Future Trends on Smart and Sustainable Transport and Logistics

TECHNOLOGICAL INTELLIGENCE STUDY

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1. EXECUTIVE SUMMARY

Transport is one of the backbones of the European economy; it plays a key role in generating economic progress through trade and labor mobility. In consequence, the European Commission (EC) has adopted an integral approach in transport, ‘Smart, Green and Integrated Transport’. The ultimate goal of the European strategy is to facilitate mobility, strengthen regional economies and to increase cohesion and competitiveness, while trying to mitigate adverse environmental, social and economic impacts.

ICT has pivotal role for the balanced transport flows in Europe, offering interesting opportunities to improve the performance of transport systems and services. Nonetheless, numerous challenges, such as lack of interconnectivity and interoperability, hamper the breakthroughs in transport. Nevertheless, constrains may be transformed into research and business opportunities by addressed in an integrated way.

In this framework, the MOVE project presents an excellent opportunity for EU clusters of different sectors -namely transport and logistics, ICT, telecommunications and green technologies- to reinforce their potentials and develop smart strategies through mutual learning processes and collaborative relationships.

The future of mobility relies on the collaboration, co-creation and coordination among companies to multiply their capacity to generate new products and services. That is co-innovation, whose results would be multiplied if approached from a cross-border perspective. With this objective in mind, the present mobility technological intelligence study is aimed at identifying emerging trends across diverse sectors, to systematically combine their assets and skills to make projects that a few years ago would have been unconceivable a reality.
2. INTRODUCTION

The 2011 Transport White Paper of the European Commission puts forward a long-term strategy for a transition towards a new way of life in cities and regions. The main issues of the 'new paradigm of urban mobility' are the transition from a mobility paradigm based on the private car to a model based on walking and cycling, high quality public transport, cleaner vehicles, and more efficient distribution of goods. The White Paper’s main target is to reach the 60% emission reduction target by 2050.

Certainly, transport is a key and cross-cutting sector. From an industrial disruption’s point of view, transport is a highly innovative sector. Indeed, transport usually adapts emerging trends faster than many other industries, from the use of data to the development of autonomous vehicles based on sensors and wireless connectivity, leading also to numerous regulatory thresholds.

Concerning the environment, transport and logistics account for the 15% of global CO2 emissions and 40 % of air pollution worldwide, particularly due to road freight transport. In this sense, these sectors need urgently to be transformed and made more sustainable.

In this context, ICT has great potential and a decisive role to play in overcoming these challenges. An appropriate implementation of ICT solutions may help reduce congestion significantly. Ingrained concepts such as Intelligent Transport Systems are only one part of the picture, since integration between various parts of transport infrastructure is becoming a competitive advantage for companies, cities and nations.

In fact, the ICT sector is already transforming the transport industry, redefining existing relationships between actors in the value chain and creating space for new entrants. ICT solutions have led to the emergence of several new organizational forms, which allow for the creation of dynamic and strategic networks among individuals and small companies.

In this report we will explore and present the changing economic structures of the transport and logistics sector in the digital age. Likewise, we will examine how leaders and organizations can contribute to build a sustainable world from economic, environmental and social points of view. Innovating and transforming a single business model will not be enough and research will thus open the road for future discoveries. In the coming years, more companies will have to back science in order to achieve really disruptive innovation.

The present report will set the basis for the future actions of knowledge transfer planned for this project, the diffusion of four newsletters and four success stories during the project length, until September 2017. As it has been said, it seeks to identify current European challenges, opportunities and world-class innovative solutions in transport and logistics. The ultimate aim to incentivize research activities and cross-sectorial business collaborations for the development of an optimized and highly efficient transport and logistics chains in the four regions of the project.
Throughout the implementation of the MOVE project, this initial technological study will be complemented with periodical newsletters and brochures, which will analyse key industrial ICT trends and business opportunities and will identify leading industrial cross-innovation practices in transport and logistics respectively.

Sources

This qualitative report has been primarily prepared through a revision and analysis of secondary data, particularly focusing on:

>> Main policies implemented at European level in the field of smart and sustainable transport.

>> The role of ICT and overview of emerging ICT trends in transport and logistics; from the information value chain to new industrial archetypes.

>> The boundaries of ICT solutions adoption and associated thresholds.

Three major domains for ICT

In this report, emerging technological trends have been identified in three main domains in which ICT is being implemented and is redefining transport:

These domains will also set the basis for the selection of ICT trends in transport and cross-innovation practices to be shared among the project’s stakeholders.
In particular, the following criteria are taken into consideration when selecting innovative practices:

**The quadruple helix system**, which involves the consolidation of the spaces and the non-linear interactions between the State (Government), the Academic and technology community (Science); the industry (Enterprises) and the society (Consumers/Users). These relations are expected to generate new combinations of knowledge and resources that can foster innovation, especially at a regional level.

**The Scope of actions**, based on the variety of interest of the stakeholders, they vary from the economic profitability to the scientific relevance and the social impact of the results.

**Modes of transport**, telling apart the different ways to perform transport (rail, road, waterborne, urban and air transport), and also considering how to deploy them.
3. SMART, GREEN AND INTEGRATED TRANSPORT: CHALLENGES AND OPPORTUNITIES, IN EUROPE AND BEYOND

3.1 Key objectives of the European Transport Challenge

Smart, Green and Integrated Transport

The European Union’s growth strategy, Europe 2020, seeks to move towards a smart, sustainable, and inclusive economy. In this regard, the EU has set a number of targets to be achieved by 2020, which focus on five key domains, namely: employment, education, research and innovation, social inclusion and poverty reduction, and climate-energy.

Undoubtedly, competitive and sustainable transport systems are vital for Europe’s global competitiveness, since they have an impact on economic growth, job creation and, of course, on people’s quality of life.

The European Commission has adopted an integral approach in transport that takes into consideration the specificities of each mode: rail, road, waterborne, urban and air transport. In this context, the transport challenge ‘Smart, Green and Integrated Transport’, addresses the following priorities:

>> Resource-efficient transport enabled by making vehicles cleaner and quieter, by developing smart technology, infrastructures and services, less dependent on fossil fuels;

>> Better mobility, less congestion, more safety and security, achieved by developing new concepts of freight transport and logistics, and by reducing accident rates and improving security with the help of ICT;

>> Global leadership for the European transport industry by reinforcing the competitiveness of European transport manufacturing industries and related services and retaining areas of European leadership such as aeronautics;

>> Socio-economic and behavioral research and forward-looking activities for policy-making.
The White Paper on Transport 2011

The European Commission has specified ambitious carbon emission reduction targets for the coming decades in its White Paper on Transport (2011). The White Paper’s main target is to reach the 60% emission reduction target by 2050. In order to meet this goal, it needs to be accompanied by an efficient core network for multimodal intercity travel and transport. For intercity travel, the objective is to shift 50% of all medium-distance transportation of passengers and goods from road to rail and waterborne systems. Concerning urban transport, the objective is to halve the use of conventionally-fuelled cars by 2030 and pull them out completely in urban areas by 2050.

