How to bring Cooperative systems on the road?

Deployment issues and deployment scenarios

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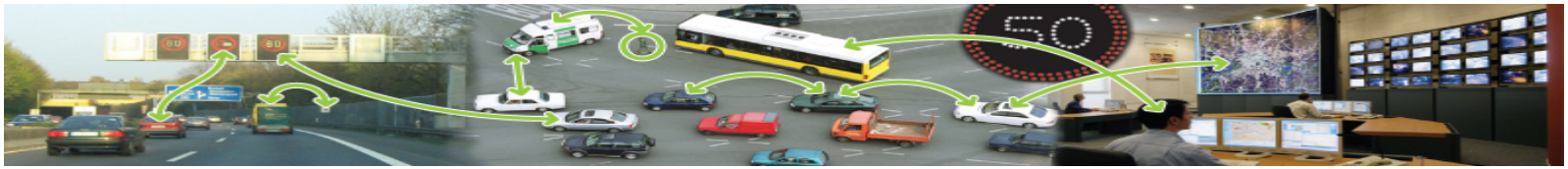


Bringing Cooperative systems on the road

…..i.e. to the market

Under which conditions?

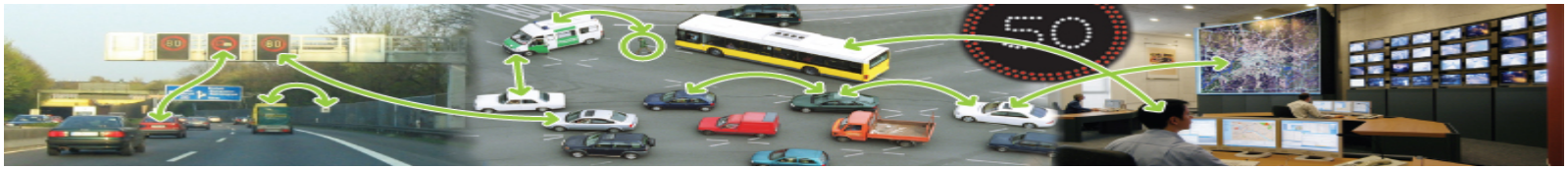
What are the prerequisites to deployment?

By whom?

What do the market surveys show?

how?

When?



Under which conditions

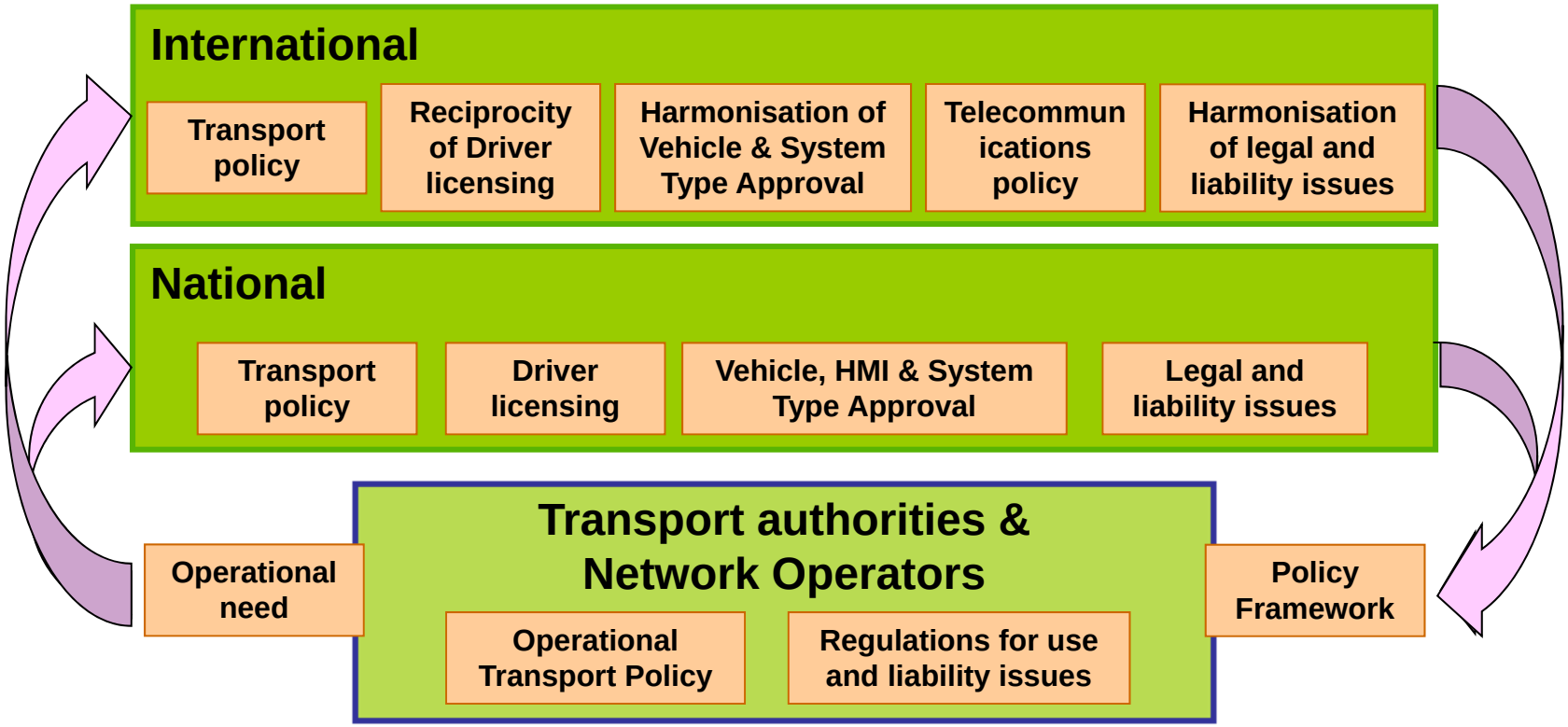
- **Interoperability** (OBU needs to communicate with RSU at different geographic locations) .
- Towards harmonisation of **standards.** (ETSI, CEN, CENELEC, standardisation mandate, 2009)
- Towards common **EU legislation (Directive)** for synchronisation of deployment across Member states (European Commission Action Plan for the Deployment of Intelligent Transport Systems 2008)

Prerequisites to Deployment

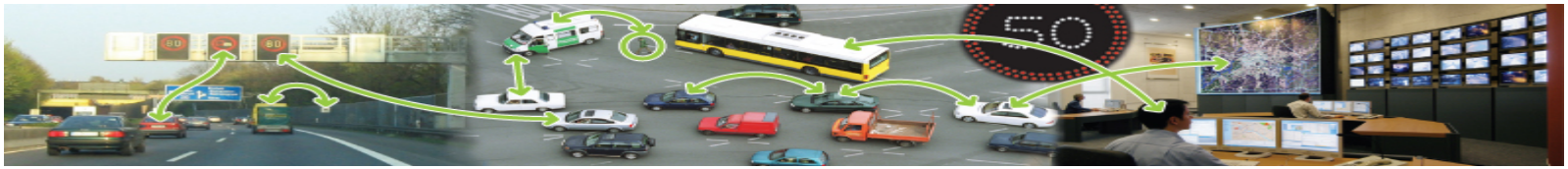
- Cooperative technologies are validated
- CVIS technology is adopted by consumers, vehicle makers, etc
- An accepted tool with recognised benefits for all stakeholders
- Good quality information is widely available / real-time information and route recommendations
- Attractive, reliable and trustworthy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

