



# How to bring Cooperative systems on the road?

*key actions and challenges for the deployment of cooperative systems*

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## Bringing Cooperative systems on the road

*.....i.e. to the market*

Under which conditions?

What are the prerequisites to deployment?

How?

By whom?

When?

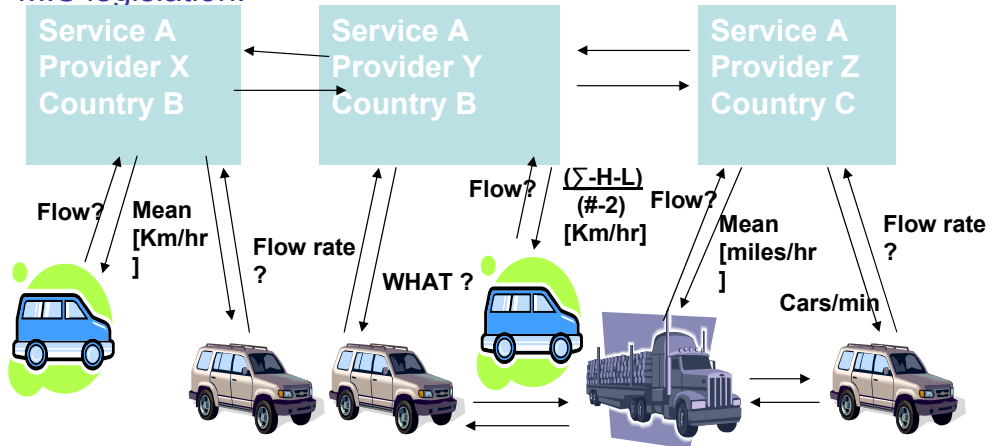




# Standardisation & Interoperability



- **Interoperability** : Onboard units in cars that travel across borders must be able to communicate with roadside equipment at different geographic locations.
- **ETSI, IEEE, ISO** are developing different standards across the continent. There is a need for harmonisation of standards not only from the standardization bodies but also from the EU & national M.S legislation.



# Legislation



✓ On 16 December 2008, the European Commission published the European Commission Action Plan for the Deployment of Intelligent Transport Systems in Europe.

✓ The Action Plan will be accompanied by a Directive and would relate to the definition of essential requirements for performance and interoperability of systems, and to the synchronisation of deployment across different Member States and between the different parties.

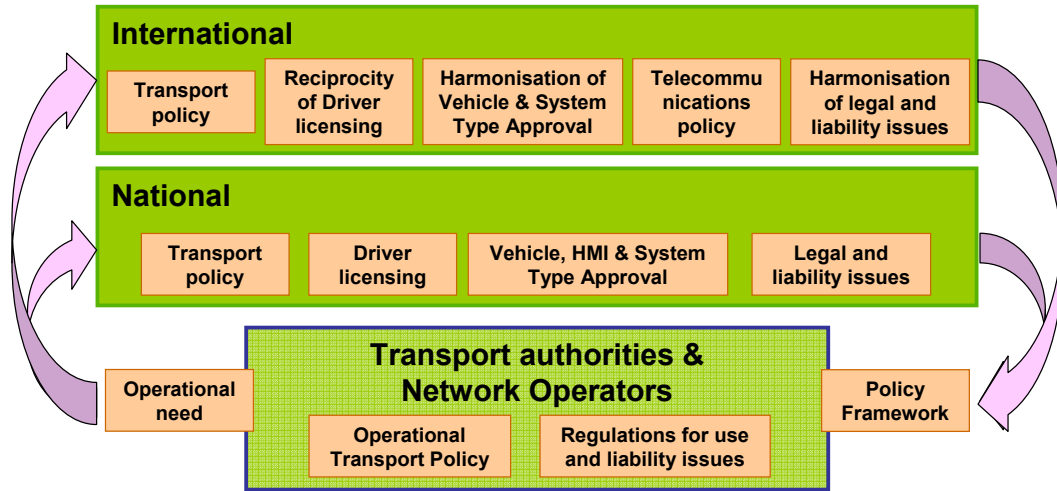




# Issues for decision making



- Iterative process:
  - Different levels - Different actors



# Prerequisites for successful Deployment



- CVIS technologies are validated
- CVIS technology is adopted
  - ✓ by consumers, vehicle makers, etc
- CVIS Systems are an accepted tool
  - ✓ with recognised benefits for all stakeholders
- Good quality information is widely available
- ✓ Quality ensured real-time information and route recommendations
- Attractive, reliable and trustworthy services
- Risks and responsibilities are clear in advance
- Positive business case ( $NPV \geq 1$ )