There are also important targets for long-distance travel and intercontinental freight. The EU aviation industry should become a front-runner in the use of low-carbon fuels to reach the 2050 target. Meanwhile, the EU CO2 emissions from maritime transport should be cut by 40%, if feasible 50%, by 2050 compared to 2005 levels.

The 2011 Transport White Paper also puts forward a long-term strategy for a transition to a new way of life in cities and regions. The main issues of the ‘new paradigm of urban mobility’ are the transition from a mobility paradigm based on the private car to one based on walking and cycling, high quality public transport, cleaner vehicles, and more efficient distribution of goods.

Roadmap to a Single European Transport Area - Towards a competitive and resource efficient transport system.
3.2 Current major transport research challenges and opportunities in Europe

This section identifies major research challenges and opportunities in today’s transport and logistics sector. Innovating and transforming a business model is not enough and research will open the road for future discoveries. In the coming years, more companies will have to back science in order to achieve really disruptive innovation.

It will not be easy though, and it is really difficult that the opportunities arise. Research centers will have to stay on the cutting edge to continue opting for programs of public support and must come closer to objectives which are useful to business. Companies will have to get their innovation needs perfectly identified so that the research can really be applicable. Clusters do have a major role in reducing the distance between the laboratories and research departments and the market, thus contributing to the industrialization of Europe. Indeed, clusters have to connect more and better university entrepreneurs with investors and business specializing in the marketing of industrial property will take up fundamental role.

Business specializing in the marketing of industrial property will take up fundamental role. It can be considered the idea of delivering the intellectual property in projects freely, with the expectation of recovering the investment in the future. Large companies will have to function as traction units and work closely with research groups, collaborating with scientists who are prepared to solve a problem in exchange for a return. Large investors will need to form companies which attract radical research projects, where the patents, although difficult to apply, will open the road for future discoveries.

The majority of European smart and sustainable transport projects share the general objective of increasing the mobility of people and goods. The ultimate goal is to facilitate mobility, strengthen regional economies and to achieve cohesion and competitiveness while mitigating adverse environmental, social and economic impacts. Nevertheless, the industry still faces many challenges to become fully efficient. Challenges and future actions that need to be taken to overcome the existing barriers for the development of a smart and sustainable transport are identified below:
### A. Incompatible infrastructure and use of land

| Challenge | An integrated approach to land use and transport planning is crucial for the sustainable development of cities and regions. It should also result in enhanced policy-making and public transport system. However, current policies often diverge and urban planning is limited by different factors such as historic building and infrastructure, cultural approaches or organizational issues. |
| Sample Project | MODTRAIN: Rail interoperability is needed to ensure that the European trains of tomorrow will enjoy the same freedom of travel as the EU’s citizens do today. This is why the European Commission funded the MODTRAIN research project, which worked on standardizing the numerous components that make up a train, as well as the interfaces between them. |

#### Opportunities

- Joined investment plans;
- Coordinated land planning;
- Further development of TEN-T network;
- Open standards for design of infrastructure and information exchange systems.

#### Sample Project

NEWAC: The NEWAC project has developed and tested novel core engine technologies aimed at closing the gap between current emissions levels and emission reduction targets. The goal has been to fully validate novel technologies enabling a 6% reduction in CO2 emissions and a 16% reduction in nitrogen oxide (NOx).

#### URL:
- [http://www.modtrain.com/](http://www.modtrain.com/)
- [http://www.newac.eu/](http://www.newac.eu/)

### B. Growing Green House Gas Emissions

| Challenge | In this field, electric vehicles are one of the promising technologies for achieving more sustainable transport and it is currently strongly supported by local and national initiatives (e.g. Holland). Nevertheless, electric vehicles still have a low market penetration. The main constraint are the high investment costs justified through high mileage use. The other barrier is the lack of recharging systems well-dispersed throughout cities and that cannot always be installed in private homes. The ideal framework to introduce electric vehicles is their introduction in public and private fleets. |
| Opportunities | - Green technologies, electric cars;
- Promoting of walking and cycling;
- Better public transportation network,
- Eliminating traditional vehicle from urban areas, low carbon aviation and maritime transport. |

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- [http://www.modtrain.com/](http://www.modtrain.com/)
- [http://www.newac.eu/](http://www.newac.eu/)
### C. Dependence on fossil fuels

**Challenge**
The volatility of fuel prices is a critical issue. The cost of energy relates directly to the forms of transport selected by companies for logistics and the options selected by people for daily transport. The increase of prices may lead to a re-territorialization of supply chains and a relocation of manufacturing closer to the sources of demand.

<table>
<thead>
<tr>
<th>Opportunities</th>
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<tbody>
<tr>
<td>- Development of alternative fuelling/charging infrastructure;</td>
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<tr>
<td>- Focus on research in cost-effective renewable fuels;</td>
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<tr>
<td>- Shorter design-to-market cycles for green technologies.</td>
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**Sample Project**
**NICE:** A new internal combustion engine addresses the drawbacks of petrol and diesel designs. As a result, it cuts both fuel consumption and carbon dioxide emissions. In particular, one sub-project taken on by a group of partners within the NICE consortium, led by Centro Ricerche Fiat, focused on turbocharged spark-ignited gasoline engines. They developed the application of an advanced system of variable valve actuation using electro-hydraulic technology, which improves on similar systems by allowing multiple valve opening and closing in a single cycle and in being simple and cheap enough to be mounted on the lowest cost segments of the car market.

**>> URL:** [http://www.greendigitalcharter.eu/projects/niceproject](http://www.greendigitalcharter.eu/projects/niceproject)

### D. Low safety

**Challenge**
Improving transport safety is a targeted action performed by many stakeholders, of both the public and private sector. It includes proper design of transport networks, intelligent transport systems (ITS) and cooperative systems of transport infrastructure, vehicle and driver, an infrastructure that can prevent accidents, injuries, risks and deaths.

<table>
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<tr>
<th>Opportunities</th>
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<tr>
<td>- To separate cargo and passengers corridors;</td>
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<td>- Improvement of the signaling systems;</td>
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<tr>
<td>- Implementation of new vehicles safety systems.</td>
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**Sample Project**
**SafeTRIP:** Satellite applications for emergency handling, traffic alerts, road safety and incident prevention. The SafeTRIP project demonstrated the possibilities for commercial services based around the S-band communication channel available via the Eutelsat 10A satellite. This channel is optimized for broadcast multimedia content delivery and two-way data communication via small mobile units that are ideal for vehicle applications.