Decision making issues

- Iterative process:
  - Different levels - Different actors

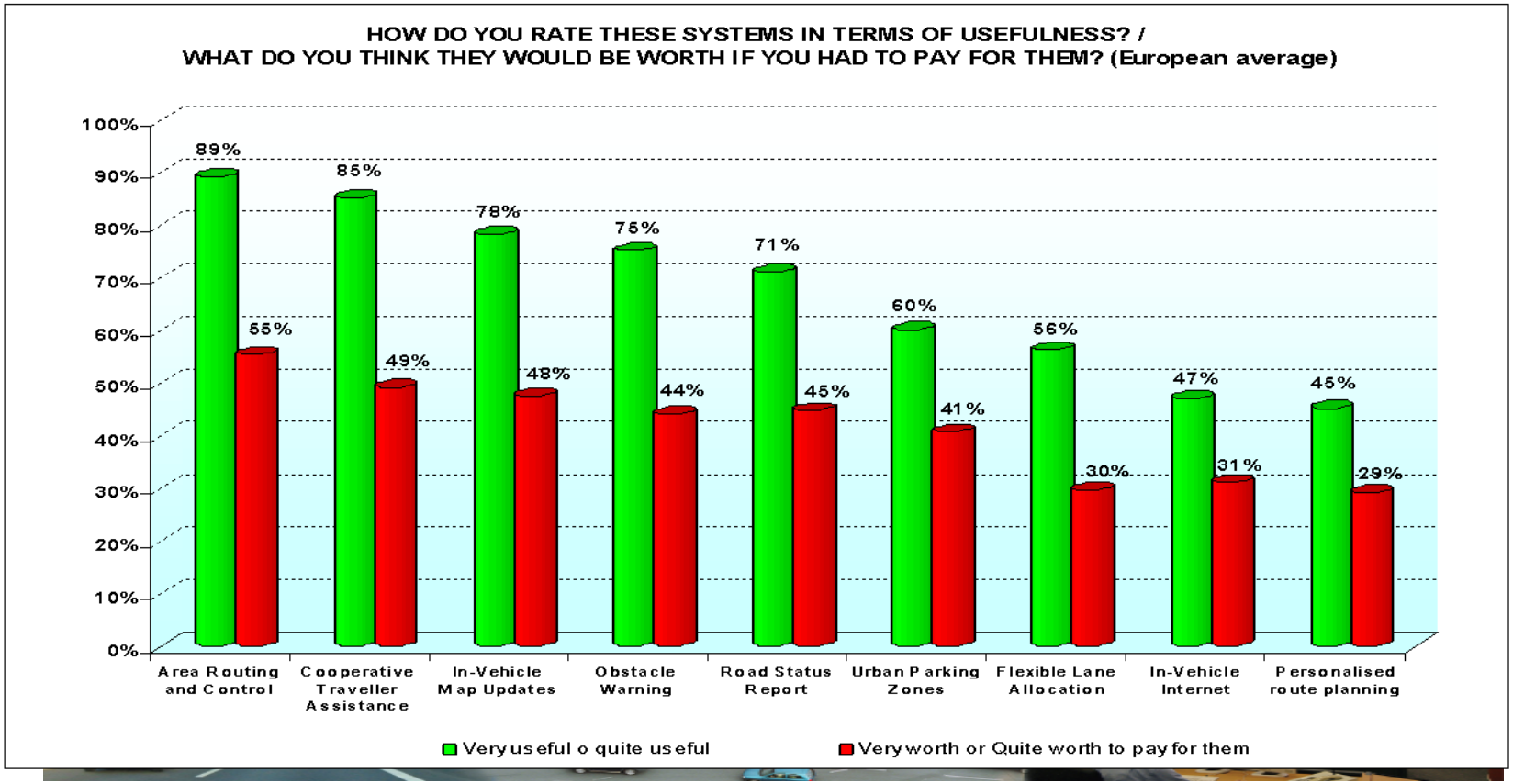


Market Surveys



Consumer acceptance survey

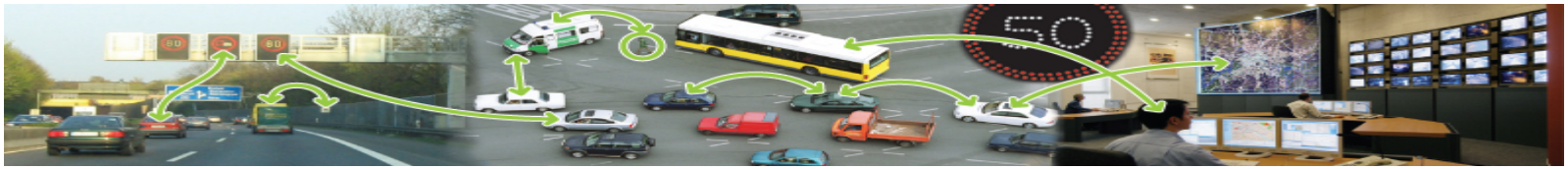
Internet-based questionnaire / 13 Automobile clubs – 12 countries / 10 different languages / 7,687 European Motorists



Usefulness vs Willingness to Pay

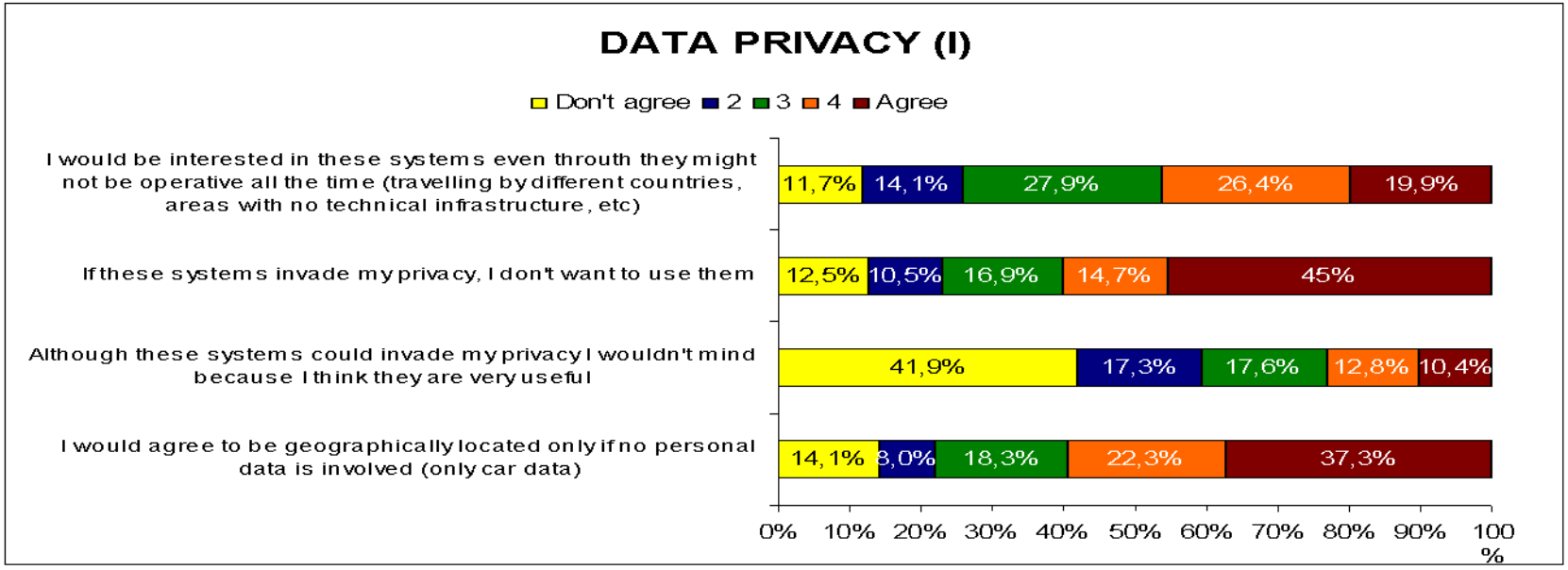
- ……Cooperative systems **will only be successful if accepted, implemented and ultimately used by consumers.**
- CVIS applications are generally well accepted by the consumer. In general, more than 50% of the Europeans think they are quite or very useful.
- The usefulness of the CVIS applications is higher than the willingness to pay for them.
- around 40% state that they would accept to pay for them.

