SAFESPOT INTEGRATED PROJECT - IST-4-026963-IP

DELIVERABLE

SP6 – BLADE – Business models, Legal Aspects, and DEployment

SERVICE AND BUSINESS MODEL DEFINITION

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Abbreviation List

ADAS	Advanced Driver Assistant System
B&SM	Business and Service Model
CCTV	Closed Circuit Television
CVIS	Cooperative Vehicle Infrastructure Systems
GPS	Global Positioning System
HW	Hardware
ITC	International Technology Systems
LDM	Local Dynamic Map
RFID	Radio Frequency Identification
RSU	Road Side Unit
SP	Sub Project
SP4	SubProject 4
SP5	SubProject 5
V2V	Vehicle to Vehicle
SW	Software
V2I	Vehicle to Infrastructure
WP	Work Package
WP3	Work Package 3
WSN	Wireless Sensor Network

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EXECUTIVE SUMMARY

According to the SAFESPOT Technical Annex "… *This task will start from the definition of different product-client-service scenarios, strongly related to the Organizational Architecture modelled in WP6.3.*
Then the specific benefits and disadvantages for the different groups of end-users (an a priori user acceptance for vehicle drivers and a stakeholder survey for the relevant stakeholders) with regard to the different scenarios will be analysed. Strengths and weaknesses of each business and service model will be highlighted.
Alternative service and business models will be supplied to WP6.5 for assessment and evaluation.
In addition a preliminary analysis to define which are the main international cooperative systems will be done…"

In order to achieve the objectives described above, 5 steps have been followed:

In Chapter 1, the methodological approach has been defined.

In Chapter 2, the possible Business and Service Models hypothesis are described, in order to define the stakeholders involved and their interactions in each B.M. and S.M. . Different product-client-service scenarios will be built up.

Chapter 3 is dedicated to the Stakeholder Consultation, in order to investigate the main Business and Service Models Aspects from an Actors' point of view.

The User Acceptance chapter (4) aims to investigate the main Business and Service Models Aspects from an "End user" a priori point of view.

In Chapter 5 the Main International Cooperative Systems are analysed in order to find out their implications for SAFESPOT.

This results as reported in this deliverable are an important starting point (first phase) of an activity articulated into three phases, whose purpose is to propose how to convert in the best way the SAFESPOT innovation into economic value for each of the stakeholder involved.

In the following phases of this Work Package the scope will be narrowed further:

In the second phase (D.6.6.2) a first selection of the most suitable Business and Service Model will be performed, together with: an in depth analysis of the user position, an analysis of the potential business drivers, and a definition of the alternative government intervention strategies together with their expected impact. The final results will be available at the end of the third phase (Deliverable 6.6.3., "Final selection of service & business models).

1. Introduction

The purpose of the research in this work package is to define the most promising Business or Service Model for SAFESPOT.

To reach out this goal, an activity structured in three main phases has been defined; the purpose is to:

1. define alternative business and service models
2. make a first ranking of them
3. select the best one.

This analysis will be focused on identifying the different Business and Service Models, with their strengths and their weaknesses. The relevant elements have been investigated under a double point of view (the “End User” and the “Actor’s” one).

In addition, a preliminary analysis to define which the main international cooperative systems are has been done.
The following issues have been investigated:

- Smartway for Japan
- MVII applications for U.S.A.

as the most representative international cooperatives systems.

This deliverable covers the first phase, the definition of alternative Business and Service Models, and summarizes the work performed in T6.6.1.

1.1.1. What is SAFESPOT?

SAFESPOT (Cooperative Systems for Road Safety “Smart Vehicles on Smart Roads”) is an integrated research project co-funded by the European Commission Information Society Technologies among the initiatives of the 6th Framework Programme. Its aim is to prevent road accidents developing a Safety Margin Assistant (an intelligent Cooperative System based on V2V and V2I communication) that detects in advance potentially dangerous situations and that extend drivers’ awareness of the surrounding environment.

The cooperative approach envisages a scenario in which the vehicles and the infrastructure cooperate to perceive potential dangerous situations extended in space and time horizon that will only be limited by the range of the radio communications.