## Market introduction



For successful market introduction:

a) there is a **visible added value** (Traffic flow, safety, comfort / fun) of **the technology for the consumer** and/or

b) legislative order

.....which in some cases coincide



## Consumers



.....Cooperative systems **will only be successful if accepted, implemented and ultimately used by consumers.**

**Innovators** – willing to experiment with new technology

**Early Adopters** – will adopt because they have special problems to solve

**Early Majority** – will adopt once an innovation is considered mainstream

**Late Majority** – come late to adoption because they are risk averse

**Traditionalists** – may never adopt the innovation

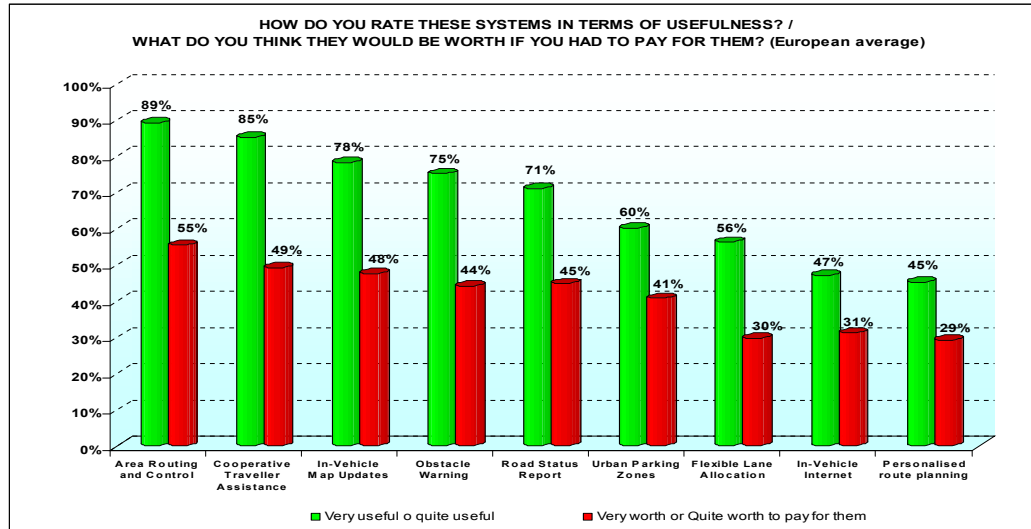
**In which group do you belong to?**





# Consumer acceptance survey

Internet-based questionnaire / 13 Automobile clubs – 12 countries / 10 different languages / 7,687 European Motorists



# Usefulness vs Willingness to Pay



- CVIS applications are generally well accepted by the consumer. In general, more than 50% of the Europeans think they are quite or very useful.
- The usefulness of the CVIS applications is higher than the willingness to pay for them.
- The % of acceptance decreases 25% on average when the consumer is asked about the willingness to pay for the systems.
- Nevertheless, around 40% state that they would accept to pay for them.

More results at <http://www.cvisproject.org>





# Privacy



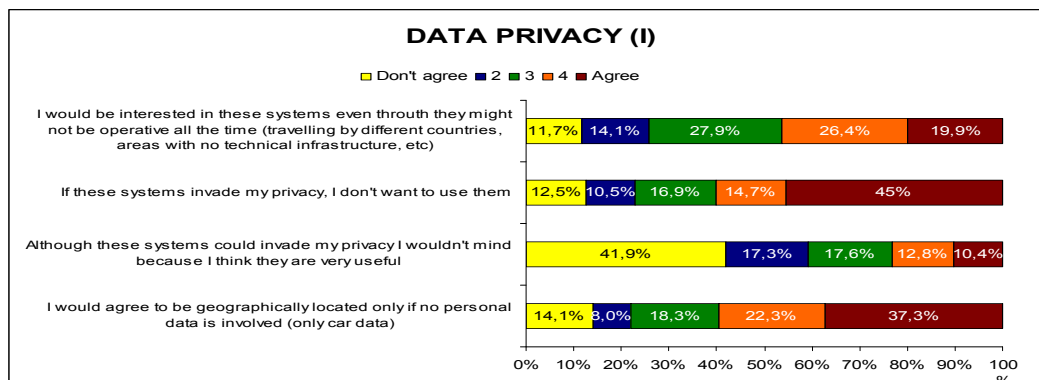
- Protecting the privacy of users depends on the member states political and legal environment.
- Strategies for dealing with Privacy : public discussion, enact protective legislation, design systems with privacy in mind and develop a set of principles.
- Privacy issues were identified at the use case and requirements level in the CVIS project, (namely the authentication and authorisation framework for CVIS applications).
- CVIS as an EC research project is also collaborating with other EC projects (SEVECOM, PRECIOSA) in the secure technical design and data privacy friendly issues.