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



Consumer Data Privacy

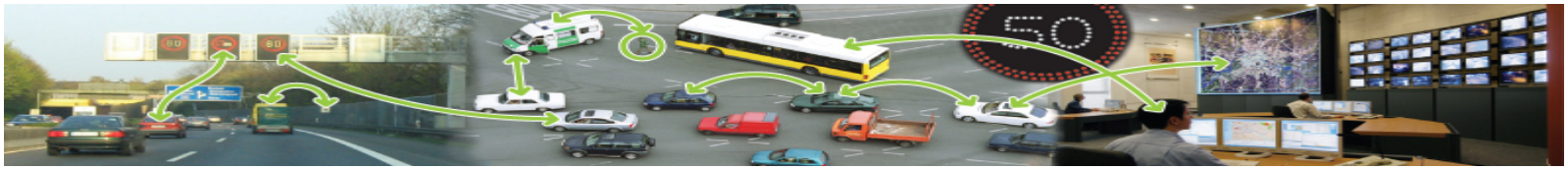
- Only 23% of respondents don't mind the systems invading their privacy since they consider the systems very useful.
- when only car data is involved (no personal data), 60% of respondents would agree to be geographically located.
- European drivers (60%) are willing to collaborate with some restrictions,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



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

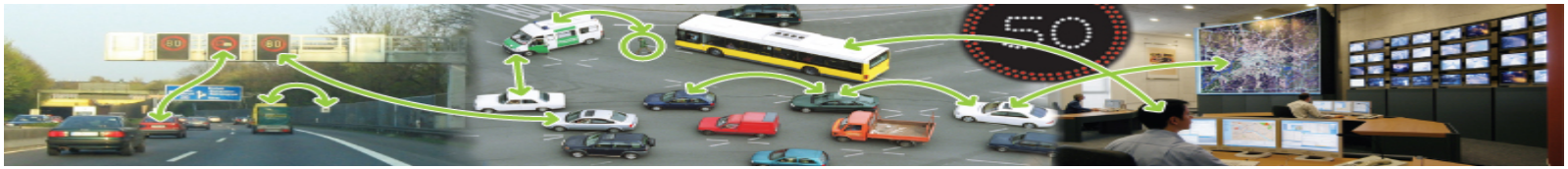
Data Privacy strategies

- Protecting the privacy of users depends on the member states political and legal environment.
- Strategies: a) talk with your National Data agency (to be involved in the Article 29 WG for protecting data privacy in ITS), b) enact protective legislation, c) help in the design of systems with privacy in mind by developing a set of principles.
- CVIS collaborates with Article 29 WG and other EC projects (SEVECOM, PRECIOSA) in the secure technical design and data privacy friendly issues.



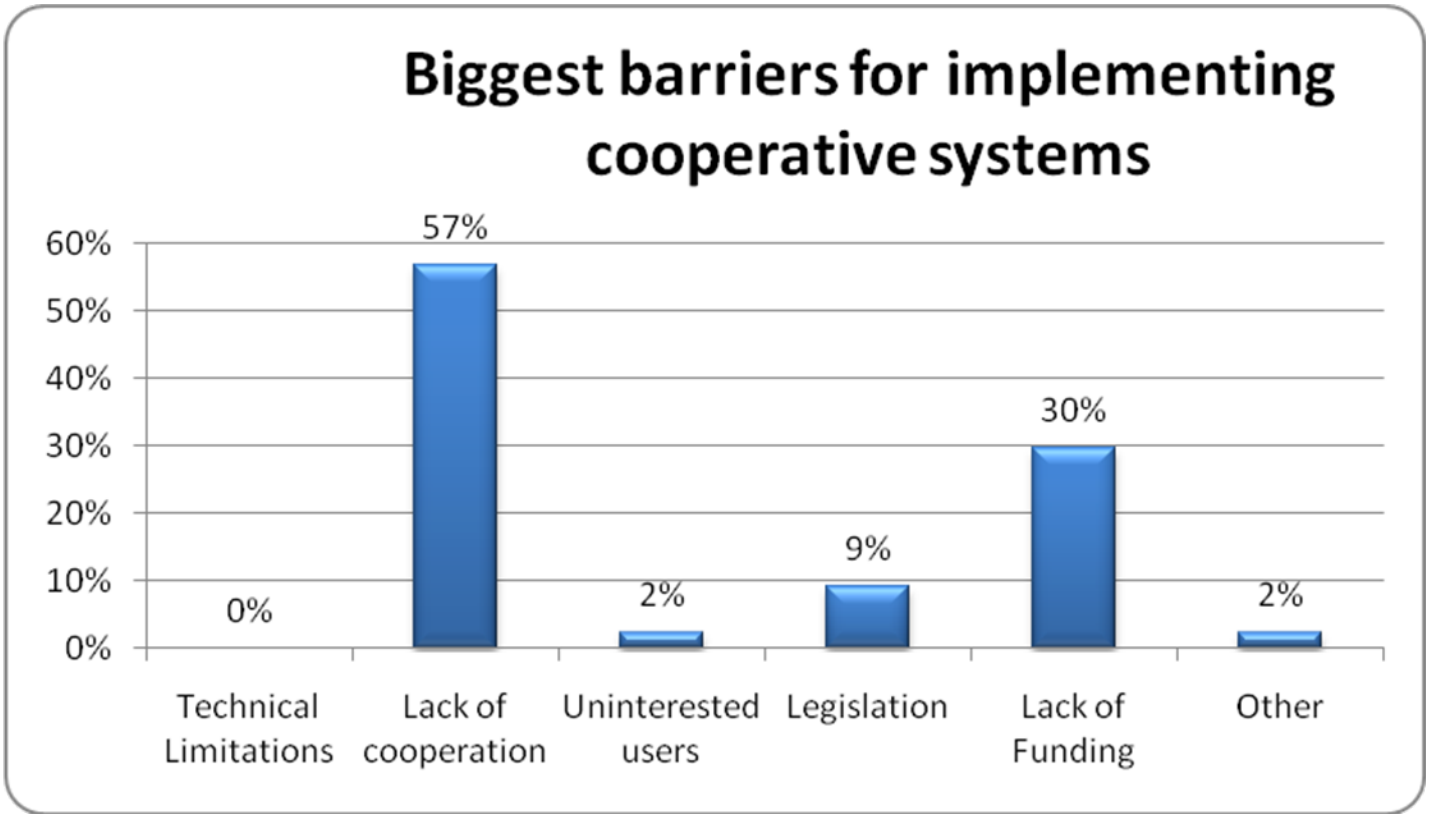
Road Operator survey

- >200 road operators from 24 EU countries have been contacted directly via an “on-line” questionnaire survey; in addition
  - 88% Road operators are public authority and consider road safety as the most important topic for their organisations
- Useful applications to Road Operators are: Obstacle warning, Area Routing and Control and Corporate Traveller Assistant (70% of the respondents).
- Willingness to Invest: Road Status Report (30%) and Obstacle Warning (19%).
- The application, least likely to invest in is In Vehicle Internet/Mobile Office.