**>> URL:** [http://www.safetrip.eu/](http://www.safetrip.eu/)
### E. Congestion

**Challenge**

An increase in people demand of public services is expected due to the rising populations and increasing levels of urbanization, particularly in urban areas. Shifting mode choice from the private car to collective transport may help meeting many challenges of urban transport system such as environmental issues, but also health threats and accidents, waste of public space, etc. New collective transport and logistics solutions are available, such as car sharing, public bikes or demand-responsive transport, and also innovative freight solutions. These services are complementing traditional public transport and making more flexible and attractive the overall offer.

**Opportunities**

- Development of high-speed rail;
- Increase in density of rail networks;
- Efficient and green freight corridors;
- Development of intermodal hubs;
- Intermodal integration of transport services.

**Sample Project**

**Straighsol**: The EU-funded Straighsol project is piloting new systems and solutions for improved city transport, with a focus on better, safer and more efficient parcel and freight delivery. A large freight trailer is driven into the city and parked in a strategic location each morning. It then feeds individual three-wheeled, electric-motor-assisted pedal vehicles that take parcels to their final destinations. At the end of the day, these tricycles return to the trailer with parcels to be shipped back out and the trailer is picked up and returned to the company’s central depot.

**>> URL:** [http://www.straightsol.eu/](http://www.straightsol.eu/)

### F. Mobility Management

**Challenge**

Intelligent Transport Systems can help reaching this goal making it not only faster and more efficient, but also more ‘user-friendly’. There is a great potential still to be explored, with ‘open data’, ‘mobile applications’ and ‘big data’ offering considerable opportunities for better transport management and new services.

**Opportunities**

- Promotion of co-modality;
- Incentives for usage of public transport;
- Creating platforms connecting airports and ports with efficient rail services;
- Establishing the framework for a European multimodal transport information, management and payment system, attractive frequencies, comfort;
- Easy access, reliability of services;
- Smart intermodal ticketing, with common standards.
### G. Financing Transport

**Challenge**

This challenge will need to be addressed by a variety of funding mechanisms from Public-Private Partnerships, by privatizing certain parts of infrastructure or possibly by investigating different tax revenues streams. Public transport is a unique market since the customers are not only the citizens and visitors using the service, but also the Public Authorities that co-finance it. The overall legislative framework for public transport in the EU is normally defined by national governments. Nonetheless, local governments play a decisive role in the definition and implementation of public transport financing schemes.

**Opportunities**

- Connecting prices and taxes with sustainability;
- Self-financing of maintenance and development of infrastructure, incentives for companies for usage of intermodal transport, full application of “user pays” and “polluter pays” principles, elimination of the harmful subsidies;
- Regulatory framework and innovative financial instruments to unlock the potential of private sector in co-financing infrastructure’s deployment and maintenances.

**Sample Project**

**INVOLVE**: this project promoted that in cities like Madrid, a telecommunication company co-financed the construction of the metro stations serving their new headquarters.

>> URL: [http://www.involve-project.eu/](http://www.involve-project.eu/)

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Within the European Commission’s Transport Policy we can find guidelines to create a friendly transport system for the natural environment and EU citizens. Nonetheless, the achievement of these goals requires a coordinated cooperation of local, regional and international stakeholders. Despite the considerable progress made in the last years, there are still a number of barriers. In order to provide sustainable transport services, new investments, shifts in mobility patterns and further technological development are needed.

**Further readings**: [http://ec.europa.eu/research/transport/index_en.htm](http://ec.europa.eu/research/transport/index_en.htm)
3.3. Enhancing the competitiveness of the transport sector through cooperation within Europe and beyond

As it has been said, constraints can be transformed into research and business opportunities by addressing the key transport and logistics challenges of Europe, which will make our industry more competitive and cooperative. These solutions and standards can be transferred to other regions that are confronted with similar challenges.

Resources are scarce while the demand is growing dramatically. There is an urgency to design, organize and manage transport and mobility in smarter ways. There is a need to explore how these challenges can be addressed in an integrated way with actions that will:

>> Impact in the form of new technologies, information systems, and business practices.

>> Be evolutionary, improving existing technologies, systems and practices, while others will be more revolutionary, offering a step-change in performance or innovative solutions.

>> Impact on the demand-side of EU transport, including people’s behavior and company logistics.

International cooperation will have major role to play to achieve a true competitive transport and logistics system in Europe. Global challenges such as CO2 and polluting emissions, oil dependency, transport safety and security, noise pollution, and standardization of many services, products and procedures will benefit from global solutions. Local challenges such as traffic congestion or land use planning can also profit from best international practices.
These exchanges are important to enhance the competitive advantages of European industries by promoting the take-up and trade of novel technologies, in particular where the applicable regulatory regime is international and can thus result in barriers to the market introduction of innovative solutions coming from EU actors. High-end European produced vehicles and European know-how has a strong demand in emerging markets.

The future transport growth will take place outside Europe, therefore, access to knowledge and to new markets will become increasingly important. Potential areas for mutually beneficial cooperation with the United States include road transport automation, green vehicles, safety, infrastructure, and climate change mitigation and adaptation. Cooperation with China, Brazil and other countries will focus on green vehicles and safety. For Euro-African science diplomacy partnership safety will be the priority. Consequently, multilateral exchanges on transport research and innovation strategies and investment priorities could be pursued with a major international partner country.
4. EMERGING ICT TRENDS IN TRANSPORT AND LOGISTICS

Foreseeing the future can be a complex task. Nonetheless, there are megatrends that can help us identify ICT trends in the transport industry. For instance, the fact that 21st will be the century of cities means that business will take place in the urban world, which is increasing every day by 180,000 inhabitants. More than half of the world’s population lives now in cities and in 2030 this figure will exceed 60%.

We will live in smart cities. Networks of sensors will obtain information in real-time, which will be used to improve the quality of life and empower citizens. With the help of technology, civil society will not only be able to become involved, but also lead planning for their city. The great challenge of cities will be mobility, and solutions will not only come from public transport and the use of bicycles, but also from multipolar cities, where it will be possible to live, work, buy and find entertainment without having to go to the city center. Sooner or later cars will be self-driving, and this will improve mobility and sustainability, a determining factor by which models of proximity production, self-production of energy and food self-sufficiency in cities will also be consolidated.

We will also optimize the possession of goods: sharing instead of owning. This will not only be more economical, but may be the only way to have access to certain products or services.

This will require new infrastructures for sharing, from services to share cars, tools or workspaces, to digital networks to accelerate the exchange of goods and services in the collaborative economy. Cities will be more complicated, with unpredictable situations regarding mobility, energy, health, environment, a multitude of social factors. These difficulties will offer opportunities for businesses and professionals able to anticipate them.