# Consumer Data Privacy



- Only 23% of respondents don't mind the systems invading their privacy since they consider the systems very useful.
- when only car data is involved (no personal data), 60% of respondents would agree to be geographically located.
- European drivers (60%) are willing to collaborate with some restrictions, for instance, as long as no personal data is involved.



More results at <http://www.cvisproject.org>



# CVIS market introduction



For successful market introduction:

a) there is a **visible added value of the technology for the customer**

...BUT there are **network & critical mass effects**



# Network effects



Cooperative systems can only **be successful** :

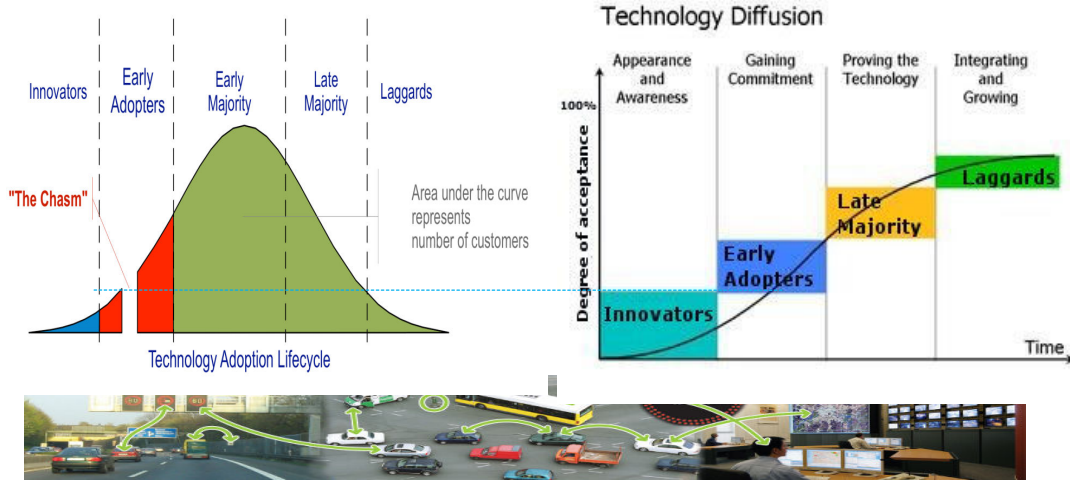
- ✓if there are enough equipped cars (OBU) and equipped infrastructure (RSU) in the area
- ✓in order to collect data and generate the relevant information (ex. information about traffic, accident, obstacles)
- ✓enough system penetration so that information is kept in a specific area or distributed over a large area or distance.
- ✓*In economics this is called technology with “network effects”. The “network effect or externality” says that the value of the good or service is directly related to the number of users and, the more users there are, the more valuable the good or service becomes.*