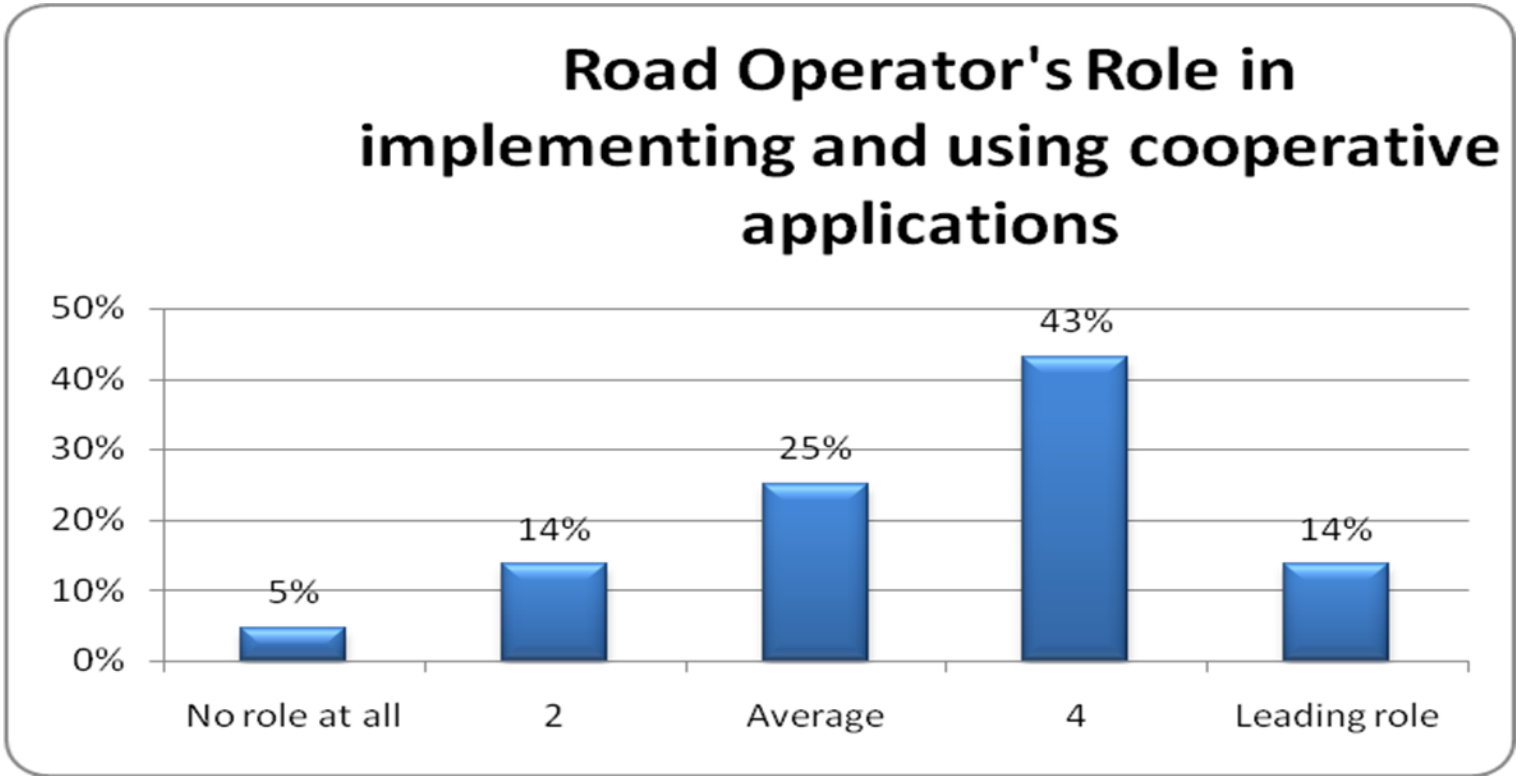
Cooperation between stakeholders

– **Cooperation between the stakeholders needs to be indispensable (70%)**

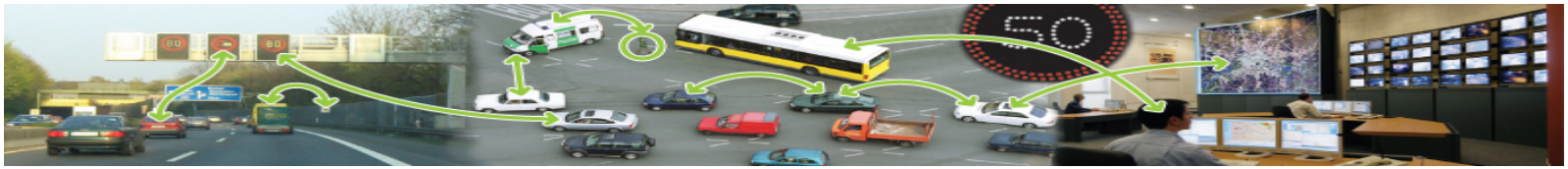


Willingness to Invest

- **Public Authority (41%), Car/Truck manufactures (16%) and Automotive Industry suppliers (14%).**



How do you deploy and when?



Market introduction

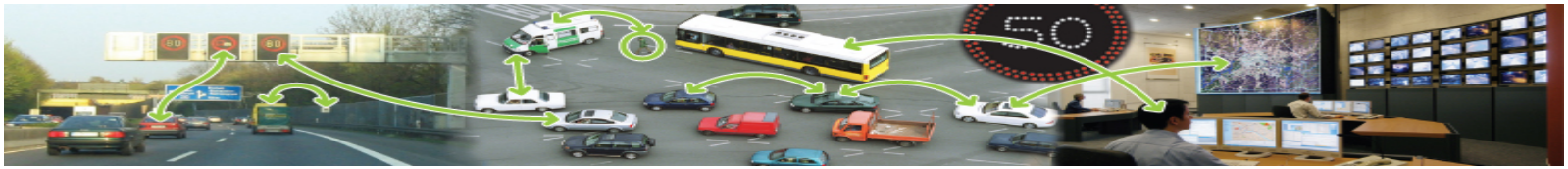
For successful market introduction:

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

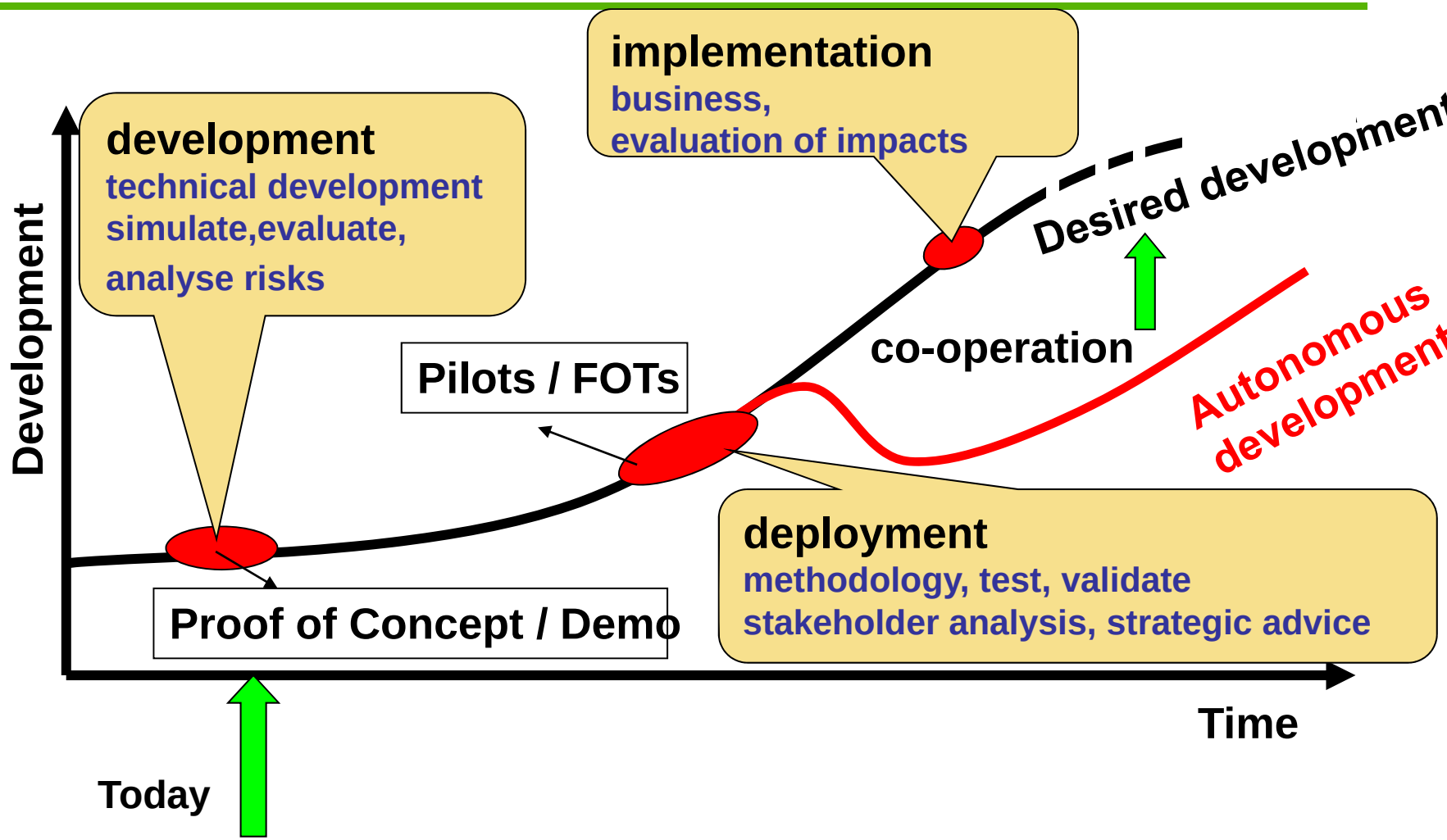
and/or

b) legislative order

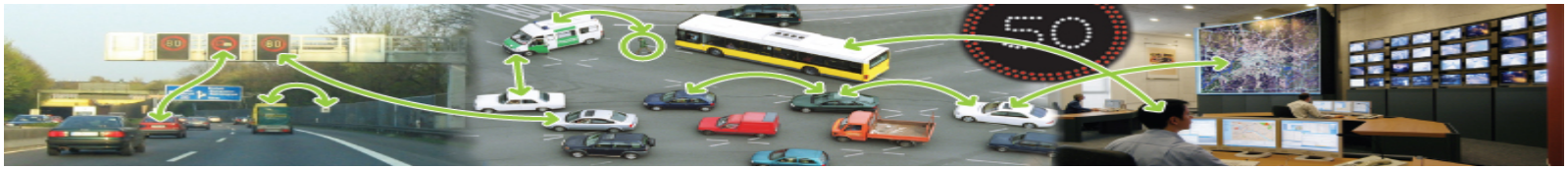
…….which in some cases coincide



CVIS diffusion curve



Deployment scenarios



Steps

1. Define core services & stakeholders
2. Identify a few scenarios for development
3. Expand scenarios, describe possible routes to deployment
4. Evaluate probability of each scenario & consequences of different deployment paths

1. Define core services, stakeholders

- **Stakeholders:** Drivers; road operators/traffic managers; commercial fleet & logistics managers
- **Services:** CVIS applications, safety applications and services (electronic toll collection, emergency system, congestion user charging, RUC)
  - **Other sources: ETSI TR 102 638 V1.1.1 (2009-06)** "Technical Report-Intelligent Transport Systems (ITS); Vehicular Communications; Basic Set of Applications; Definitions" produced by ETSI;

Core services

EFFICIENCY	SAFETY	PUBLIC SERVICES
Traffic information	Approaching emergency vehicle (V2V)	Electronic toll collection
Enhanced route guidance and notification	Emergency electronic brake lights	Regulatory / contextual speed limits
Fleet management	Co-operative glare reduction	Road user charging
Intersection (Only dangerous cross)	Slow vehicle warning	Congestion User charging
Traffic light optimal advisory speed	Co-operative forward collision warning	
Road restricted access, detour notification	Decentralized floating car data	
Automatic access control	Hazardous location notification (wind, ice, etc..)	
Point of Interest notification	Road obstacle warning	
Approaching emergency vehicle (V2I)	Safety function out of normal condition warning	
Eco-driving	e-call or emergency assistance service (?)	
Car rental/sharing assignment/reporting		
Floating car data		
Loading zone management		

2. Identify scenarios

- Who are “lead” stakeholder(s)?
- What are they trying to achieve?
- How would they deploy/use cooperative systems and services?
- 3 scenarios
  - “personal”
  - “commercial”
  - “public”

"PERSONAL" SCENARIO
Focus: Traffic information services

- **Driving forces:** Consumers want real-time traffic information & route guidance to help avoid congestion; consumer electronics offers portable devices with good performance for low price; integrated devices still expensive and inflexible; traffic information services often disappointing; FCD collection & info services starting to take off…
- **Services:** FCD collection, real-time traffic & road status, incidents, congestion avoidance through dynamic navigation (on-board) and route recommendation (off-board)
- **Maturity:** proprietary systems based on 2G/3G in market now; no short-range communication integration, no traffic system-vehicle interaction; R&D quite advanced; large-scale FOTs in planning…
- **OBE:** Cellular connected handheld / portable systems provide route guidance with real-time traffic information; CVIS application software & 5.9GHz short-range comms could be integrated
- **RSE:** To start, only cellular network needed; short-range comms not needed for FCD or traffic info services
- **Main Actors:** Traffic info service provider, navigation/route advice service providers, telecom operator(s), public authorities (national data warehouse)
- **Deployment:** High potential for service as smartphone apps; possible additional service in aftermarket nomadic navigation systems; limited potential as embedded services linked to single provider; issue for aggregation of FC Data from various providers;

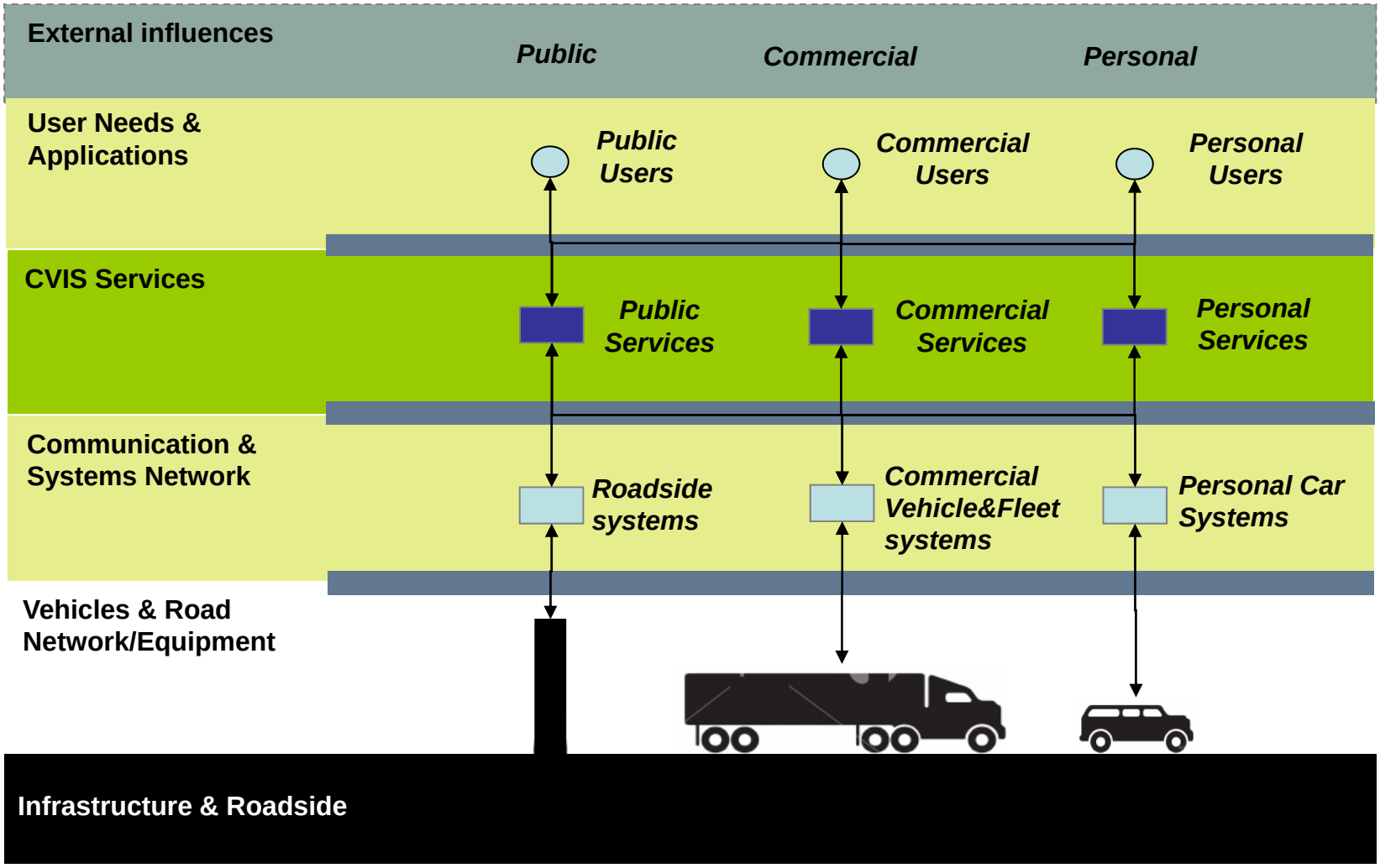
"COMMERCIAL" SCENARIO
Focus: Freight and Fleet services

- **Driving forces: a)** growth of networking in logistics will extend to the vehicle, driver & cargo – all will need to be "always connected" b) pressure to reduce costs, increase reliability & profitability c) new regulations on truck operations, especially in cities
- **Applications:** access control / loading zone & parking booking / electronic tolling
- **Penetration: <10%**
- **OBE:** aftermarket solution
- **RSE:** Pressure will grow on city authorities, road operators to create "intelligent infrastructure" – to battle congestion, environment.
- **Main Actors**: freight operators, (cargo fleets, courier fleets, taxi fleets, bus fleet), local authorities, Telecom providers, navigation providers
- **Deployment:** In the short term, co-existence of non-CVIS equipped vehicles with CVIS vehicles as both will have different methods of operating. freight operators and drivers should be engaged to include their user needs into the system design.