Three main domains for ICT in Transport and Logistics

As it has been discussed, ICT will play an increasingly influential role in transforming the transport industry. In this section we will explore three main domains in which ICT is being implemented and is redefining transport:

> Intelligent Transport Systems (ITS) and Logistics;
> On-Demand Transport Services;
> Disruptives Industries.
Through these areas we will analyze concepts such as **data-driven driving**, which is changing the nature of commuting and insurance; or **social logistics**, that apply the logics of social networking to freight.

*Figure: Key Features of digital-age transportation system. Source: Digital-Age Transformation. Deloitte.*

**Smart Cities**

A smart city is one in which the seams and structures of the various urban systems are made clear, simple, responsive and even malleable via contemporary technology and design. Citizens are not only engaged and informed in the relationship between their activities, their neighborhoods, and the wider urban ecosystems, but are actively encouraged to see the city itself as something they can collectively tune, such that it is efficient, interactive, engaging, adaptive and flexible, as opposed to the inflexible, mono-functional and monolithic structures of many 20th century cities.

*Definition by Arup*
4.1. Intelligent Transport Systems (ITS) and Logistics

For decades technology has been applied in the transport sector to help improve safety and efficiency. Intelligent Transport Systems aims to provide innovative services in relation to different modes of transport and traffic management. The ultimate goal is to enable users to be better informed and promote a safer, more coordinated and ‘smarter’ use of transport networks.

There are a large number of possibilities for ICT in this field, for instances in telematics and communications in vehicles, between vehicles (car2car), and between vehicles and infrastructure (car2infrastructure).

Open data, mobile applications and big data are offering considerable opportunities for better transport management and new services.

Next generation of urban transport systems will connect transportation modes, services, and technologies together in innovative ways.

Figure: Urban gridlock. Source: Digital-Age Transformation. Deloitte.
However, the transport sector faces difficulties in sharing information quickly and easily among multiple systems and sources: sensors, satellites, cars, social media, etc. Information is often held in data silos, meaning that the different actors within the transport value chain do not share information in a coordinated manner. An integrated approach to using data is necessary to create an information marketplace for transport and logistics truly operative.

Therefore, there are considerable opportunities for better transport management and new services far from exhausted within the Internet of Things (IoT). Below we analyze the opportunities in data integration and logistics.

**The Internet of Things (IoT)**

IoT is the concept of basically connecting any device with an on and off switch to the Internet (and/or to each other). IoT includes everything from cellphones, coffee makers, and washing machines to wearable devices. This also applies to components of machines, for example a jet engine of an airplane or the drill of an oil rig. The IoT is a giant network of connected “things” (which also includes people). The relationship will be between people-people, people-things, and things-things.

**4.1.1. Data Integration**

As it has been mentioned before, faster processors in sensors will enable a more dispersed network of counters, near-field communication, light sensors, sound sensors, wifi device sensors (smartphones) and video cameras that can be used to not only track transport patterns, but also to create significantly smarter traffic systems.

Smart traffic systems assist in reducing congestion, increasing safety and creating a more enjoyable transit experience for commuters.

**Traffic Vision** is a good example, this software turns any traffic monitoring camera into an intelligent sensor, and detect incidents and continuously collect real-time data. By providing the information needed to reduce the impact of incidents and recurring congestion on highways, TrafficVision helps traffic managers provide safer and more efficient travel for the public.

Some moves in this direction have been made in the field of the “connected car”, where end users’ cars are connected via the cloud to a variety of actors they were previously unconnected to. Through these sorts of applications, the Internet of Things (IoT) allows drivers and passengers to access applications from a screen within their vehicle that provides them real-time information regarding traffic, congestion, possible parking spots and tailored navigation services.

**Metaiot** turns your car into a wifi hot-spot to enjoy 3G wifi on the road, it ensures real-time location tracker, parking finder and navigation or set custom alerts for over-speeding and route-deviation.
Sensors in the car may transmit information to the car manufacturer to improve product development and provide tailored maintenance schedules for the drivers.

For instances, **Bitkar App** enable car owners to find trusted service providers easily and improve the car maintenance experience and ownership experience.

City officials can also look into these data streams in order to gain a more detailed understanding of driver behavior, areas of the city that need more planning in order to reduce blind spots, maximize maintenance etc.

In this way, cars may be viewed as a fundamental part of the transport infrastructure itself. **Without connectivity between cars and between a car and the broader transport infrastructure, truly efficient transport infrastructures will not emerge.**
4.1.2. Logistics

Logistics is an area where ICT has been successfully applied for many decades in managing the flow of goods between end points. ICT has already led to substantial improvements in real-time monitoring of the flow of goods. Tracking and tracing systems allow an exact view of location of different products, be they at the supplier, distributor, salesman, or already delivered to the end-customer. These systems have been successfully applied to reduce theft, pinpoint route tampering, provide equipment tracking, reduce delays in production and increase the security of products and staff. Delivery processes have been improved by providing detailed information on temperature, air quality and by monitoring the rate of decay. Decision makers now receive a broad picture about the condition and location of individual goods as well as components across the entire supply chain. IoT holds significant promise for logistics in creating increasingly efficient and effective supply chain processes. Strong ICT capabilities are a core competence and often a core differentiator in this industry.
Logistics can have a significant impact on manufacturing company's margins and companies are therefore often trying to understand how to best integrate flows to minimize so-called “empty running”.

Surprisingly, some innovative ICT applications in the logistics industry has not been fully embraced until today. For example, many systems such as IsoTrak allow companies to know the rough locations of drivers and trucks long their routes. Since the companies were charged per message to know the location of drivers and trucks, many companies did not use these services since it would affect margins. Instead, companies used this system to maximize fuel efficiency and attempt to reduce empty runs by drivers and trucks, rather than to fully streamline their operations.

Nowadays the cost barrier has been overcome as the costs of sensors, smartphones and other tracking technology has fallen, and many companies have decided to invest in such innovations.

Logistics operations that rely on trucking or road transport are familiar with smartphones, sensor technology or GPS. This allow them to have more control over delivery routes and the performance of individual drivers.

In the maritime field, where assets such as ships, containers or lift trucks are dumb and disconnected, the introduction of the smart containers will drive the digital supply chain revolution. 3PL companies are currently embracing Machine-to-Machine (M2M) communication solutions (satellite-based IoT communication). The areas of application for M2M communication are tremendously diverse. In all of these applications areas, sensors, machines, individual modules and complete systems communicate with one another or transmit the data to a central control center.

ORBCOMM is a leading global provider of Machine-to-Machine (M2M) communication solutions designed to remotely track, monitor, and control fixed and mobile assets in the fields of transportation and distribution, heavy equipment or maritime transport. One of its clients is the Maersk Line, which regards smart containers as a ‘game-changer’.