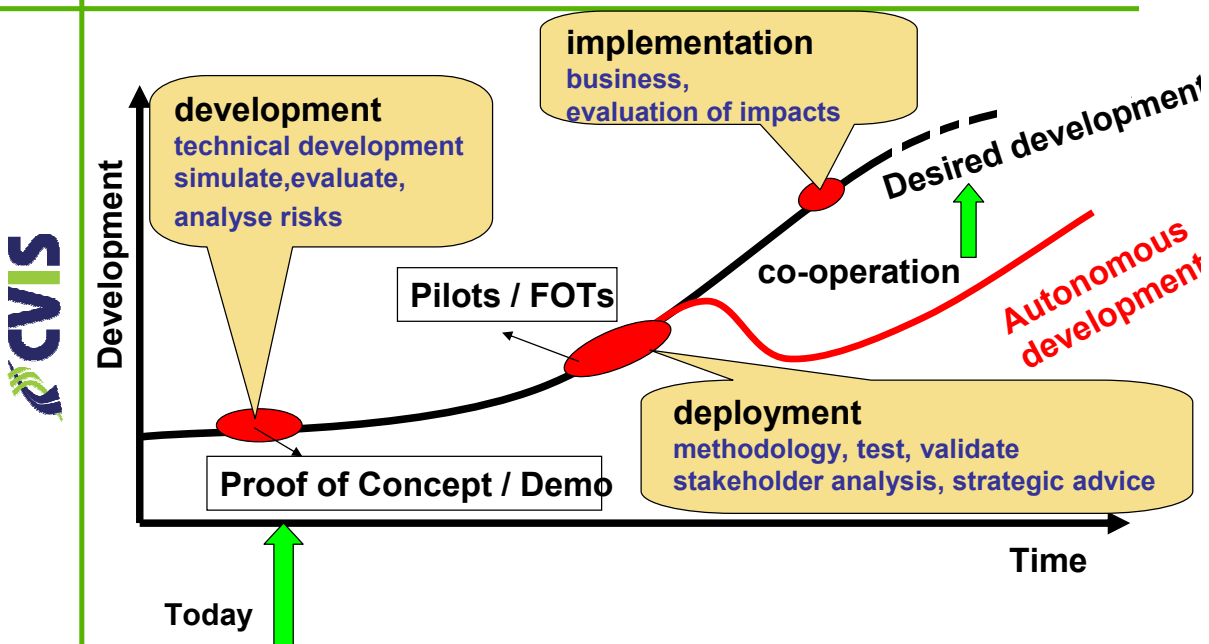


# “Critical mass effect”

A large proportion of consumers may not be willing to purchase a good unless the number of existing users exceeds a threshold network size, called **Critical mass**. **Early adopters** are instrumental in getting an innovation like CVIS to the point of **critical mass**.

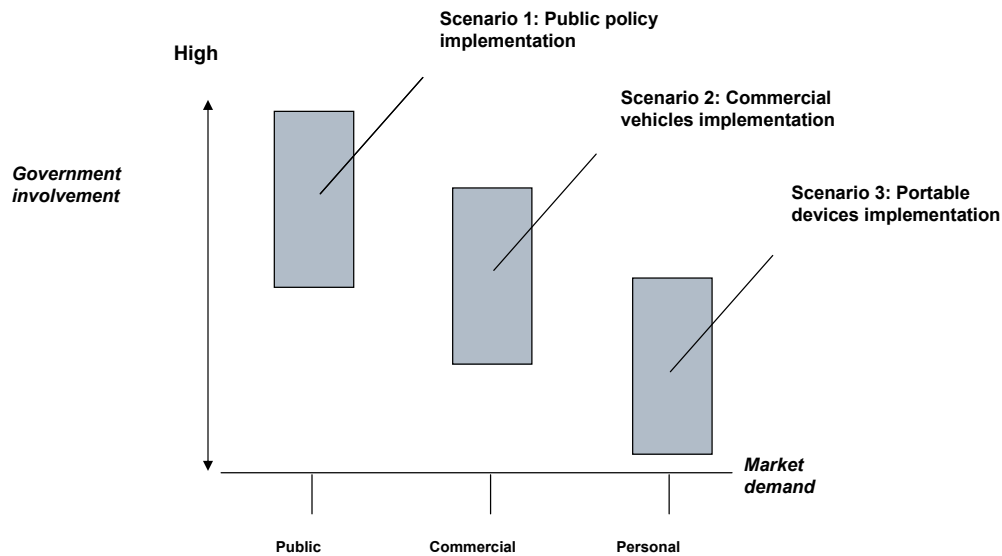


# CVIS technology diffusion curve





# Deployment scenarios



# Preferred Deployment scenario



- Equipping the vehicles in market-led way will not achieve the desired result. It is probable that sufficient market penetration can be achieved by public sector intervention, either in the form of investment in the infrastructure (immediate benefit to equipped users).
- The optimal solution is for the **public sector** and the **private sector** to work together and analyse different cost-benefit scenarios in order to come up with optimal deployment scenarios.
- For CVIS diffusion it would preferable to follow a double approach, which sums the intervention of the government (with the introduction of common rules and common standards), to a market driven solution.





