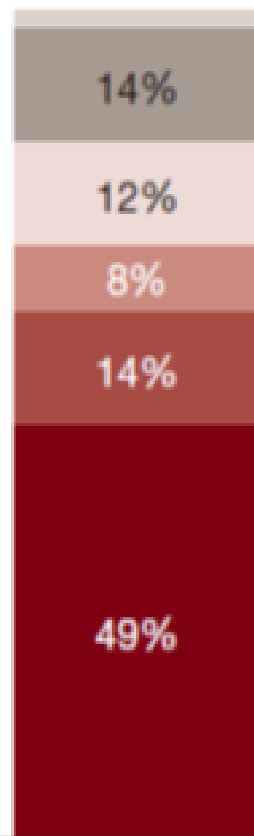
Connected and Autonomous Vehicles

Prof.Dr. Orhan B. Alankuş
Istanbul Okan University
17th of January,2019

AUTOMOTIVE VALUE CHAIN SHIFT

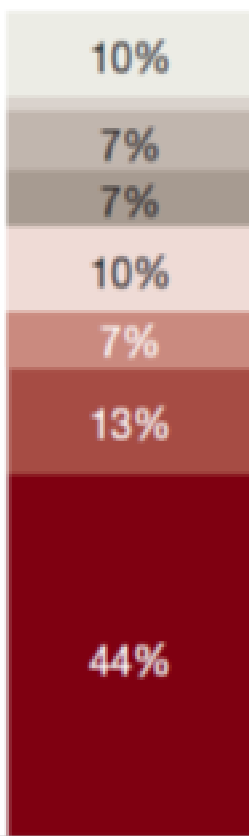
Revenue

~ \$5 trillion



2015

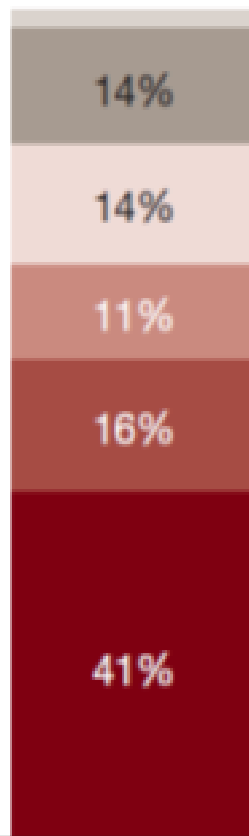
~ \$7.8 trillion



2030
(scenario)

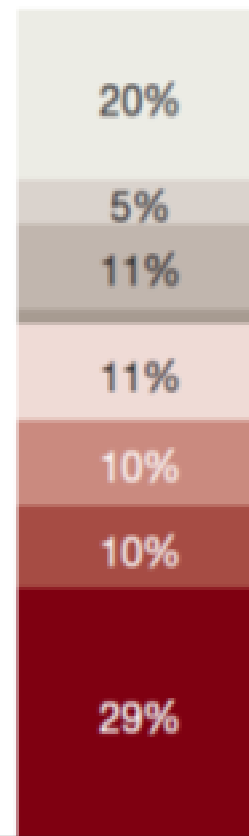
Profits

~ \$400 billion



2015

~ \$600 billion



2030
(scenario)



Note: Non-consolidated view: supplier value pools not eliminated from vehicle/aftermarket revenues to show full industry value pools.

Description of the Operation / Trends and Market

Automotive Revolution-Perspective towards 2030 (Mckinsey, 2016)

- 30 % increase of automotive revenues amounting to \$ 1,500 Billion due to connecting vehicles and related business models.
- By 2030 around 15% of vehicles sold will be autonomous in case the regulation issues are solved.
- the cars of 2030 will have 300 million lines of code, representing a 3-fold increase with respect to today's most advanced cars

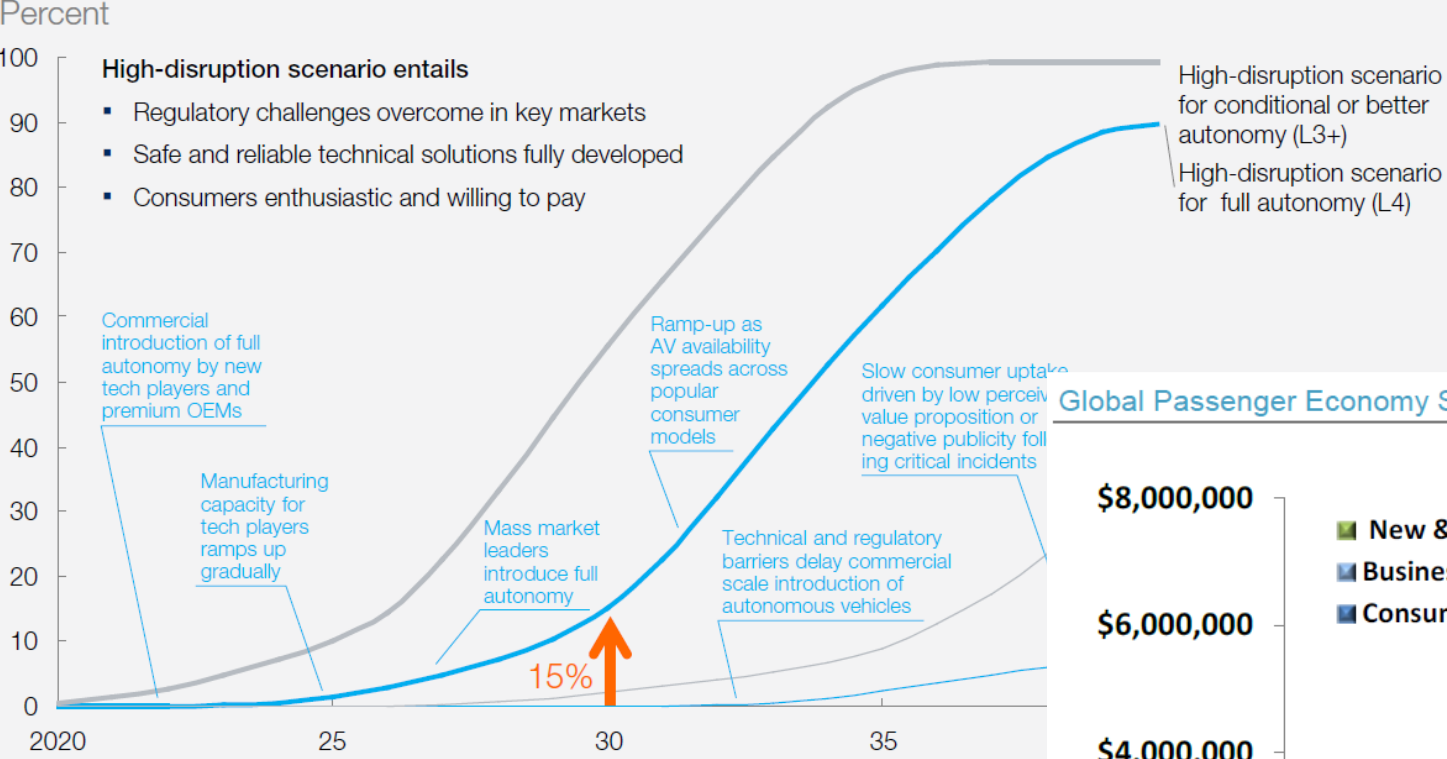


It is quite obvious that communicating, intelligent and autonomous vehicle technology is coming and disrupting the automotive sector.