Maersk Line took the decision to equip its fleet of over 260,000 refrigerated containers with machine-to-machine (M2M) technology that gives global real-time visibility into equipment location and status, and allows the carrier to remotely control temperature, humidity and other climate settings for perishable cargoes.

Thanks to this technology Maersk and its customers have already started to reap the benefits, seeing a significant reduction in cargo damage. Some 30% of the food produced by the world is lost each year, and smart reefers have a part to play in tackling this, improving cold chain stability and reliability in a globalizing food market. Remote container management is also cutting down on the need for manual equipment inspections along the cold chain. This is helping to drive down costs – a critical consideration in today’s straitened shipping climate – as well as to reduce the risk of human error in data collection.
Further readings on Maersk’ Smart Containers:


>> Podcast: Keeping it Cool with Smart Container Monitoring Technology: http://theloadstar.co.uk/podcast-industry-reaction-maersks-remote-container-management-game-changer/

Even **smaller logistics companies** are able to take advantage of the reduced costs of digital technologies. Many studies show that carriers and owner-operators are placing greater dependence on devices including smartphones, tablets and apps, to run their businesses, find freight or improve load management. **Integrated transport solutions** will become critical to the competitive success of a broad variety of logistics operations and as a result, this sector of the industry is likely to provide opportunities for industrial transformation for new entrants.

Nowadays several startups and mobile application are proving to be as disruptive to the transportation industry as Uber was for the taxi business, changing the existing role of the broker. **Some of the startups on the list below will probably make a huge difference:**

**Fleet Backhaul**

**Coyote Logistics**

Coyote Logistics, Chicago based company, founded in 2006, enables its customers, such as Heineken, to lower transportation costs by taking advantage of spare capacity on its carriers’ return trips. On a map of Texas routes, Coyote reduced the distance its trucks traveled empty by 225,000 miles.

**Chief Marketing Officer Jodi Navta about how Coyote’s technology is making its people and its operations more efficient:** “Today it’s not only about capturing vast amounts of data, but it’s also about enabling our employees to quickly find and use the right information to provide useful insights to our customers and help them be more successful and efficient in their supply chain operations,” said Navta. “We are hyper-focused on harnessing the power of our technology and making our data actionable by those who will benefit most.” Coyote is essentially offering “Shipping as a Service,” and it is transforming the shipping industry just as the cloud has rocked the world of traditional software manufacturing.

**Transportation systems**

**Matternet**

Matternet is a transportation system made up of Unmanned Aerial Vehicles (UAVs), landing stations and routing software. The system aims to transform the way we move goods locally, starting with the pharmaceutical delivery market in areas inaccessible by traditional infrastructure. Check link below to watch Matternet CEO Andreas Raptopoulos’ TED Talk.

>> Video: No roads? There’s a drone for that: https://www.youtube.com/watch?v=9yEIo-bCA9M&feature=youtu.be
<table>
<thead>
<tr>
<th><strong>Freight rates</strong></th>
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<tbody>
<tr>
<td><strong>Freightos</strong></td>
</tr>
<tr>
<td>A website – and a network of freight forwarders – that provides automated freight quotes and a contract management system for shippers.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Containers</strong></th>
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<tr>
<td><strong>Staxxon</strong></td>
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<tr>
<td>A shipping container folding/nesting technology that removes the air from empty shipping containers so you can move 5 empty shipping containers in the same space as 1.</td>
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</tbody>
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<table>
<thead>
<tr>
<th><strong>Crowd shipping</strong></th>
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<tbody>
<tr>
<td><strong>PiggyBee</strong></td>
</tr>
<tr>
<td>It is a crowd shipping service. PiggyBee connects people who want to get or ship something with travelers.</td>
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<table>
<thead>
<tr>
<th><strong>End-to-end shipping</strong></th>
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<tbody>
<tr>
<td><strong>Shipster</strong></td>
</tr>
<tr>
<td>Logistics service network for local and long distance shipping. Take a picture of anything, a Shipster Agent picks up and takes care of everything else (including packaging, documentation and shipping through partners).</td>
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<tr>
<th><strong>3PL</strong></th>
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<tbody>
<tr>
<td><strong>Shipwire</strong></td>
</tr>
<tr>
<td>It is an enterprise logistics platform from which you can handle all your logistics needs in the cloud, including warehousing, processing, shipping and sales channels.</td>
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<table>
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<tr>
<th><strong>Fleet Management</strong></th>
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<tr>
<td><strong>Local Motion</strong></td>
</tr>
<tr>
<td>A car fleet management system for companies making it easy to share vehicles and monitor the fleet after installation of an onboard module.</td>
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<table>
<thead>
<tr>
<th><strong>Local delivery</strong></th>
</tr>
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<tbody>
<tr>
<td><strong>Boxc</strong></td>
</tr>
<tr>
<td>Boxc offers cheap 3-5 day international shipping to US buyers, and accept returns at a US address. Boxc achieves this by aggregating shipments, and choosing the optimal carrier for each leg of the journey.</td>
</tr>
</tbody>
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<table>
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<tr>
<th><strong>Trucking</strong></th>
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</thead>
<tbody>
<tr>
<td><strong>Cargomatic</strong></td>
</tr>
<tr>
<td>A platform that provides shippers with instant access and real-time visibility to trucks around them via mobile app and cloud-based software.</td>
</tr>
</tbody>
</table>
4.1.3 Multimodal Transport

Multimodal transport refers to the transportation of goods by two or more different modes of transport (such as road, rail or inland waterway, and short- or deep-sea shipping) as part of the contract where often a multimodal transport operator (MTO) is responsible for the performance of the entire haulage contract from shipping to destination (UN, 1989). The movement of goods could be within one country or international with additional procedures such as goods clearance at customs. It aims to transfer goods in a continuous journey more efficient from a financial, environmental and time perspective. With the massive growth in containerization and the great shift from a conventional unimodal to a multimodal approach, multimodal is currently the main method used in international transportation process.

A combination of different features of each transport mode could place additional constrains on goods during transportation such as packaging, transportation conditions and storage. On the other hand, multimodal combines the specific advantages of each mode in one voyage, such as the flexibility of road haulage, the relatively large capacity of railways and the lower costs of short/deep-sea transport in the best possible way. Moreover, in comparison with road transport, which plays a relatively dominant role in the traditional freight transport industry in Europe, several alternative modes of transport, such as rail, inland waterway and short-sea shipping, are widely recognized as being less harmful to the environment with regard to CO2 emissions.

Therefore, due to the advantage of multimodal transport as well as the increasing pressures to act on climate change through reduction of carbon emissions, government, the European Commission proposes several measures aimed at developing a European transport system capable of shifting the balance between modes of transport and encouraging the use of multimodal transport (EC, 2011).