# CVIS Deployment Roadmap



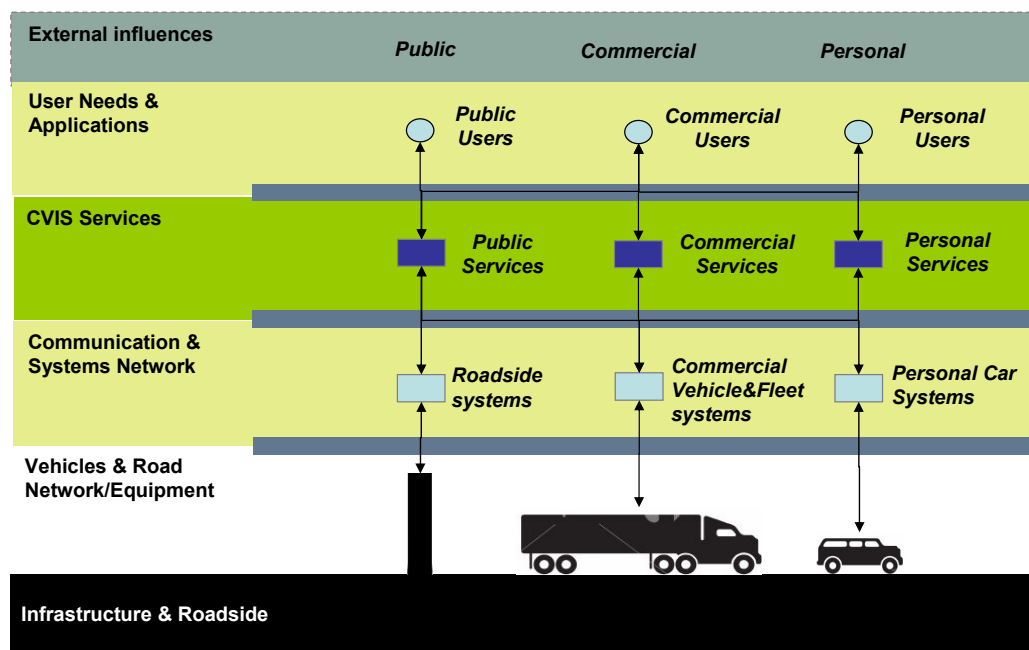
## Scope

- Identify the specific development path likely for each of the separate technical elements
- Address the main deployment enablers for the CVIS, such as risks, liabilities, business models, etc and aggregate them in an overall deployment roadmap.

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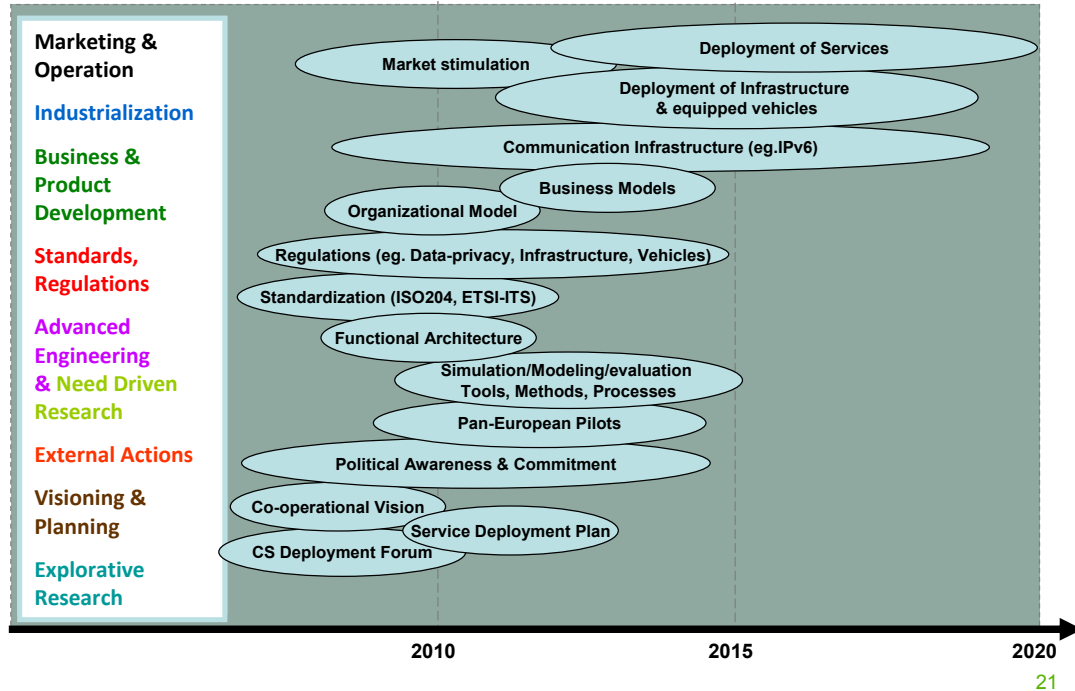
# CVIS Deployment Framework



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# Aggregated Deployment Model



Thank you...  
Any questions???