This technology is also promising an important new market and new revenues if the value chain is managed correctly.

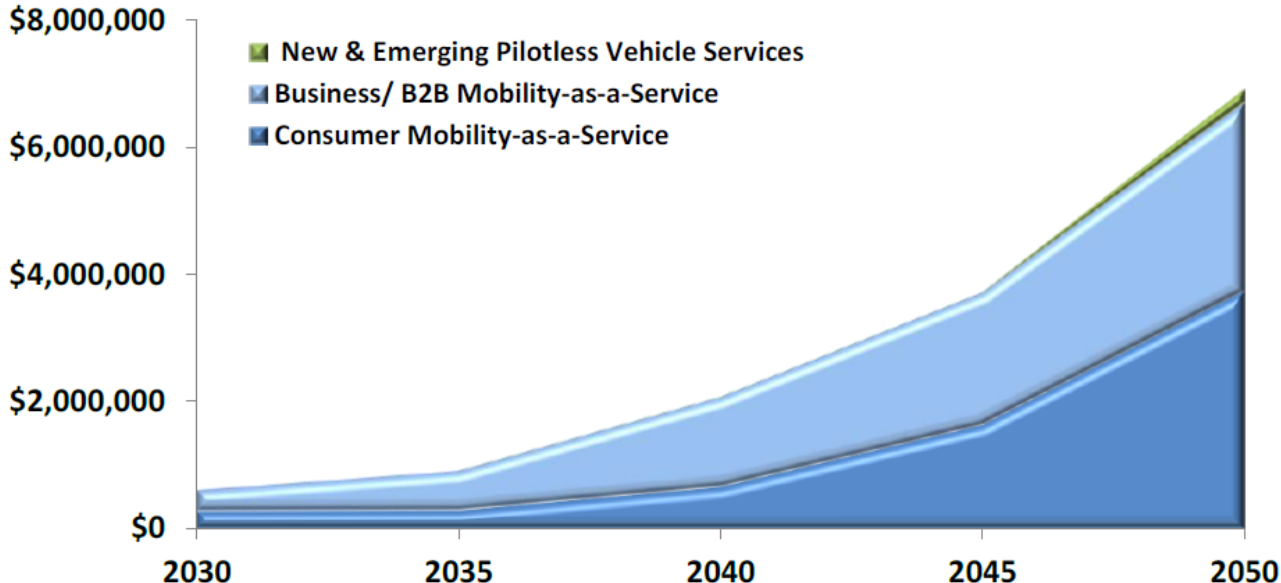
Market and Services Estimations

New vehicle market share of fully autonomous vehicles



SOURCE: McKinsey

Global Passenger Economy Service Revenues 2025-2050 (US\$, Millions)



Source: Strategy Analytics

Advanced Transportation Technologies

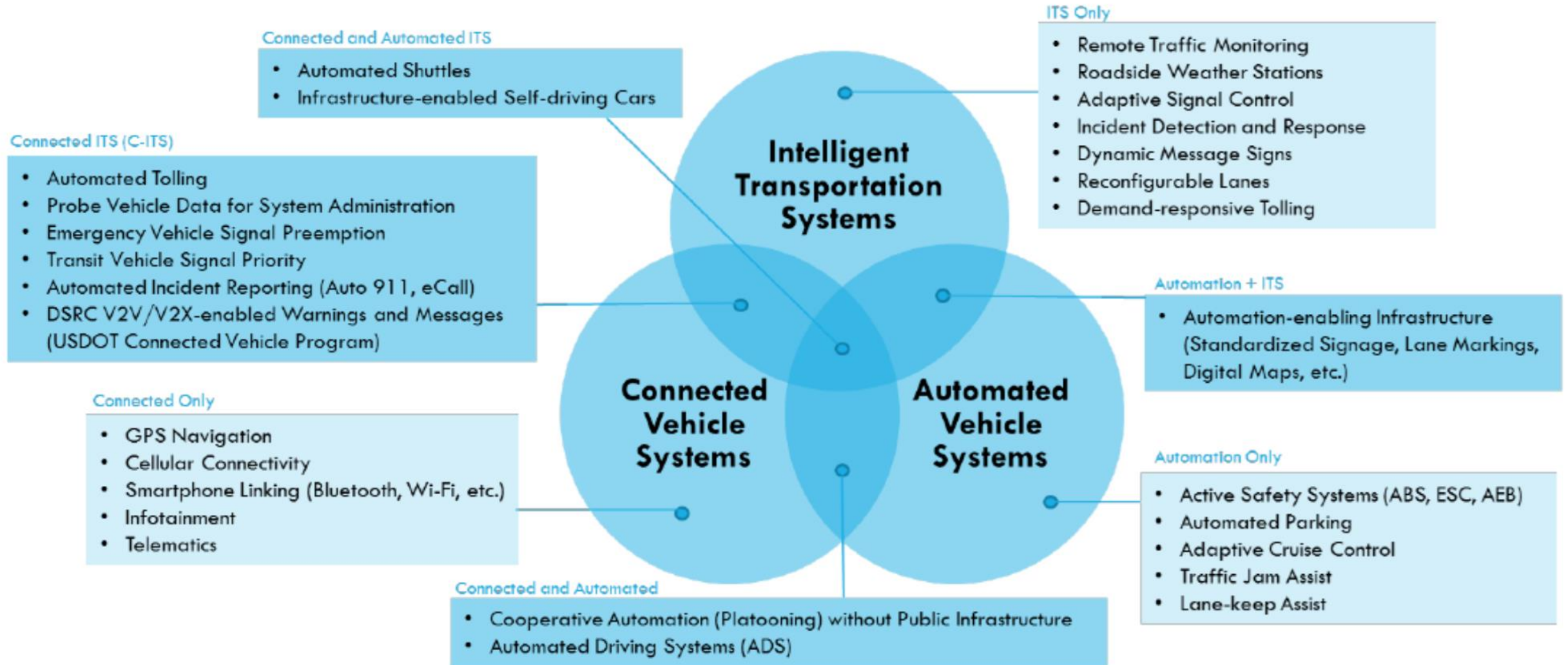


FIGURE 1: Advanced transportation technologies

ERTRAC 2050 VISION and R&D TOPICS

ERTRAC 2050 VISION

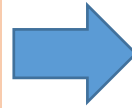
- Ensure mobility in urban areas
- Sustainability: Energy efficiency, decarbonisation and air quality
- Ensure an efficient and resilient Road
- Transport System Digitalisation – an enabler for improved mobility
- Safety, security and resilience