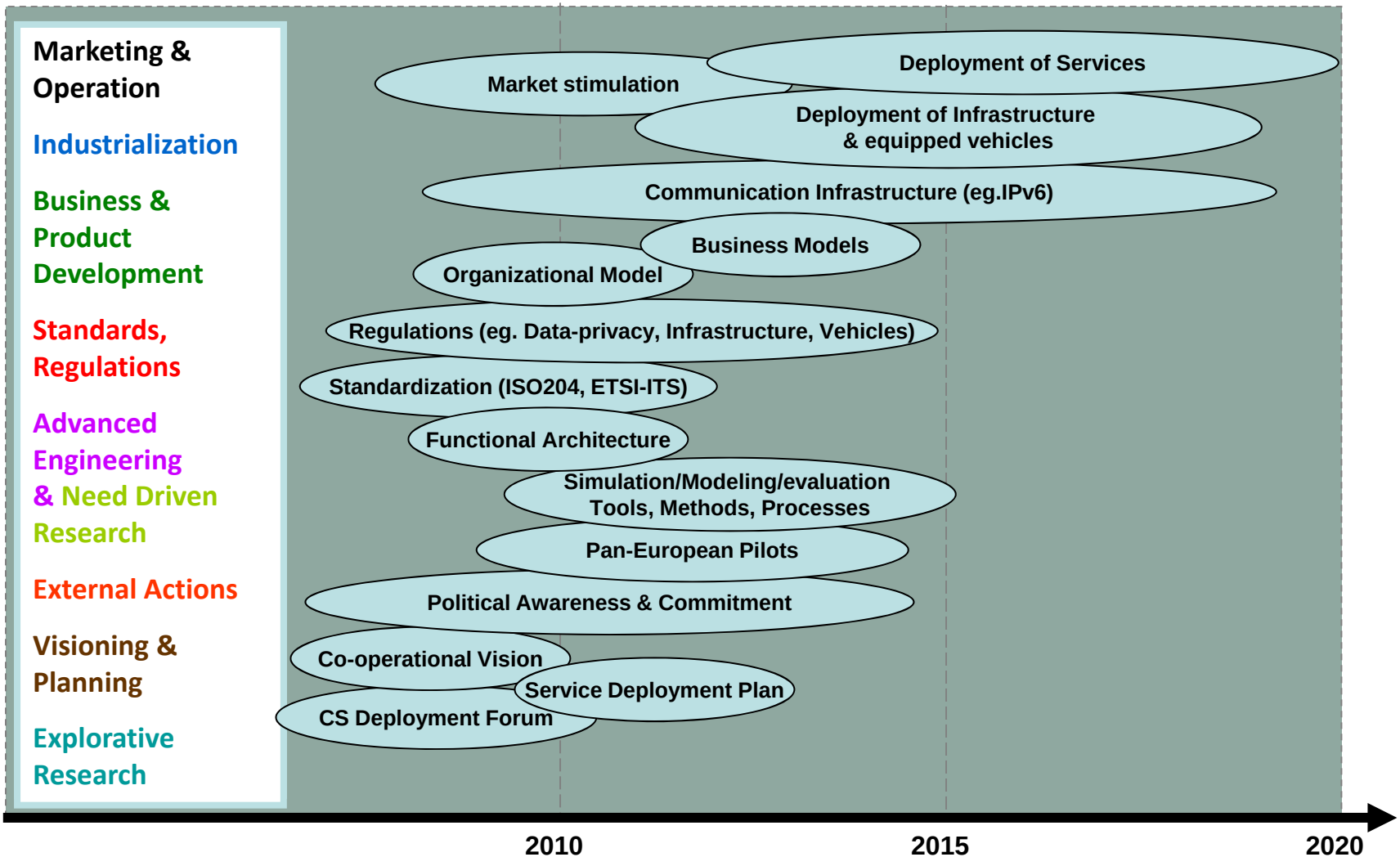
PUBLIC SCENARIO - Efficiency & environment driven

- **Driving forces:** In this scenario the strong demand for mobility services and comfort is the crucial driver of change. From the consumer's perspective, the focus is no longer on different transport systems, but on precisely tailored solutions for individual mobility needs which differ according to situation.
- **Applications:** car sharing, eco-driving, access management, real time route planning and rerouting , intersection & priority applications
- **OBE:** distributed for free or subsidized (at a low cost)
- **RSE:** YES. Pressure will grow on city authorities, road operators to create "intelligent infrastructure" – to battle congestion, environment.
- **Main Actors**: CVIS will be financed (fully) by the road operators and the users (though taxes). They will install the technological infrastructure along the roads.
- **Penetration:** high

CVIS Deployment Framework

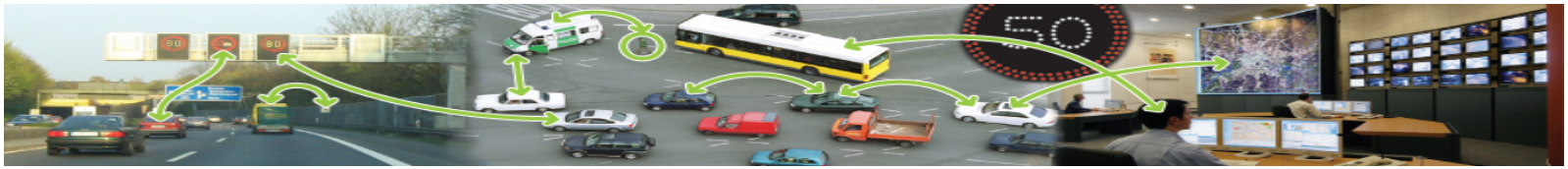


Aggregated Deployment Model



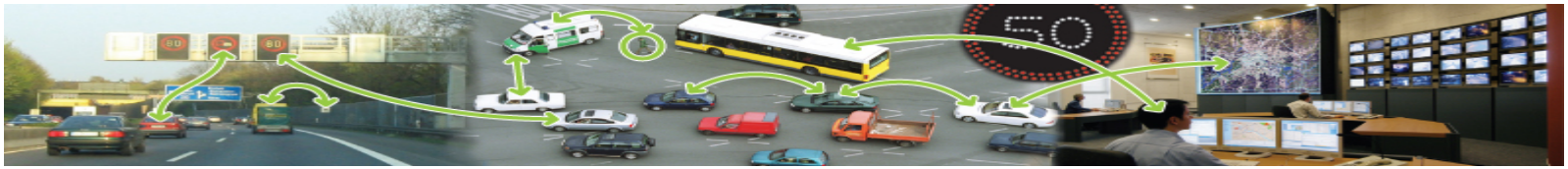
How cities could benefit in the different scenarios?