Lina Konstantinopoulou





## Additional slides



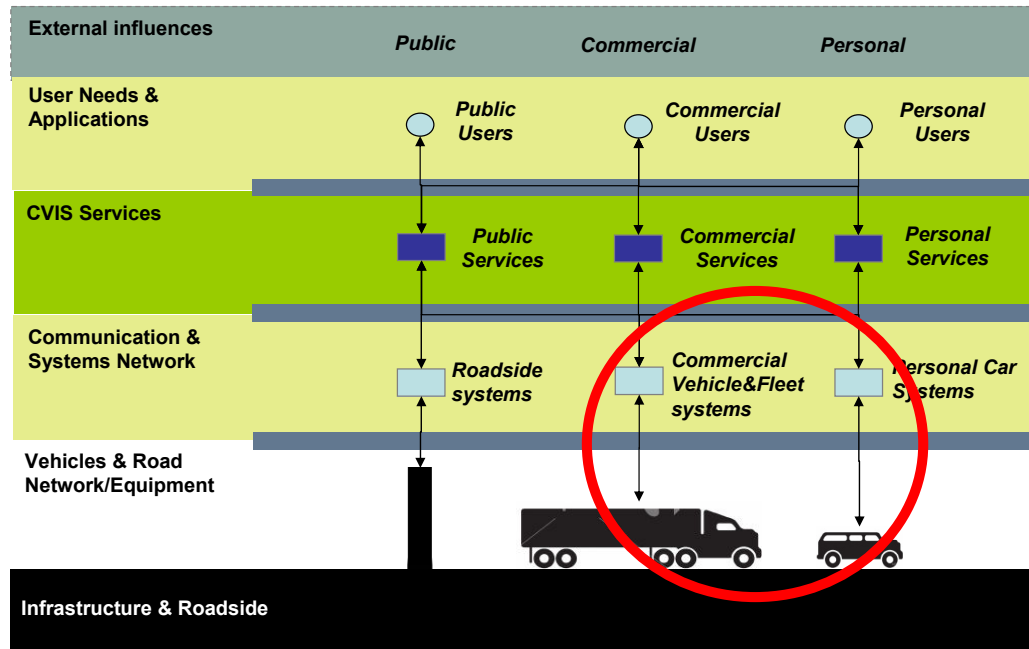
## Aggregated Deployment Method

### Review and identify:

- Main Drivers (main drivers for CVIS deployment)
- Critical Issues (critical issues that only could be resolved through CVIS deployment)
- Showstoppers (potential “showstoppers” for CVIS deployment)



# CVIS Deployment Framework



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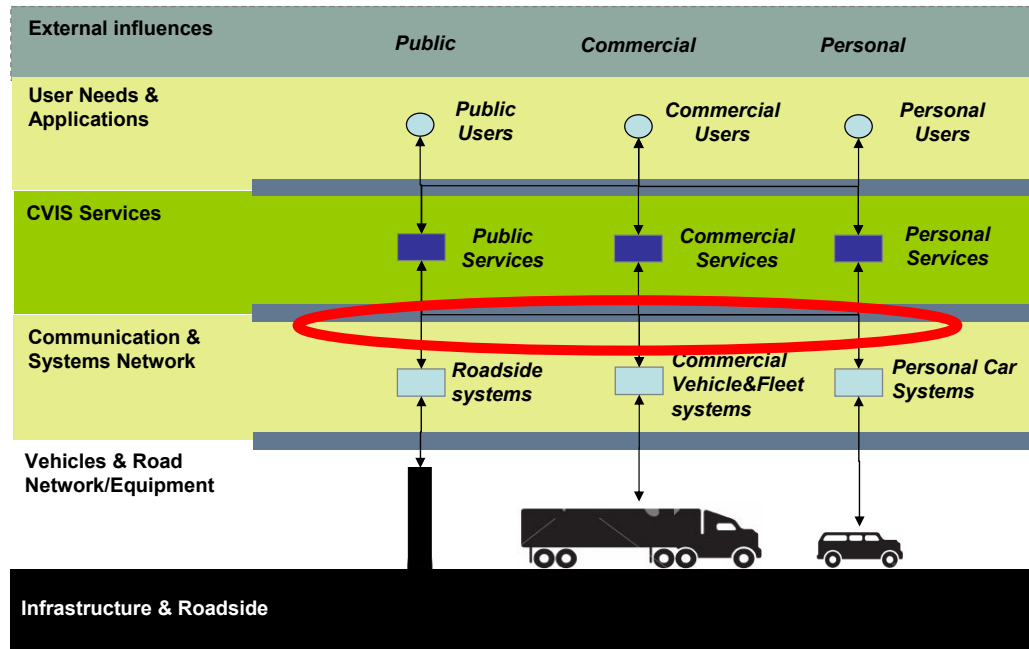
## Commercial Vehicle & Fleet systems



- **Main Drivers** (Describe main drivers for CVIS deployment)
  - General expected increase of goods transport generates an increase of transportation need on all transport modes (road, train, boat and air) (add ref.)
  - Increase demand for transportation efficiency and road safety
  - Increased Global warming and demands for CO2 reduction from all parties
  - Increased fuel prizes
- **Critical Issues** (Describe critical issues that only could be resolved through CVIS deployment)
  - Interoperability vehicle-infrastructure
  - Manage legacy with already installed vehicle base
  - Harmonized and standardized solutions for fleet & transport management
  - Integration with nomadic devices for safety and system compatibility
  - Dedicated services for goods transportation
  - Regulation
  - Business models
- **Showstoppers** (Identify potential "showstoppers" for CVIS deployment)
  - Unclear ownership of service operation
  - Lack of dialogue with traffic and transport regulation regarding commercial transportation
  - Competition with commercially available systems