R&D TOPICS for FP9

R&D TOPICS FOR 2020's

- Fully automated efficient transport systems for people and goods
- Pilots and FOT's (L3, L4, Platooning)
- User/driver awareness, acceptance, Policies and regulation to Support CAD introduction
- Innovative services for the future digitalized global transport system
- Future CAD vehicle Technologies
- Ensuring safe, secure, resilient CAD
- Methods and tools for development



ERTRAC Automated Driving Roadmap 2017

ERTRAC report on Automated Driving Roadmap (2017) describes the drivers of automated driving as follows;

- Safety: Reduce accidents caused by human errors. Increasing road safety
- Efficiency and environmental objectives: Increase transport system efficiency and reduce time in congested traffic. Smoother traffic will help to decrease the energy consumption and emissions of the vehicles.
- Comfort: Enable user's freedom for other activities when automated systems are active.
- Social inclusion: Ensure mobility for all, including elderly and impaired users.
- Accessibility: Facilitate access to city centres.

ERTRAC 2017 Report

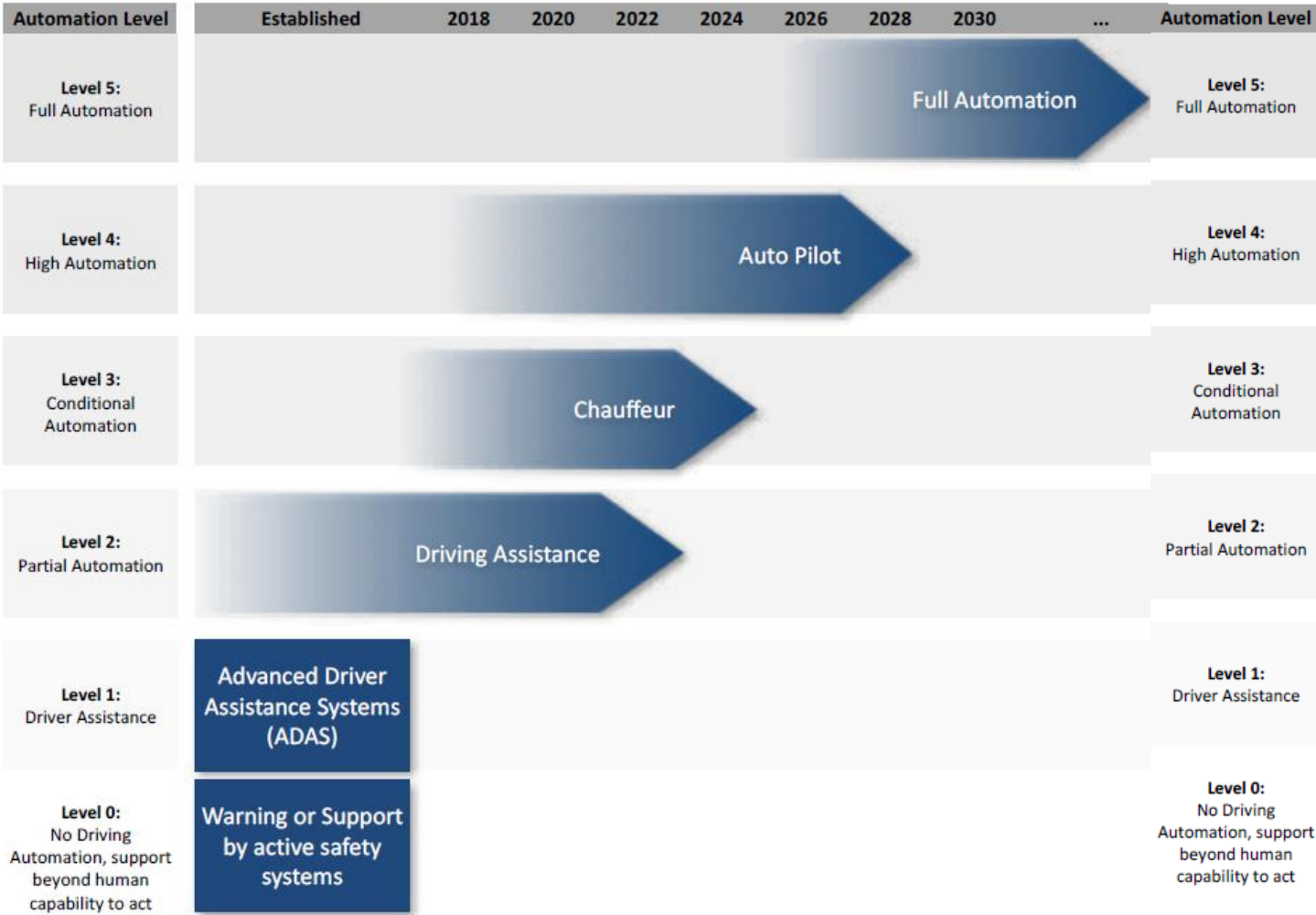
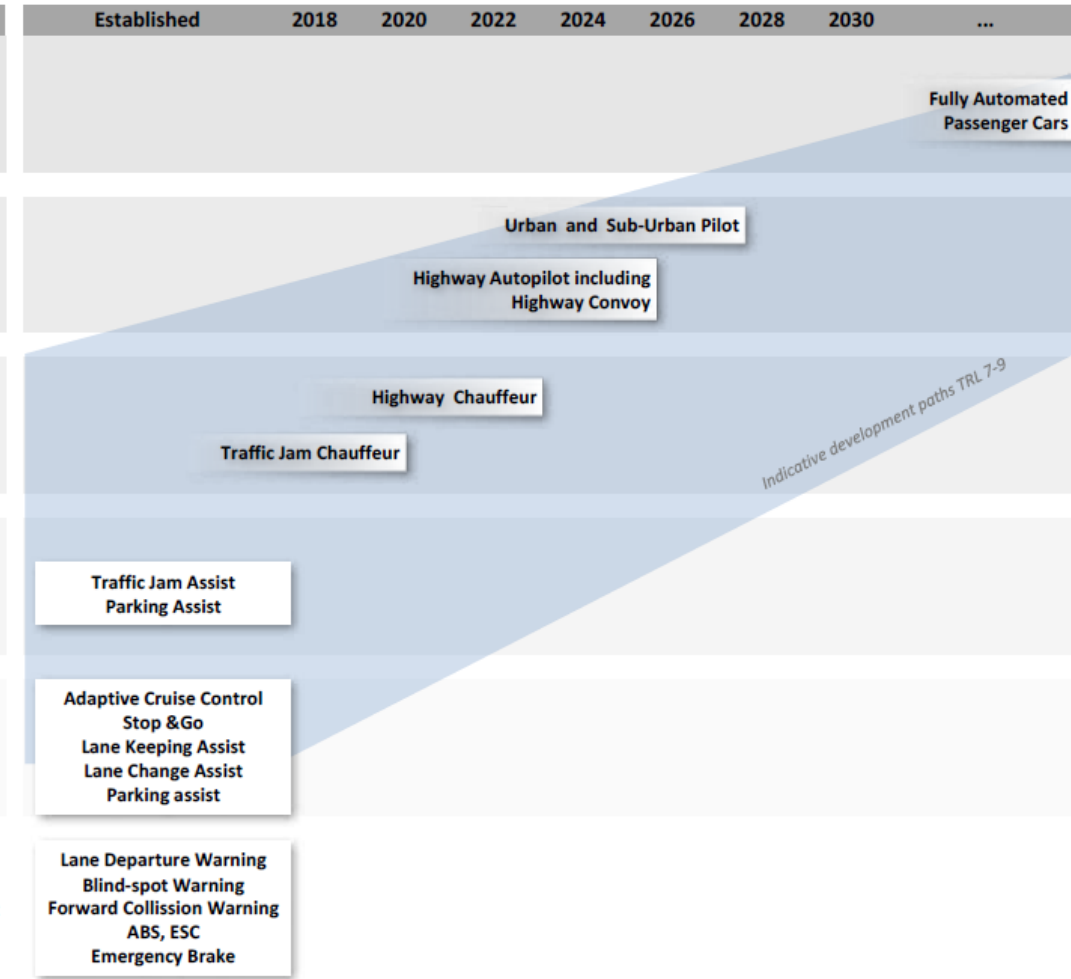