Multimodal transportation process is complex and involves different players: freight forwarders, third-party logistic service providers, couriers, carriers of different modes of transport, MTOs, rail, sea carriers, port and intermodal terminal operators. The communication between these parties needs to accurate, timely and efficient to ensure flawless and visible delivery process which could be challenging due to different technology being deployed by different companies.

Each phase of the multimodal transport chain needs to be optimized and integrated:

> Transportation order handling (delivery schedule, forecasting);
> Prepare the transportation chain (select and contract actor services)
> Prepare transportation (loading, customs)
> Perform transportation (report on unloading, loading, damage)
> Monitor transportation (track vehicles and driver’ behavior)
> Terminal operation (control loading/unloading, manage stock terminal)
The range of activities varies from resource management and port operation to fleet and freight management processes that need to be supported by appropriate ICT solutions. ICT initiatives under EU framework programmes to support multimodal operations can be categorized in the following classification:

**A. Freight resource management systems and applications** deploy solutions for effective and efficient use of resources supporting an organization and focus on optimization and execution of resources supporting infrastructure; equipment and production, financial transaction, human resources, transportation planning organization, vehicle routing and scheduling, and others.

The objective of these application is to achieve a match between supply (transport orders) and demand (Transport capacities including vehicles, drivers and storage areas) at minimum cost with information consolidation at the dispatchers site and the optimal matching of orders to vehicles.

Sample projects:

**F-MAN** (2005) developed a prototype of a telematics system that provides wagon position and status information to allow a fleet manager (rail) to carry out an economic selection of his wagons and update that decision if the wagon is delayed.

The **MarNIS** (2009) project represents the Maritime Information Management and Maritime Operational Services concepts for port traffic management. The EC co-funded project 'Maritime Navigation and Information Services' (MarNIS) goes a long way to supporting the EU in their ambitions through providing a substantial and valuable contribution to the E-Maritime concept.

**B. Terminal and Port information and communication systems and applications** support intermodal terminal and port operations where transportation movement is temporarily interrupted and freight is changing transportation mode as well as responsibility for certain transshipment times and related costs. Road haulers, railway operators, port authorities, cargo handling companies and customs are among the existing participants of intermodal terminals which could be seaports, river ports, dry ports and inland containers depots. Single window system, often initiated by government bodies, is a popular concept in this respect, which allows traders to submit all import, export, and transit information required by regulatory agencies via a single electronic gateway, instead of submitting and processing the same information many times for different government entities.

Sample projects:

**uTradehub** in Korea and **TradeNet** in Singapore represent such initiatives. At individual terminal or port level, projects such as the **CHINOS** (Container handling in intermodal nodes, 2009), address challenges faced by container terminal and transport operators due to security issues and cargo volumes through innovative IT technology such as RFID.

The **Metrocargo Intermodal Transport** (MIT, 2011-2013) project aims to scale up a full industrial installation of a fully automated system for the distributed intermodal transport over a territory and for processing full trains in port/dry-port shuttling.
C. **Freight and Fleet tracking and management systems and applications** aim to reduce uncertainty in every link of the multimodal transport chain and improve operational efficiency between modes of connection. ICT management systems enable the tracking, monitoring and controlling of cargo and vehicles: they are underpinned by the appropriate reporting tools and based on real-time related information through the integration of various technologies such as on-board computers, web-based tools and short-range identification technologies.

Sample projects:

- **The focus of the D2D project (D2D, 2005)** is on an integrated and global management system for door-to-door intermodal transport operations though the development of a transport chain management system, a freight transport monitoring system and the application of “smart technologies” to improve the efficiency of multimodal transport operations.

- The main objective of the M-TRADE project (M-TRADE, 2007) is an integrated end-to-end system providing services related to tracking and tracing goods, the identification of freight and efficient transshipment at terminals and nodes and monitoring transportation of hazardous and perishable goods. A container door-to-door transport chain is conducted through the use of advanced technology in the SMART-CM project (SMART-CM, 2011).

D. **Integrated operational/information exchange Platform/Portal/Marketplace** intend to improve overall performance of multimodal transport to create a seamless and secure information system by interconnecting developments in mobile and wireless communications, tracking and tracing, fleet and freight management and Internet-based technologies. Integrated platforms aim to link all actors together to allow cooperation, collaboration and information sharing from the point of dispatch to the point of arrival.

Sample projects:

- **Global Intermodal Freight Transport System (GIFTS)** framework aims to improve and integrate existing and emerging intermodal freight transport technologies into one internet platform (the GIFTS Integrated operational Platform) focusing on small and medium players (GIFTS, 2004).

- Applications support activities related to administrative services, freight transport, operational monitoring, control functions and E-Commerce services. The **e-FREIGHT** project aims to achieve optimal and sustainable deployment of European freight transport resources through e-Freight Platform that provides a repository of e-Freight solutions and services and a “run-time” environment to support interaction with solutions (e-FREIGHT, 2011).
4.2. On-Demand Transport Services

Small-scale consumer technology such as smartphones and tablets as well as the availability of cheap cloud computing allows the creation of new organizational forms in industrial structures and networked societies. Within this section, these small-scale developments in the transportation industry are explored:

**SOCIAL TRANSPORT**

1. After telecommuting from home in the morning, you need to get across town for an afternoon meeting with a client.

2. A quick comparison of the time, cost, carbon footprint, health-benefit analysis, and awards points associated with all of your possible travel options, you see that there are shower facilities and bike rack within a couple blocks of your client’s office and opt to grab a bikeshare across town.

3. It’s raining when your meeting wraps up, so you opt to share a ride to the gym after work. You pull up your real-time rideshare app and see that a driver headed in the same direction is just a few blocks away.

4. When you get out of the locker room you have an alert from your personal travel assistant that indicates there’s been an accident a half mile from your apartment and traffic’s at a standstill. You opt to burn off some additional calories and walk home rather than wait for traffic to clear.

5. When you get home, you log the day’s trips and see that you are close to the top of the employee trip reduction leaderboard at work—just 300 points away from that mountain bike you’ve had your eye on.

Figure: The future of urban mobility. Source: Digital-Age Transformation. Deloitte
4.2.1. Transport Information Broker

Within the transport industry, there has been a spreading of smartphone apps that are based around increased interactivity and networking among transport users.

Services such as TransportApi, Britain’s first comprehensive open solution for transport data from a variety of sources such as Network Rail and Transport for London (TfL). TransportApi’s Developers are able to build sophisticated transport services for end-users with integrated information on live departure, timetables, journey planning, tweet mapping, performance indicators and fares. The ultimate transport App they have developed is Citymapper, which provides on-demand route information in real-time.