# CVIS Deployment Framework



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# Communication Networks

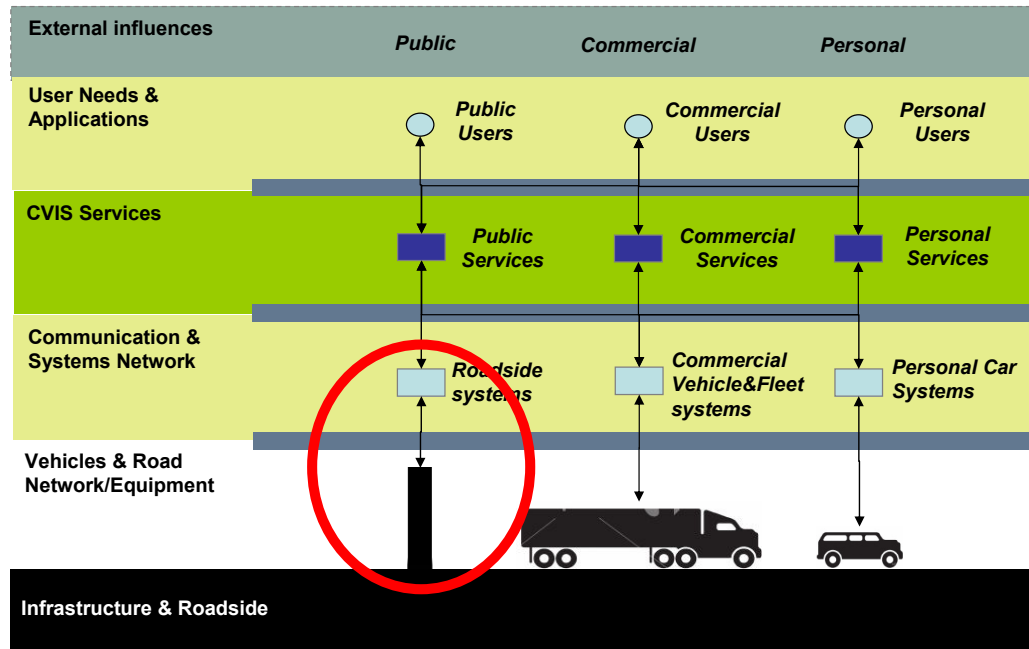


- **Main Drivers** (Describe main drivers for CVIS deployment)
  - Evolution to heterogeneous network connectivity – Internetworking
  - Integration between IT and Telecommunication solutions – distributed and cooperative systems and services
  - New market opportunities – innovative IT services
- **Showstoppers** (Identify potential “showstoppers” for CVIS deployment)
  - Most of the communication technology is already mature for ITS deployment (faster time-cycle)
  - Emerging new standards require time for consolidation and consensus establishment
  - Proper regulatory framework need to be established in order to provide certification and interoperability
  - Networks are ready, but currently no real market demand for IPv6 (Q. Will ITS market alone be sufficient to drive the transition IPv4→ IPv6 ?)
  - Poor definition of credible inter-working and evolution strategies with existing deployed roadside infrastructure
  - New roles among the cooperative actors involved in the scenario to be defined

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# CVIS Deployment Framework



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# Infrastructure and Roadside