Figure 2: The vehicle automation development paths



Passenger Cars: M1 category

Figure 3: The Automated Driving development path for passenger cars

Autonomous Vehicle Road Maps

- EU
 - Ertrac
 - EPoSS
 - iMobility Forum
- EU National
 - Declaration of Amsterdam (Signed by the transport ministers of all 28 EU member states, April 2016)
 - UK
 - Germany
 - Finland
 - Austria
 - France
- USA(2x)
- Australia(3x)
- Japan
- New Zealand
- South Korea
- Canada(2x)

Roadmaps public

- AASHTO
- GEAR 2030
- CEDR
- ITFVHA

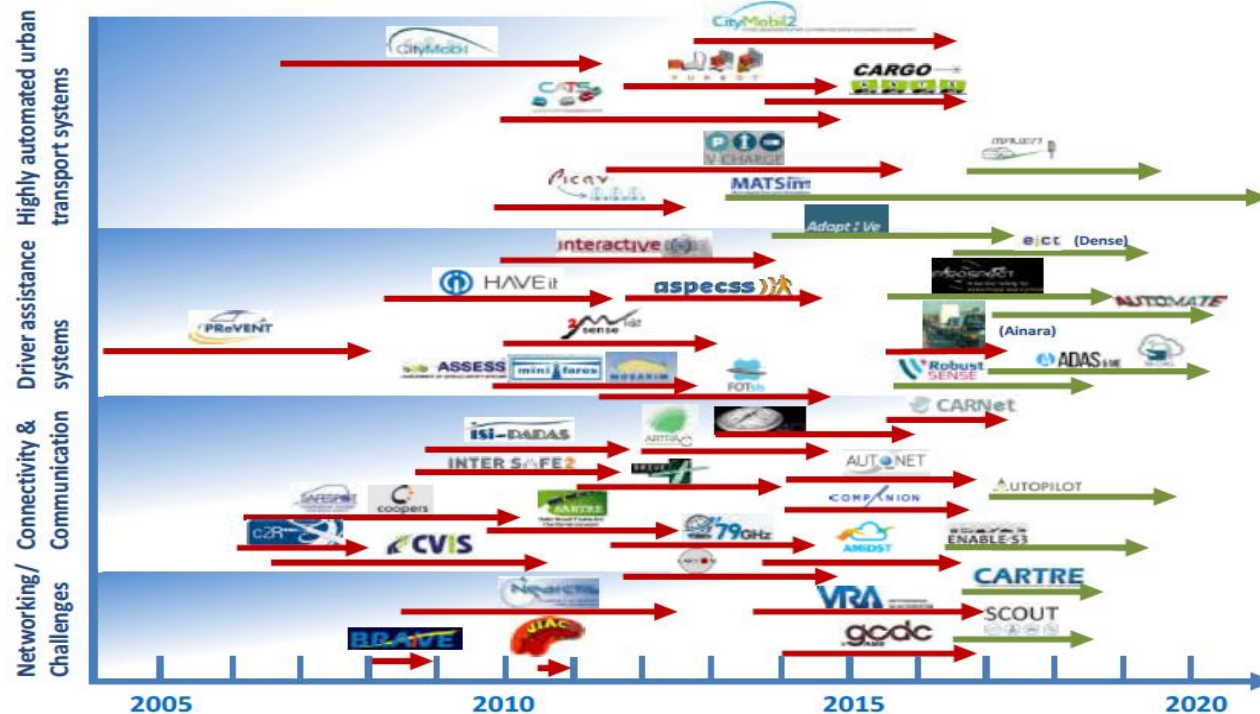


Figure 6: Overview of the EU funded projects that support development of automated driving. Red arrows indicate completed projects. Green arrows indicate projects still running in 2017