Time for Discussion

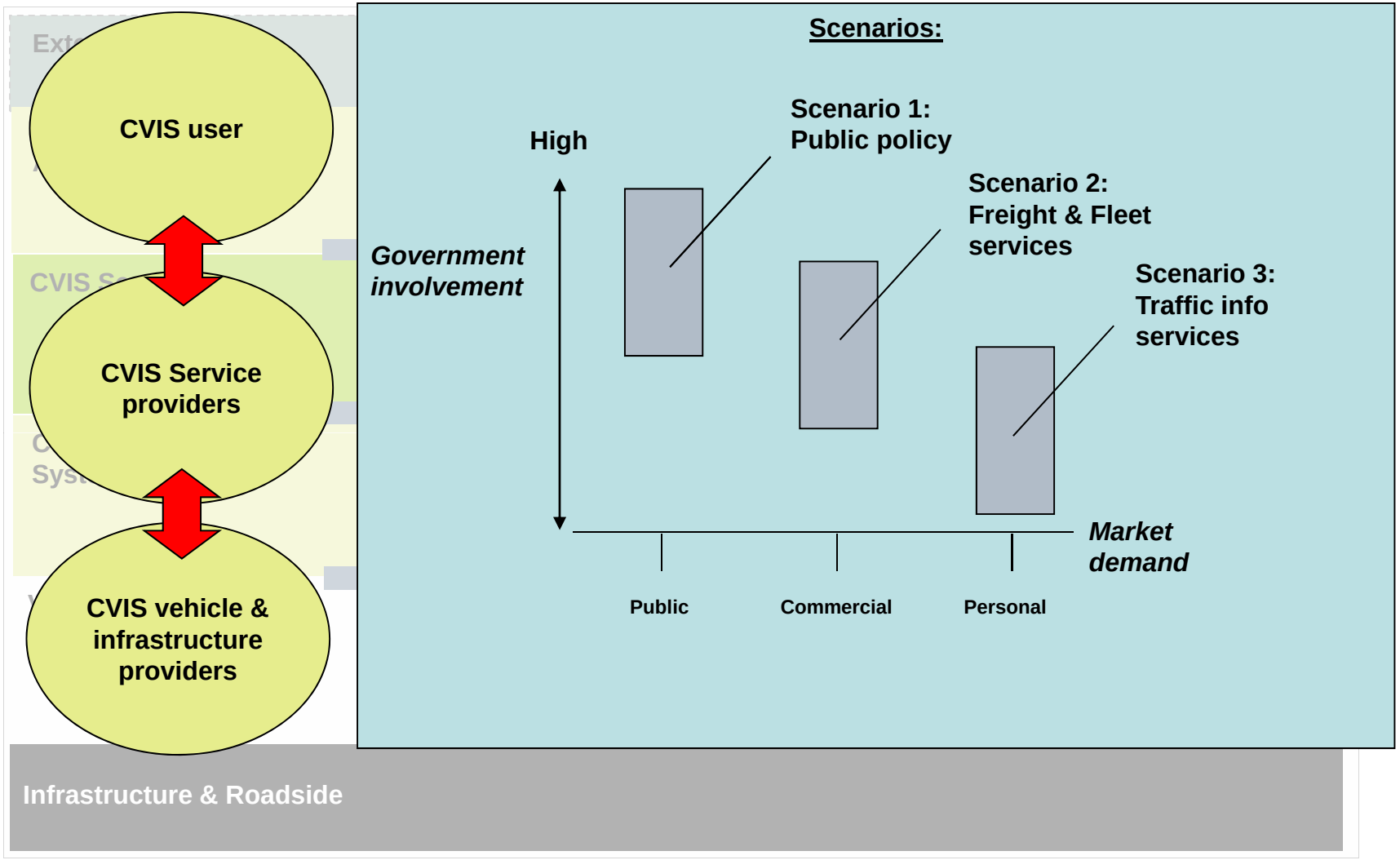


Discussion questions

- What would be the advantages and disadvantages for cities in each of the described deployment scenario?
- Individually, what would be a first step (application) for deployment of cooperative systems in your own city? Identify your ''killer'' application?
- With whom you think you have to work to make it happen?
- what are the main obstacles for deployment of cooperative systems in cities?
- What aspects you need to harmonise in your own city or country to make it happen?

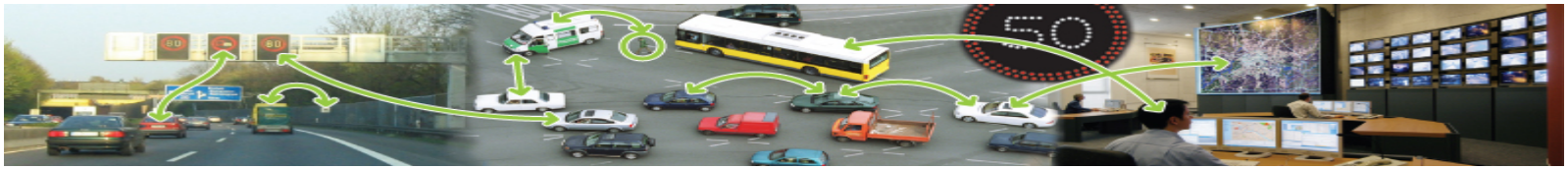


High-level Responsibilities



Thank you for your attention

Background slides
Deployment scenario example

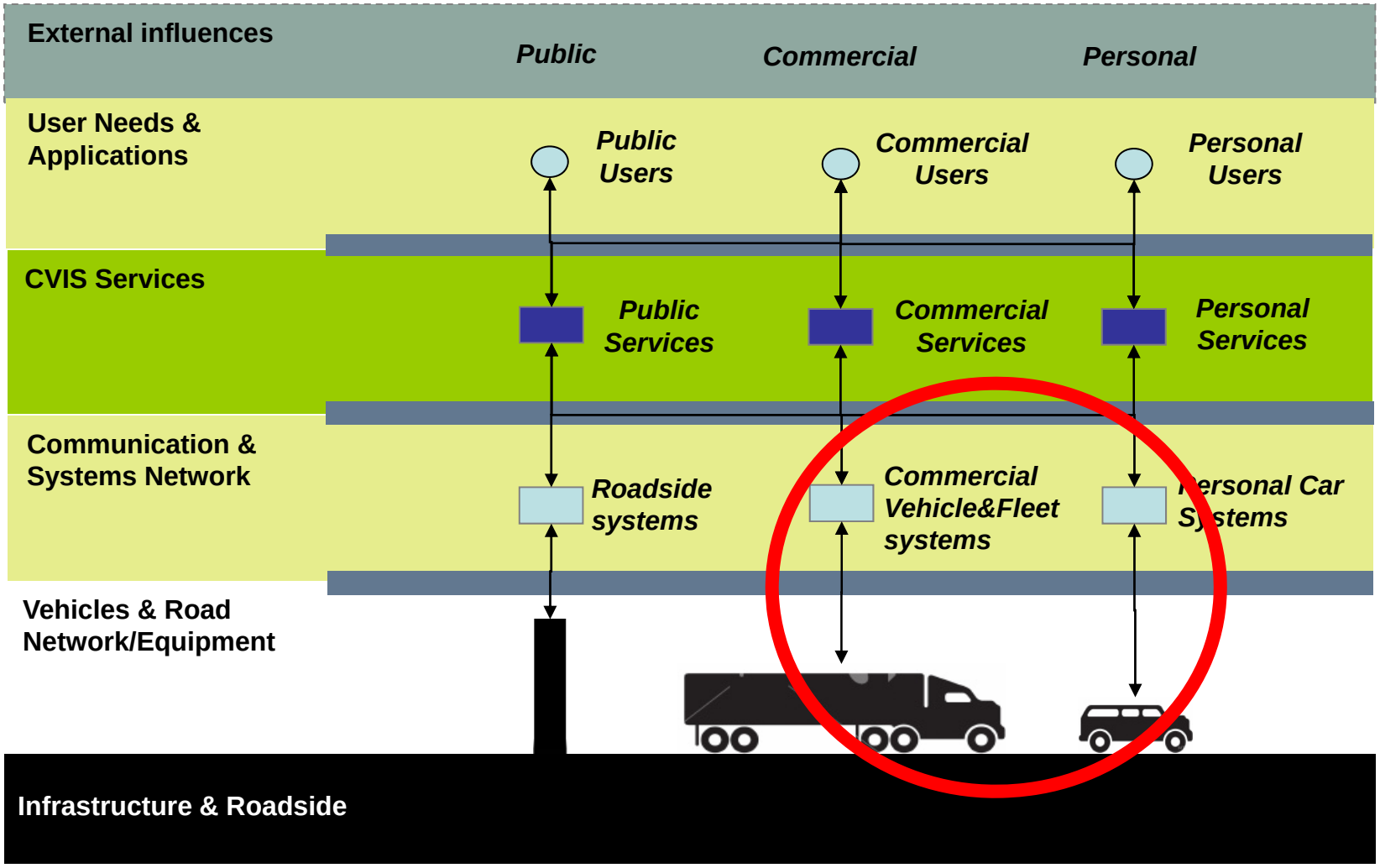


Aggregated Deployment Method

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)