Through integrating mapping services with social media and cloud computing, some apps are also able to provide analytic services to developers showing how people feelings about their commutes and related travel services. Therefore they can give further support both the developer, transport services and commuter communities.

The transportation system of the future will be built on collaborations among neighbors, communities, governments, and traffic managers on everything from traffic planning to signal timing to commute planning.

These services are also being delivered to a broad variety of customers via the increasing use of electronic signage at bus stops and other transport connection points. Through interactive interfaces, cities are able to provide access to these aggregated transport information services to all citizens – not only those with a smartphone. As we build the so-called “smart cities”, we need to consider the point of engagement where citizens interface with the city’s operating system.

Today, media facades, public screens, ambient interfaces, responsive architectures, and other forms of “public interactive” systems are transforming our physical environments into interfaces in their own right. In the photo placed above, we can see Arup’s vision for transport data visualization in real-time. Arup is an independent and internationally recognized firm of designers, planners, engineers, consultants and technical specialists. For a C40 UrbanLife workshop in Melbourne in March 2010, they envisioned screens embedded in architectural facades, at transit stations, on the side of trams, and hanging from posts on every block.
Further readings:

>> Smart Cities. Transforming the 21st century city via the creative use of technology: file:///C:/DESCARGAS/Arup_SmartCities_June2011%20(1).pdf

**Car and bike rental:** Other common practice in cities is the use of digital technologies to provide more efficient access to physical transport assets. A form of transport in which users are able to ‘pay per use’ of a bike or a car, while asset owners are able to ensure that assets are in use a greater proportion of the time.

This model can be found in a variety of transport subsectors, from bikes (e.g. **Santander Cycles**, London’s self-service, bike-sharing scheme for short journeys) to car rental (Avis’s acquisition of **Zipcar**, that allow to rent a car for a few hours) to car sharing (e.g. Peer-to-peer car renting company **RelayRides**). In addition to digital interactions, however, this organizational structure also requires new methods of access to the asset in question. Public bike rental services, for example, need both the bike pick-up physical sites as well as digital technologies.

**Car2go ‘floating car sharing’** of conventional and electric cars is a particularly advanced system making use of smart phone app communication between the customer and the service provider. It creates the possibility to locate and use a shared car without prior reservation and to drop it off anywhere within a designated urban area or region. This new scheme is different from the traditional car sharing schemes and is particularly suitable for quick and short trips in large urban areas. Car2go has been implanted in cities such as Amsterdam, Berlin, Milan, Rome or Madrid.

Source: Car2Go.
**Taxi Services**

A similar organizational form can also be found among taxi services. Through an app installed on a smartphone, end-users are able to request a taxi at their exact location, rather than having to rely on an available taxi in the street.

With apps such as **Hailo**, nearby taxi drivers receive a request and are able to decide whether or not they will pick up the passenger.

**Intermodality**

Promoting intermodality means relying upon efficient interchange systems. Trip planners are based on Information and Communication Technologies (ICT) and aim to facilitate and promote multi-modal public transport services. Recently trip planners have also come to include private cars, taxi, and pedestrian information in order to give a more complete picture. Some trip planners also provide additional information, such as cost of the trip (both for public and private alternatives), walking instructions at interfaces, calories burned etc.

The transport authorities ZTM (Warsaw) and VBB (Berlin) developed a transnational trip planner (CAPRICE) that also includes flight schedules in door-to-door trip information between the two cities and beyond. URL: [http://www.caprice-project.info/](http://www.caprice-project.info/)

The IDOS multimodal journey planner for the Czech Republic and Slovakia is another example of an advanced and highly consolidated tool (POLITE). The IDOS trip planner allows searching for train, bus, air and public transport connections or combinations of train, bus and public transportation timetables. URL: [http://www.idos.cz](http://www.idos.cz)

**4.3. Disruptive Industries**

In this section we analyze the potential for disruption of some new digital technologies and services. In particular we focus on that technology that displaces the established one and shakes up the industry or on a ground-breaking product that creates a completely new industry.

**4.3.1. Digitally-enabled ride**

**Ride Sharing**

There are services that apply a combination of cloud computing and mobile applications to allow travelers to rent time, space and a driver in someone else’s car.

**Uber** and **Lift** are two good examples that have received great attention by the media for having used digital technologies to innovate in the field of transport. Anyone who owns a car, after passing the security check, can register as a driver and is able to rent out space and time in their car. Born under the context of the “sharing economy”, it is also regarded as a type of taxi service, but one that is fully digitally enabled.
Uber’s disruption of the local cab industry has been met with resistance and regulation disputes lead by rival local taxi drivers. Despite the controversy, Uber’s ever-increasing global footprint has made its way to Africa in recent years, where it now operates in 11 cities (e.g. Egypt, Kenya, Nigeria, Morocco or South Africa).

**Parking Sharing**

**Peer to Park** App is one of the largest parking market Spain, created to connect parking garage owners to drivers who need a place to park safely and economically.

**Carpooling**

In the traditional way of sharing cars, startups such as BlaBlaCar or RideJoy offer a digitally mediated carpooling service. Through these platforms end users are able to find other people travelling to and from similar destinations to share travel costs.

**Disrupting Last Mile Logistics**

This digitally enabled model of ‘last mile’ logistics within urban areas is probably one of the most interesting organizational patterns now emerging within transportation sector.

In many modern economies the time available for visiting shops, collecting items or waiting for home deliveries can either diminish or become more unpredictable. In parallel small shops are suffering from online and large-scale retailers. In response to this a new movement has emerged, the creation of ‘last-mile’ delivery brokers within a variety of urban areas, allowing people to buy items from local stores or restaurants and have them delivered by local drivers to their home or office location.

Nowadays companies such as PostMates, in the United States, now offer delivery of anything from designer clothes to make-up accessories. Small-scale applications like this enable a degree of coordination between suppliers, brokers and end users that was previously only available to large-scale corporations with the capacity to invest in large-scale ICT systems.

In the future such deliveries could incorporate the use of drones or other form of autonomous systems as they become integrated in transport systems. Many local transport and logistics suppliers will be required as supply networks are re-established at a local level, in particular to help overcome the issues associated with congestion and last mile logistics in urban areas.

**Further readings:**

>> Uber Wants To Conquer The World, But These Companies Are Fighting Back (Map): http://www.forbes.com/sites/liyanchen/2015/09/09/uber-wants-to-conquer-the-world-but-these-companies-are-fighting-back-map/#287510182925

>> Lamilo EU Project - Smart City Logistics: innovative mapping platform for urban freight planning: http://www.lamiloproject.eu/smart-city-logistics/
4.3.2. Electric and Autonomous vehicles

Electric cars

Progress has been made to overcome the challenges of the electric car industry. With the help of approximately 3.5 million EURO in financial support from the European Union (EU), researches are developing a composite blend of carbon fibers and polymer resin – codenamed StorAGE – that can store and charge more energy faster than conventional batteries can. Volvo Cars is the only car manufacturer participating in the project.