Okan University Vision

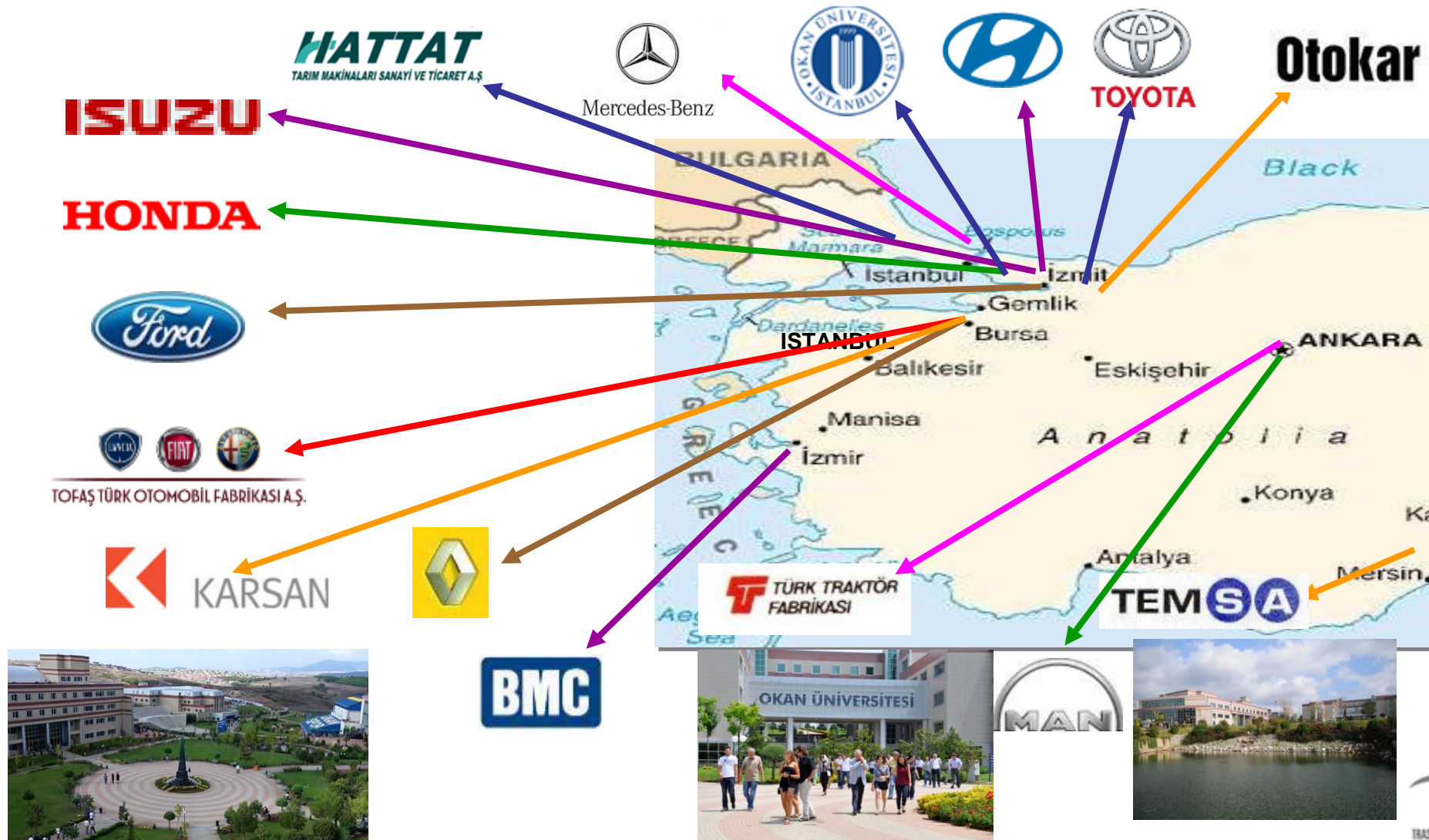
Vision: Innovative and leading «World University» which can answer the requirements of society and business world on the state of art level

Fourth Generation University:

- Innovative and entrepreneur;
- Proactive relations with business world;
- Part of worldwide excellence centers ;
- Open innovation ;
- Technology development based on early scientific knowledge;
- **Contribution to the development of related sectors and industries**



AUTOMOTIVE MANUFACTURING PLANTS IN TURKEY AND LOCATION



OKAN UNIVERSITY TRANSPORTATION TECHNOLOGIES & INTELLIGENT AUTOMOTIVE SYSTEMS APPLICATION AND RESEARCH CENTER

«TTIS»



- TTIS aims to be a World Wide recognized node of knowledge and research as well as a Centre of Excellence in the field of Intelligent Transport Systems by 2020
- Member of ERTICO, and EGVI (only university member from Turkey), and founder and management board member of National ITS Association(AUSDER)



EGVI
European Green
Vehicles Initiative



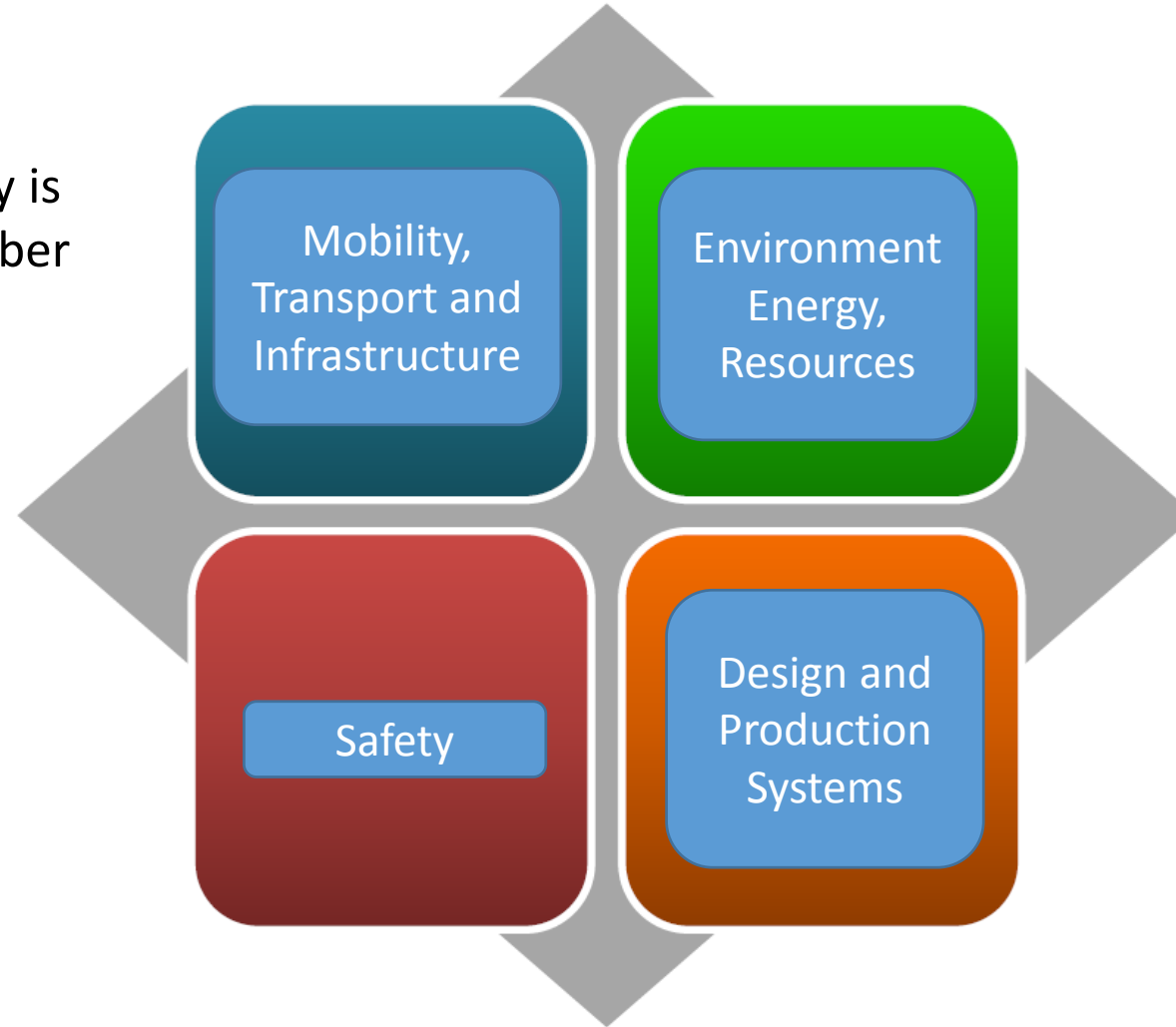
Research Areas

- Intelligent vehicles
- Communicating Vehicles
- Intelligent Energy management systems
- Battery packaging and management systems
- Electric machine and inverter development
- Traffic management
- Big data management