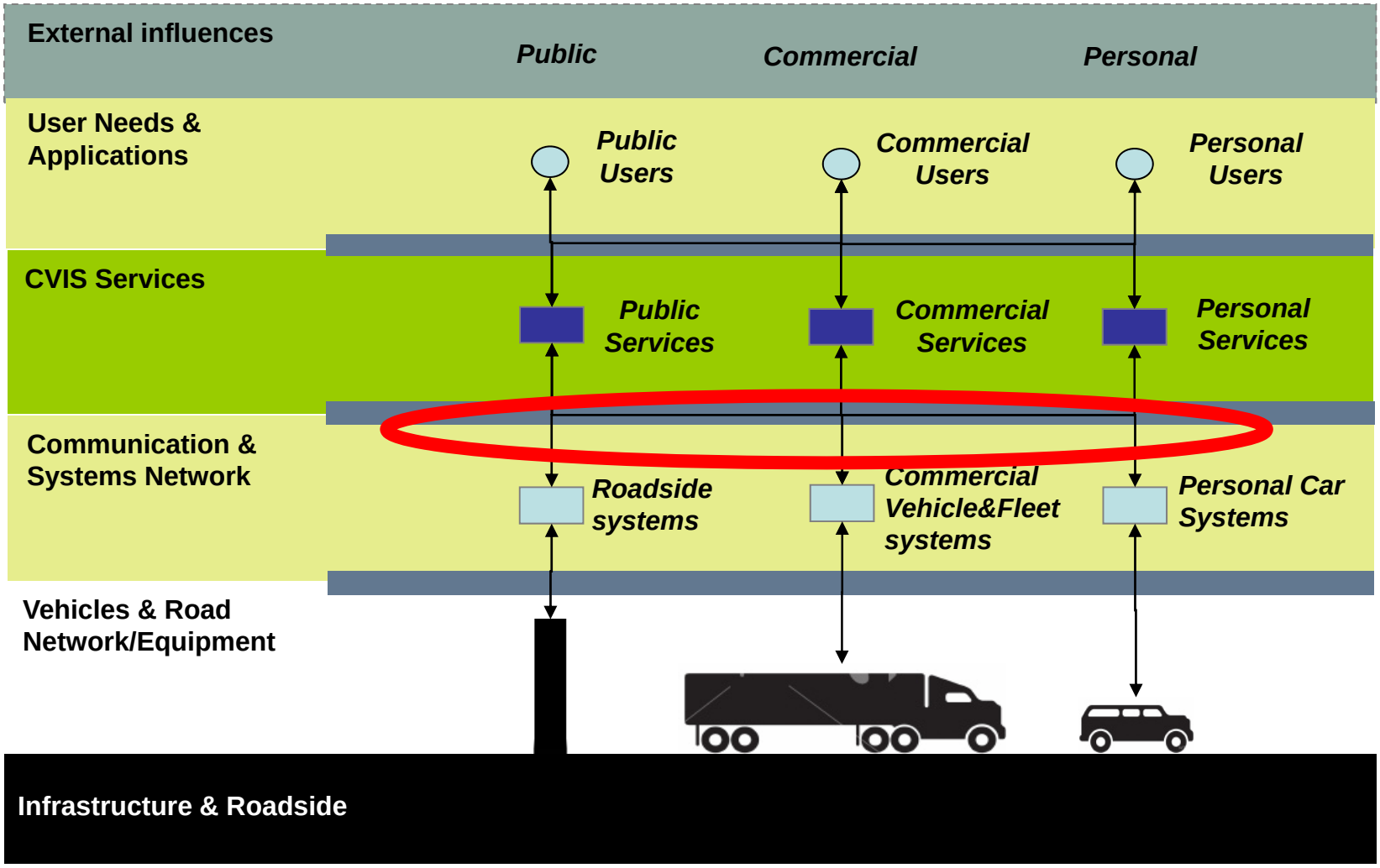
CVIS Deployment Framework



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

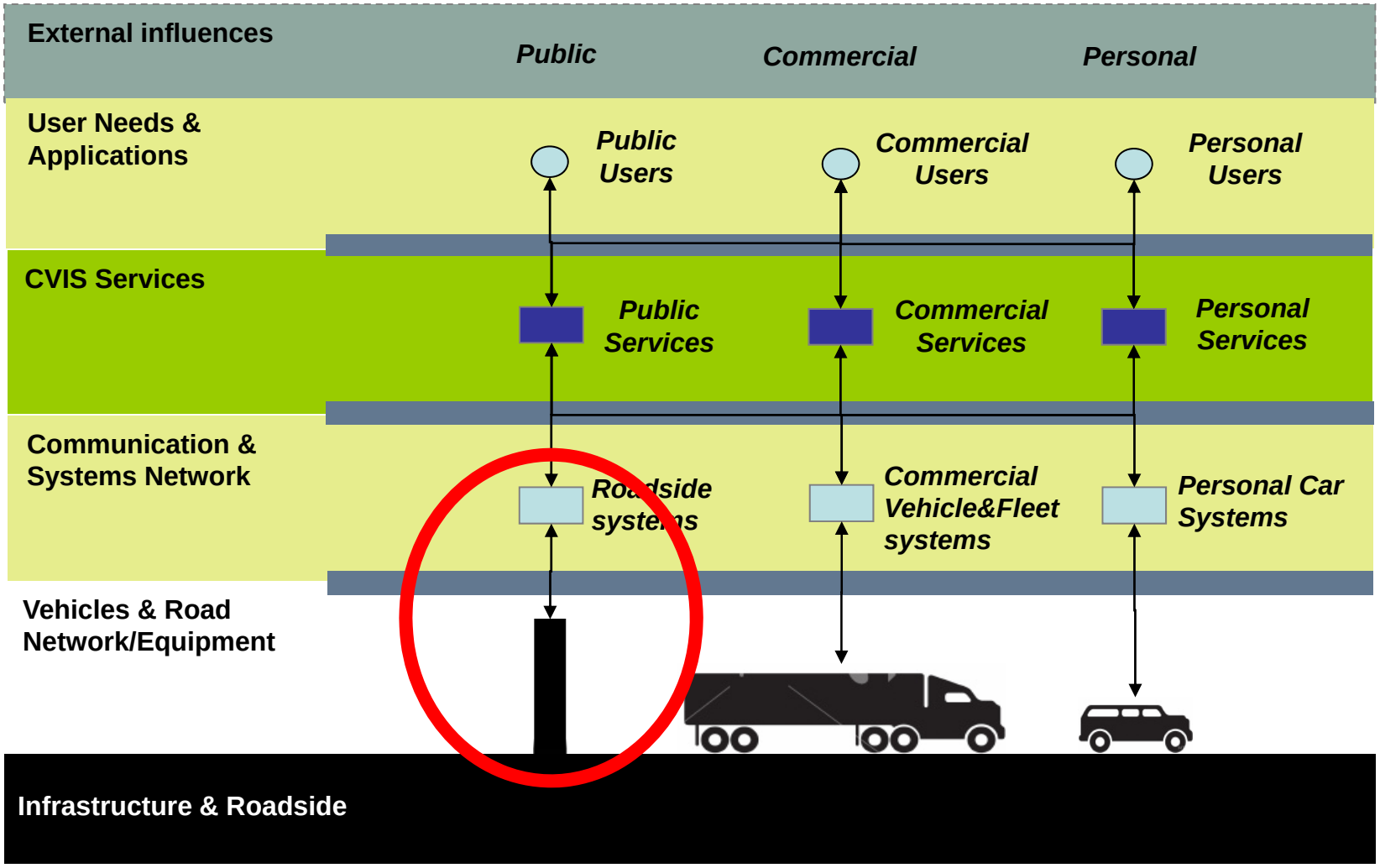
CVIS Deployment Framework



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

CVIS Deployment Framework



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)

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