The safety “added value” of the SAFESPOT activities is to look for the “combination” of the information from vehicles and from the infrastructure; the focus is on R&D activities regarding the identification of co-operative solutions that

will firstly be applied to the critical areas ("black spots") whose dangerousness is quantified by statistical data.
The key aspect of the project is to expand the time horizon for acquiring safety relevant information for driving, as well as to improve the precision, the reliability and the quality of driver information, and to introduce new information sources. The time horizon of the SAFESPOT applications will allow an extension of the "safety margin", namely the time in which a potential accident is detected before it can occur, from the range of "milliseconds" up to "seconds". This extension, named "green area", will reduce the risk of the accident to happen as more time will be given to drivers to realise that there is a potential danger and to undertake the appropriate manoeuvres.

Therefore the support from road infrastructure is needed to provide earlier information on driving or driving conditions, complementary to the autonomous systems, with increased precision in time, space and quality.
The idea is to validate the benefits of the co-operation among the future "intelligent" road infrastructure and the "intelligent" vehicles in terms of safety (reduction of the number of accidents), mobility and environmental impact, three keywords for the quality of life.

1.1.2. Three phase approach to the Business and Service Models

The complete study is made of a series of interacting parts, which will develop the SAFESPOT Business and Service Models. The research activities are conducted in 3 phases, each resulting in a deliverable, that include:
First Phase (D.6.6.1, M27):

- "ad hoc" value system definition: the main actors with their interrelationships
- the relevant Business and Service Model aspects identification, in an "end user point of view": the user acceptance analysis
- the relevant Business and Service Model aspects identification, in a "actor's point of view": the stakeholder analysis
- the preliminary aspects about the main international cooperative systems

Second Phase (D.6.6.2, M36):

- Analysis of the user position, based on user acceptance analysis and market assessment (wp6.5);
- Analysis of the potential business driver of each Business and Service Models;
- Alternative government intervention strategies together with their expected impact on the possible business and service models;
- First preliminary ranking of each Business and Service Model based on preliminary quantitative evaluations (socio-economic, financial and market assessment) and Legal and Risk Analysis.

Third Phase (D.6.6.3, M42):

- Final ranking of each Business and Service Model based on final Quantitative evaluations (Socio-economic, financial and market assessment), Organizational, Legal and Risk Analysis.

The relations among this deliverable and the other WPs activities are clarified in the chart described in the following figure, where related BLADE deliverables are represented according to their timing.

1.1.3. Reflection

The selection of the 'most promising' business model is very dependent on the viewpoint of the different stakeholders involved in SAFESPOT. What is "best" in the eyes of a commercial service provider may very be differently appreciated by a public road operator. Because the stakeholders of SAFESPOT consist of a wide variety of parties and because there are still a lot of uncertainties to deal with, within this work package we researched a wide range of models. We not only evaluated the extreme variants of the possible business models, we also assessed models that are more realistic for instance taking into account public and private reliance.

For the ranking of the business models this introduces a major challenge. A possible solution is to work from some basic assumptions for the main uncertainties (e.g. platform, public/private reliance). Another way is to chose a scenario approach. Based on the interaction with key stakeholders (road operators/administrations and possible service providers) the selection of a number of realistic models will be performed.

In order to get useful elements for the business and service models, two surveys have been conducted. Since we are still in a phase where the concept of SAFESPOT needs to be proved, the results of the surveys should be treated with caution and at a high/generic level. These type of surveys need to be repeated in the next stages of development, narrowing down to the systems that will be brought to the market.

1.1.4. Deliverable structure

The deliverable is structured in four main chapters, reflecting its main objectives:

- Chapter 2: "SAFESPOT'S Business and Service Models";
- Chapter 3: "Stakeholders' Consultation";
- Chapter 4: "User Acceptance Survey"
- Chapter 5: "Main International Cooperative Systems"

Furthermore, the deliverable includes five annexes:

Annex 1 (integrated in the present document): Review of the Literature/main studies

Annex 2 (integrated in the present document): The Preliminary Business and Service Models Questionnaires

Annex 3 (integrated in the present document): The Stakeholder Questionnaire/ Secondary-other results

Annex 4 (integrated in the present document): The User Acceptance Questionnaire/Secondary-other results

Annex 5 (separated file named SF_DB_User_Acceptance_results.xls)