Automotive Technology Platform(OTEP) Strategic Plan- Four Main Pillars



Okan University is
An active member
of the steering
board of OTEP





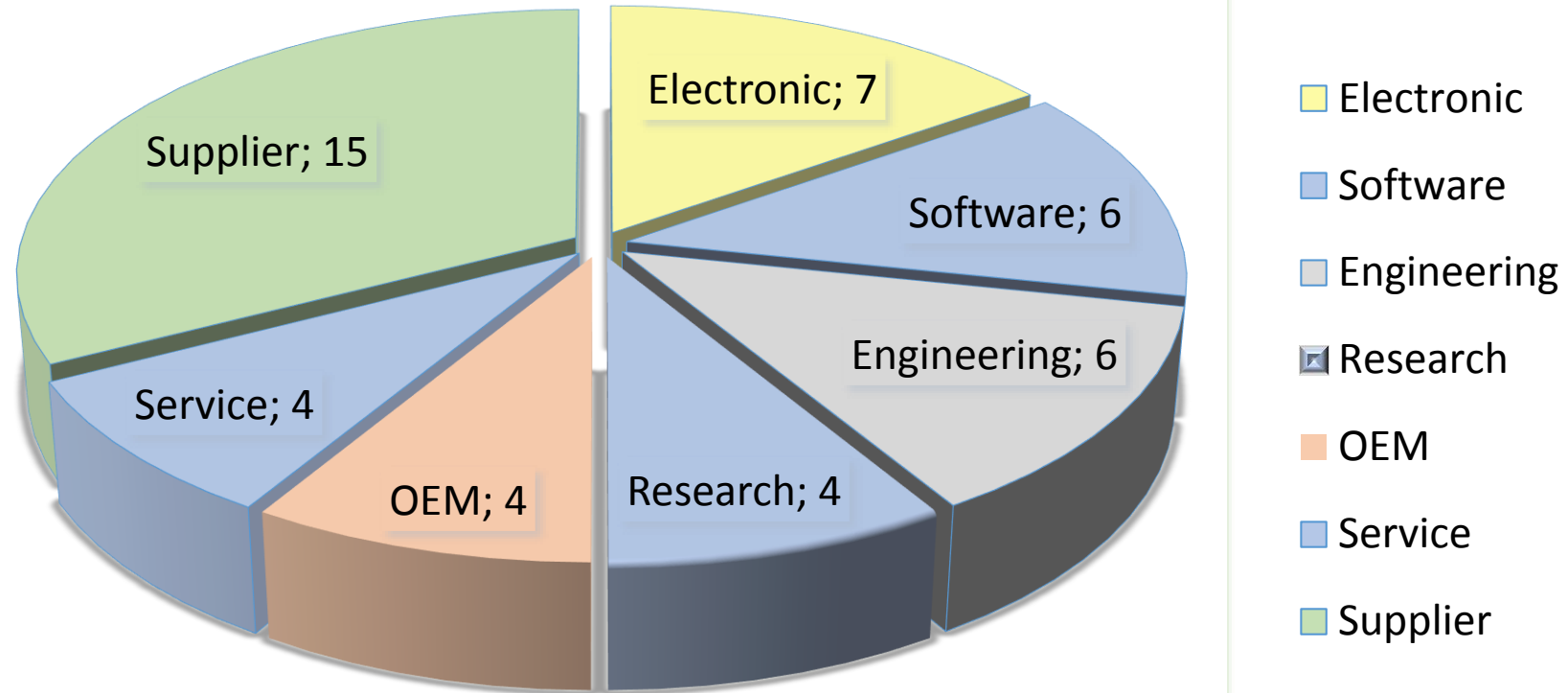
Innovative and Sustainable Electric and Hybrid Vehicle Technologies Development Center and Cluster






DESTEĞİ İLE





Cluster Composition





[Anasayfa](#) [Hakkımızda](#) [Haberler](#) [Dökümanlar](#) [Yeni Fikirler](#) [Üyeler](#) [İletişim](#)






Duyuru
Almanya Regensburg Elektrikli Araçlar Kümesi ile işbirliği sözleşmesi imzalandı
04-11-2015

Üniversitemizin Ulaştırma Teknolojileri ve Akıllı Otomotiv Sistemleri Araştırma Merkezi (UTAS) bünyesinde, İstanbul Kalkınma Ajansı desteği ile...


[devami](#)


1	2	3	4	5	6	7	8
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e-Hike Kümesi bir UTAS Projesidir.

HABERLER

**ARDEB 1003 Programı Kapsamında 24 Yeni Çağrı Açıldı**
0 Pazartesi, 20 Temmuz, 2015 - 14:12


**Plug-In Araçlar Ne kadar Ne Zaman Kaça ?**
0 Cuma, 15 Mayıs, 2015 - 17:12


MAKALELER


A Universal State-of-Charge Algorithm for Batteries
0 Pazartesi, 4 Mayıs, 2015 - 00:50

Energy Management and Control of Electric Vehicles, Using Hybrid Power Source in Regenerative Braking Operation
0 Pazar, 3 Mayıs, 2015 - 00:33

"e-MOBILITY & Net-Futures"


**Mtl_Paris**
RT @DigitalAgendaEU: How to bridge gaps between tech, #cybersecurity & legislation? Read a report from #ICT2015
<https://t.co/QAmaLu7oM4> htt... - 09/11/2015 - 15:04

 InfoSecLeague



ISTANBUL OKAN UNIVERSITY
1999

ISTANBUL
OKAN UNIVERSITY

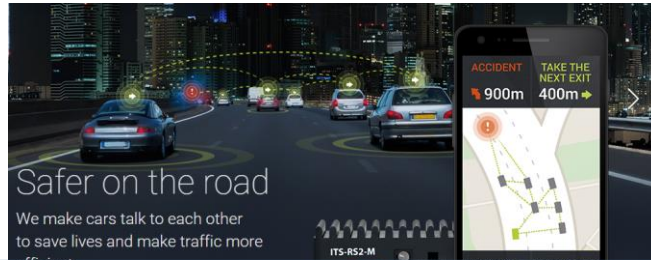
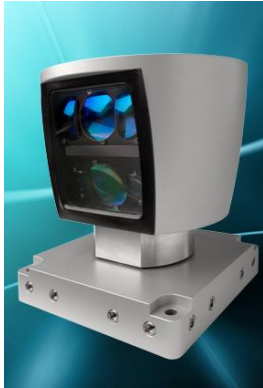