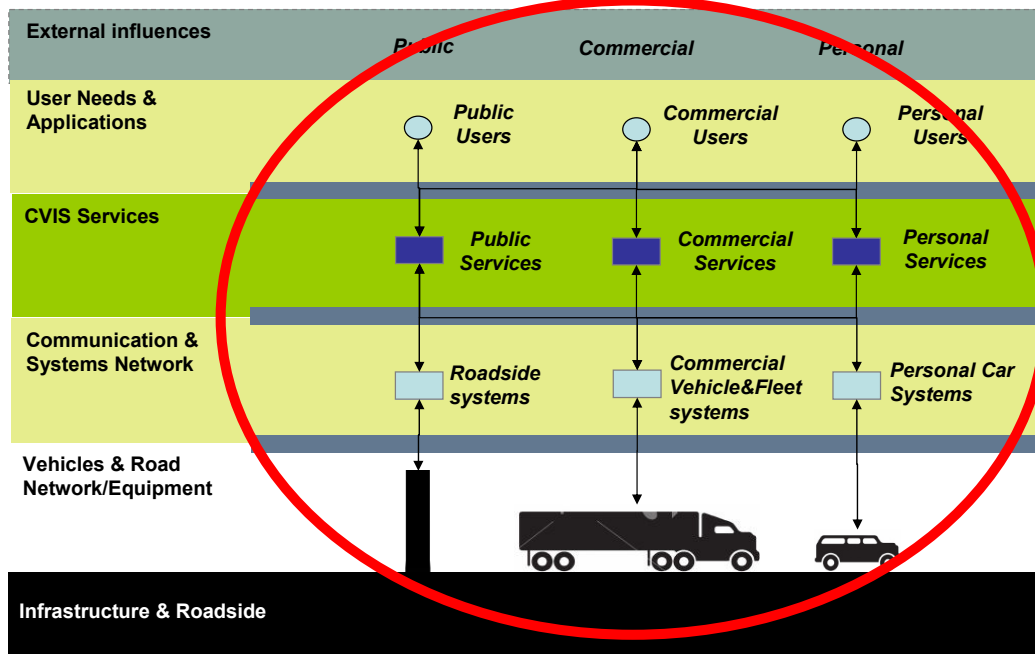


- **Main Drivers (Describe main drivers for CVIS deployment)**
  - Road Safety in combination with road maintenance
  - On-line, real-time traffic management
  - User acceptability (drivers pay to use the road, give info to the road operator, info must be usable for the road operator,...); national wide and international introduction
  - Road Operators needs – e.g. Real-time Pavement Management Systems (PMS), Decongestion Tool, Online Traffic Management,...
- **Critical Issues (Describe critical issues that only could be resolved through CVIS deployment)**
  - Manage information exchange road-user <> road operator
  - Services design and the testing should follow, objective impact studies of the services are feasible
  - There must be a governmental interest, policy makers and lobbies have to be aware of the benefits
  - Low cost systems in the vehicle
- **Showstoppers (Identify potential “showstoppers” for CVIS deployment)**
  - Test sites in the road network, Large scale demonstration (TEN); the road operator is the one who has to implement the “hardware” (e.g. electrification)
  - To get it going it needs standards, regulations and norms; data protection is a key issue
  - All services must be cost-effective; the usage of common technology at the beginning (VMS: Variable message signs; TMC: Traffic Message Channel)

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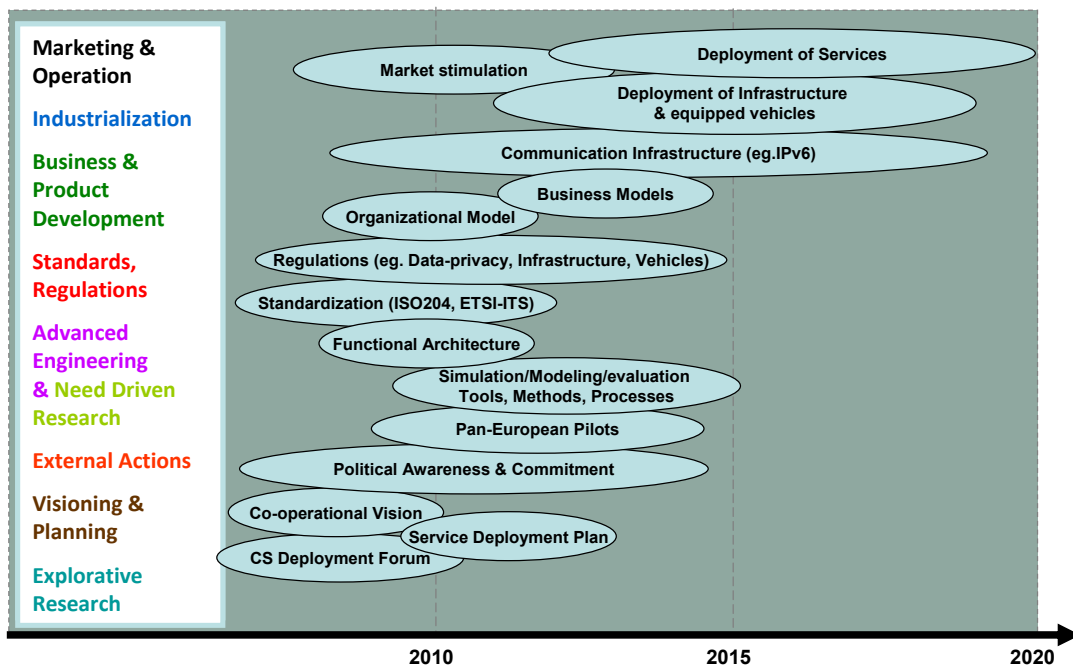
# CVIS Deployment Framework



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# Aggregated Deployment Model



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## Conclusions

- The deployment framework has been defined using a layered system approach
- An aggregated deployment roadmap identifying main critical issues and estimated timing
- Main issues are connected and depending on each other