“The key ingredient in the carbon fiber composite is lignin, a constituent of the cell walls of nearly all plants that grow on dry land. Lignin is the second most abundant natural polymer in the world, surpassed only by cellulose.”

Göran Lindbergh, KTH.

Cars that use lignin based materials would be much lighter in weight that conventional cars. Weight is the enemy of electric cars. Reducing the weight of an electric car has the effect of giving it more range without using a larger battery. Even in conventional cars, less weight translates into better fuel economy and lower carbon emissions. In addition, lignin based components can be recycled in a way that traditional carbon fiber cannot — another environmental plus for lignin.

Further readings >> Storage: Car Body Panels That Function as Batteries: https://www.youtube.com/watch?v=GDPav8eexPk

Source: Volvo. Note: Currently it is just a model.
Autonomous vehicles apply a range of technologies including sensors, lasers, satellites and car-to-car communication, to automate the task of driving. Although a full-scale adoption of such vehicles is still relatively distant, several pilot studies are in progress (Google’s driverless car). Car manufacturers are also exploring the role of driverless car technologies, including integrating concepts such as platooning of autonomous vehicles, which would allow cars to effectively travel much closer together, thus reducing congestion.

In theory, if the autonomous vehicles are designed as electric vehicles, fossil-fuel-based technologies can also be more rapidly eliminated in urban areas. Effective autonomous vehicles for short trips or for use in last-mile logistics can therefore significantly reduce emissions and fossil fuel dependency through the development of business models in which end-users can share autonomous vehicles for local journeys.

Further readings:

>> Self Driving with Tesla: https://www.youtube.com/watch?v=d1yJyRKjL54

>> How Does Google’s Driverless Car Work? : https://www.youtube.com/watch?v=ftouPdU1-Bo
5. BOUNDARIES TO ICT SOLUTIONS IN TRANSPORT AND LOGISTICS

In this section an overview of the main boundaries to ICT adoption in transport and logistics industry are presented. Nowadays, digital technologies are creating opportunities for new entrants that may cause a reorganization of the industrial structure and the means by which transport is provided to end-users.

The following boundaries should be taken into account:

> **E-commerce:** The rising number of consumers shopping online and using solutions such as click to collect and online delivery mechanisms will have a dramatic impact on logistics companies existing operations and transport infrastructures.

> **Data:** The increasing amount of data captured from sensors and smartphones will restructure the industry once a critical number of data sets are collated. The data amounted will needs to be collected, analyzed and applied appropriately within the transport sectors. This is a critical issue in the upcoming transformation of the transport and logistics industry.

> **The drop of licensed drivers to cars:** Since digital technologies allow end-users to coordinate and access transport solutions such as ride sharing, car sharing and autonomous vehicles, the number of licensed drivers will decrease. As a consequence, the number of service business models may increase and transport infrastructures will need to be flexible and responsive to these changes.

> **Insurance Risk Models:** Insurance will also be an arising difficult issue within the emerging digital world. Boundaries need to be addresses within the current laws, like for instance the liability and related risks models for the new technology solutions for different emerging modes of transport. Who will be responsible for an autonomous vehicle during an accident?

Boundaries play a major role keeping the transport industry functioning in a stable manner. Once a boundary is crossed by new entrants, the industrial structure is likely to re-adjust. As a result, existing actors within the established industrial structure will be forced to adjust their strategies. Although several action plans and policy packages relating to ICT and transport issues have been published by the European Commission, there is still a lack of coordination and synergy between stakeholders and related member states.
6. CONCLUSIONS

As discussed throughout the report, the transport industry is facing an array of challenges from a variety of sources, including growing populations, rising urbanization, changing work patterns and environmental pressures to reduce emissions. Technology has a major role to play in facing these pressures, not only leading greater efficiency, but also having a transformational impact on the transport industry.

The arrival of the “Internet of Things” and ubiquitous technology has opened up new opportunities to make the existing transportation industry far more efficient and user friendly. The most evident new entrants are the ICT manufacturers who are now critical parts of the supply chain for automotive manufacturers, leading the data-driven driving revolution. End users are now also more deeply embedded in the transport value chain: firstly, through the collection of end users’ private data about the transport infrastructure and service; and secondly, through the collection and analysis of end users’ driving performance. These driving statistics could potentially change the nature of commuting and insurance, being used to create improved vehicles or new insurance models.

For instance, with Amodo’s Connected Customer Platform, insurers can finally address the needs and lifestyle of the new connected generation properly. Amodo collects data from smartphones and a number of different connected consumer devices in order to build holistic customer profiles, providing better insights into customer risk exposure and customer product needs.

Consequently, ICT is set to become a key component of all parts of the transport infrastructure. Certainly, ICT implementation will be critical to overcome current major challenges of the transport industry as well as to foster European competitiveness in transport. More importantly, ICT can contribute to reduce congestion without building entirely a new transport infrastructure. These solutions will need to be rapidly implemented in our society in order to provide cost-effective transport solutions across the world.

Services such as real-time ridesharing and car sharing are helping end users to gain more control in their interaction with transport systems. The creation of disruptive applications allows the emergence of new organizational forms by applying the logics of social networking to freight and mobility. New apps provide commuters with the possibility to compare the time, cost, convenience, carbon footprint and health benefits across all modes of public and private transport, which broadens their range of choices and let them make real-time decisions. Meanwhile, automakers focus on the next-generation of “connected vehicles” that access, consume, create and share information with other vehicles and surrounding infrastructure in real time—improving traffic flow and safety.

The result of these innovations—and of the ecosystem of creative players that have been drawn to transportation, from information technology companies to ridesharing pioneers to app makers—is that the mobility field will look very different in the future. It will be far more interconnected, citizen centered, socially engaged and integrated than it was ever imagined before.
7. LOOKING AHEAD

The future is shaped by today’s industrial and academic collaboration.

In the last years, collaborative advantage and cross-sectorial collaboration have come to the forefront of the European competitiveness advantages. We are witnessing many companies that - either internally or externally- combine their products (hybrid products), companies that combine their knowledge, and companies that work together to gain from a combined experience (co-learning, based for example on sharing best practices).

Therefore, the future of transport business relies on the collaboration, co-creation and coordination among companies to multiply their capacity to generate new products and services. That is co-innovation. Here is where true disruption takes place by reshaping value-systems and redefining eco-systems. With this objective in mind, this technological intelligence study, aims to create the conditions for teams of passionate professionals, across diverse sectors, to systematically combine their assets and skills to make projects that a few years ago would have been unconceivable a reality.
8. SOURCES