OKAN UNIVERSITY
TTIS
TRANSPORTATION TECHNOLOGIES AND INTELLIGENT AUTOMOTIVE SYSTEMS
APPLICATION AND RESEARCH CENTER



Innovative Intelligent and Communicating Vehicles Technology Development and Clustering Centre





- 3D LIDAR
- 3D Camera
- Modem and road unit
- Signal generator and analyzer
- HIL System
- Real time processor
- NVIDIA Drive PX

**Full Otonomous
Vehicle**

• Scope

Objectives

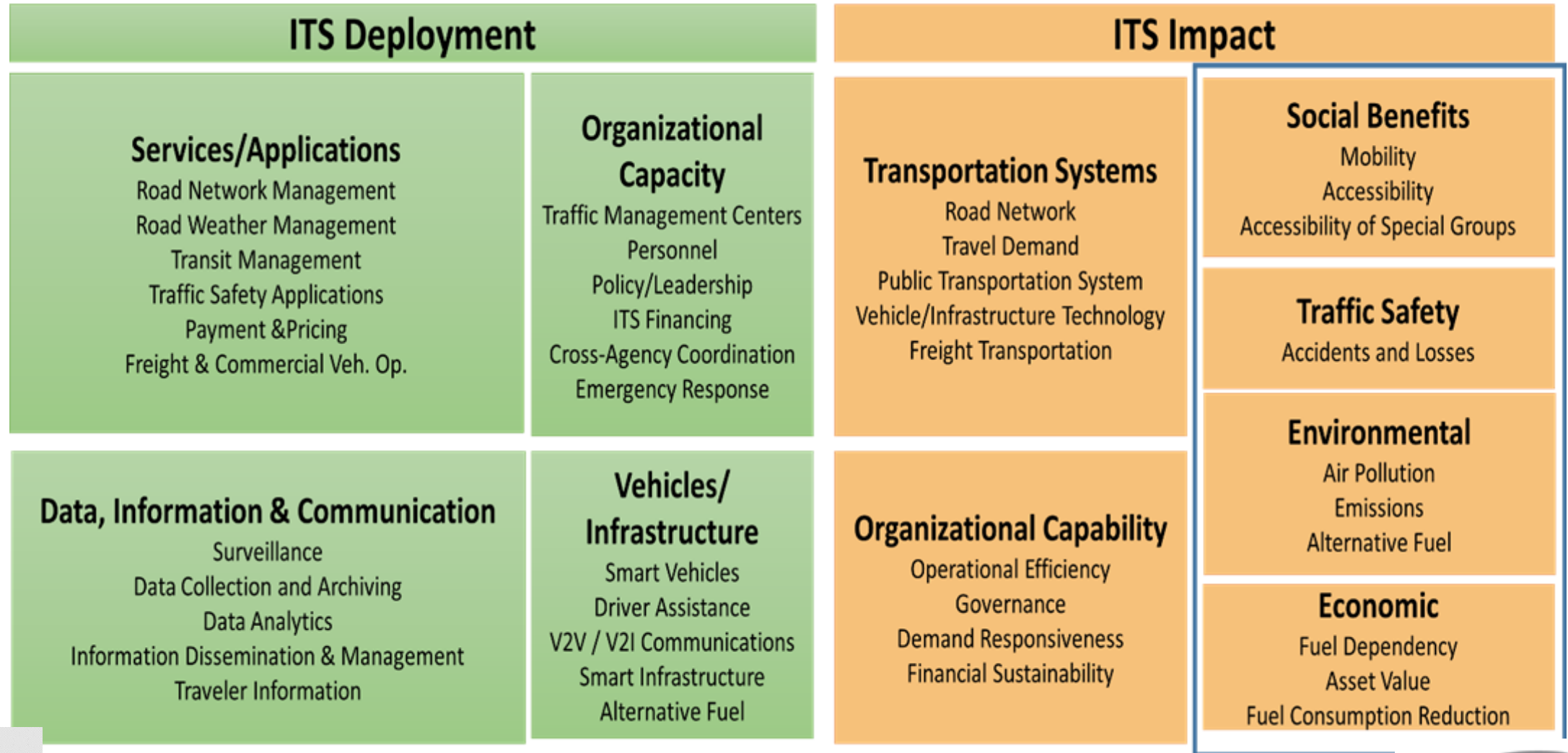
- Form a cluster with stakeholder companies
- Develop innovative business solutions and technologies for the stackholders
- Analysis the whole value chain
- Develop an open research structure
- Develop innovative concepts for
 - Advanced autonomous vehicles
 - Vehicles with V2V and V2X
 - Intelligent vehicles for safety
 - Business models
 - Future transport systems

Some Project Examples

- Intelligent Battery Management System(TUBITAK Supported)
- Advanced Autonomous Vehicle Project (Internal, Development Agency Support, TEYDEB 1505)
- optimal fuel consumption with Predictive PowerTrain control and calibration for intelligent Truck(optiTruck) –HORIZON 2020
- MOdify Drivers' behaviour to Adapt for Lower EmissionS (MODALES)-HORIZON2020
- Intelligent Transport Index Development (National ITS Support)
- Intelligent Energy Management System for Electric Vehicles (Ph.D Project)
- HORIZON 2020 Applications on Battery Pack optimization and Innovation for SME's on Battery Value Chain
- Open Innovation Autonomous Vehicle Development and Testing Platform(OPINA) (IPA II Fund)
- Automotive Value Chain Collaborative Upgrading (AUTOCUP)(IPAI Fund)
- Twinning Application for 2018



ITS EVALUATION INDEX DEVELOPMENT



optiTruck PROJECT



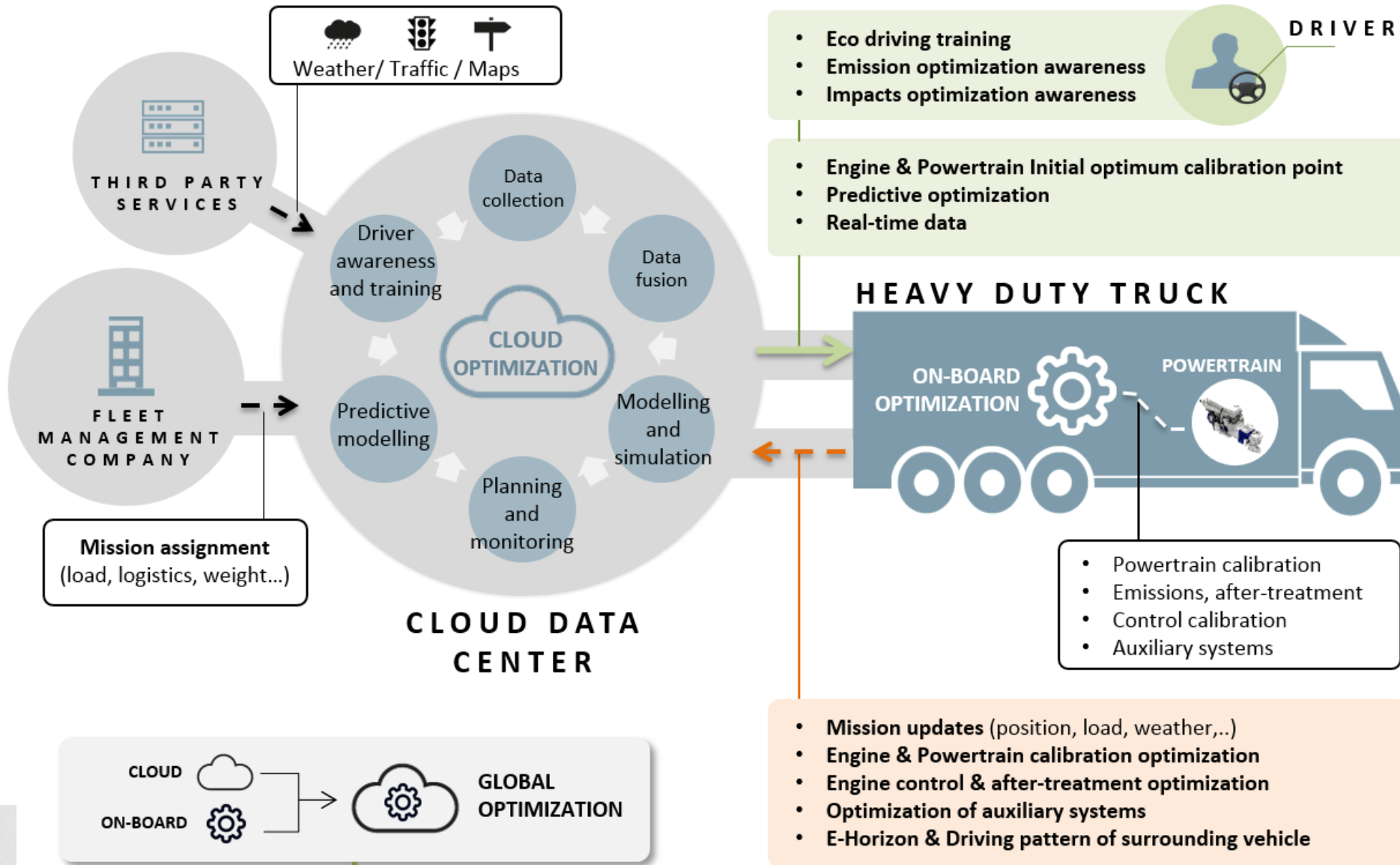
Project Partners

Project Coordinator		
Industry		
		
Research & Innovation Sector		
		
		

optiTruck

- Started Sept 2016
- Duration 3 years
- Budget: 5.39 Mio€
- Funding: 4.54 Mio€

Concept and approach under development



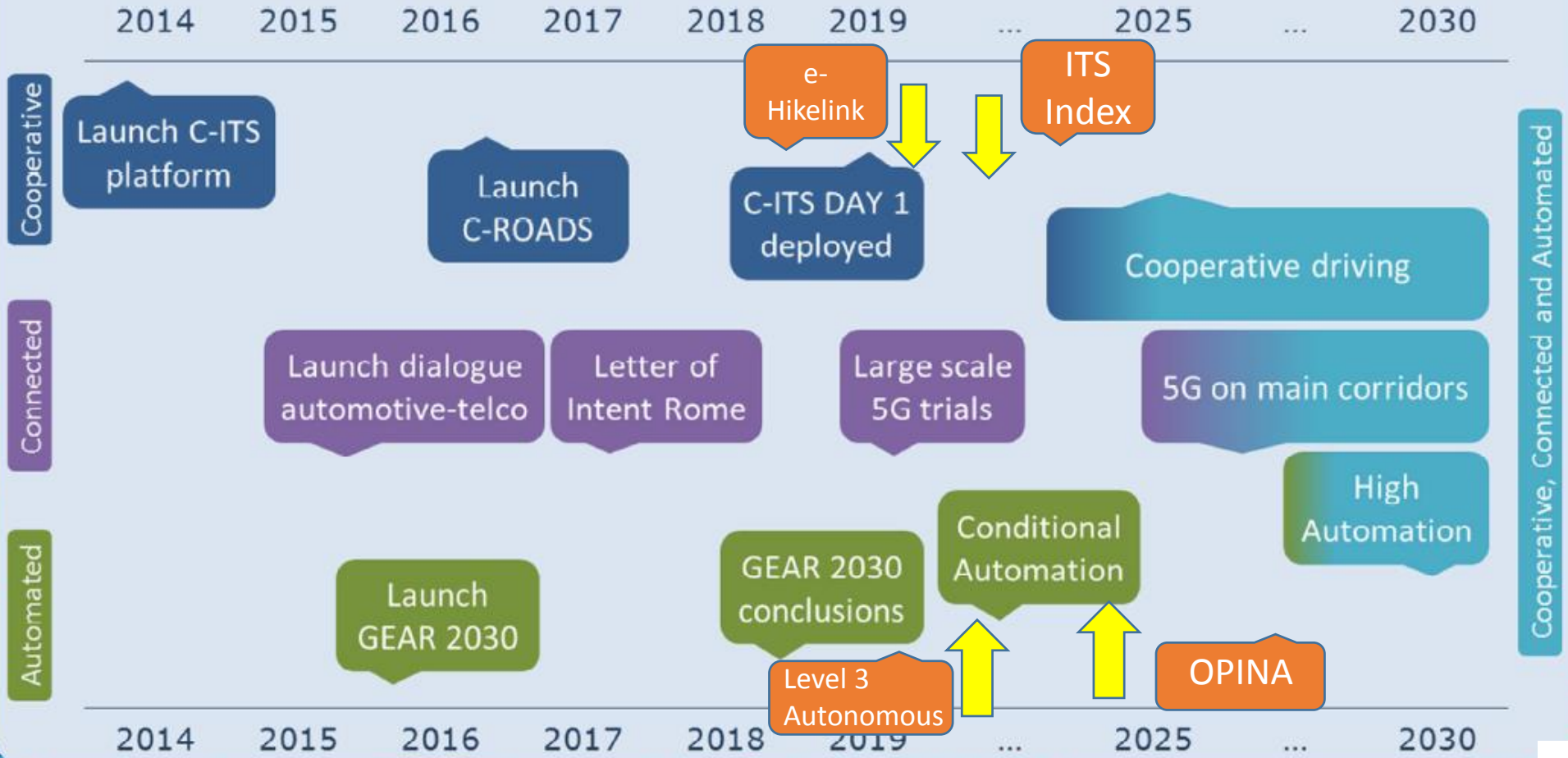
31/05/2017

optiTruck, EGVI Workshop, Brussels



European Commission

Stakeholder Platforms for shared Visions



THANK YOU