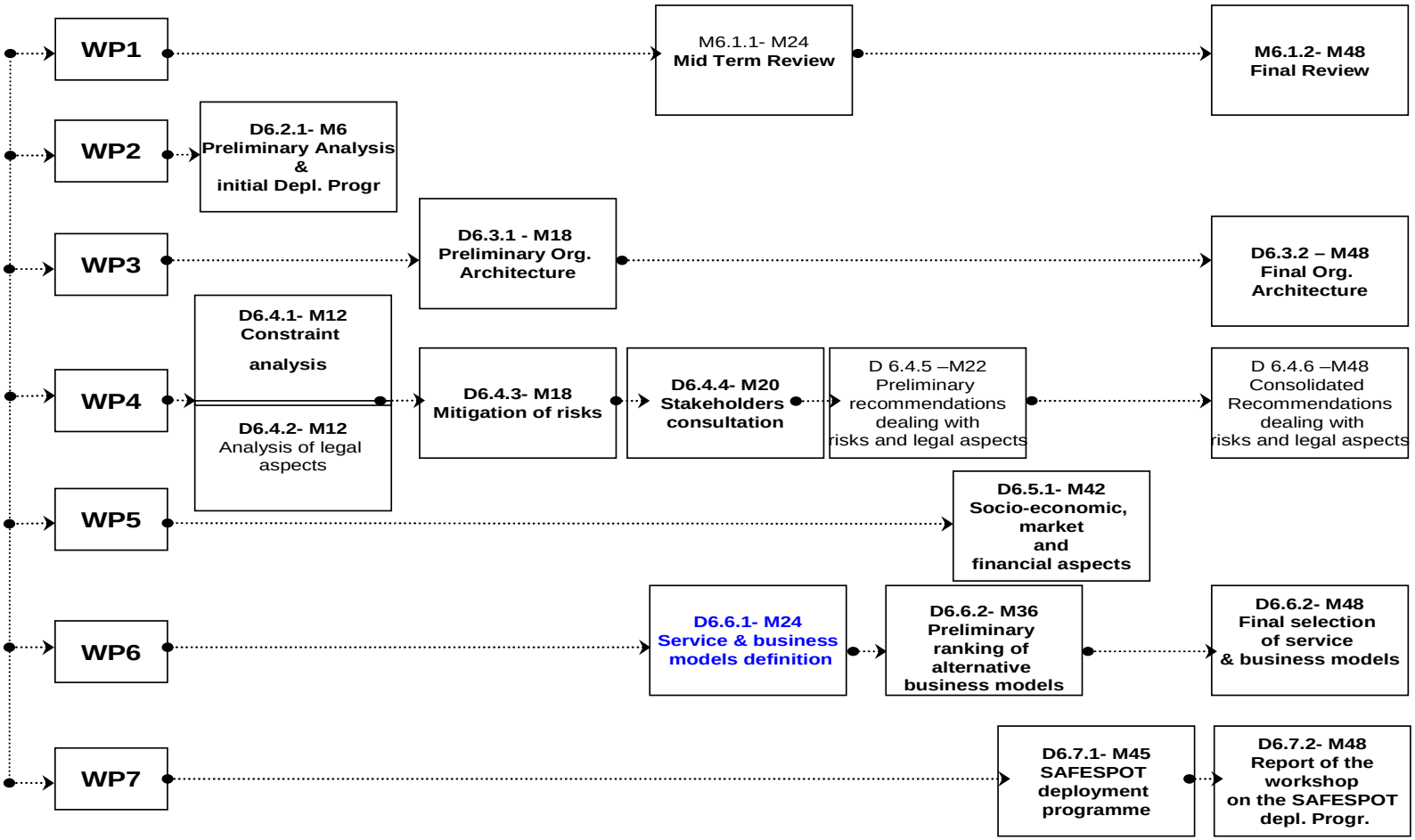


Figure 1 Deliverable Timetable[1]

[1] This Deliverable timeline is based on what is written on page 340 of the T.A..

1.2. Innovation and Contribution to the SAFESPOT Objectives

This deliverable gives a specific innovative contribution to the general BLADE objectives, because it is an important starting point regarding the proper deployment of SAFESPOT applications. The final result of BLADE will be a complete and sustainable Deployment Plan.

The goal of BLADE 6.6.1 is to define different Business and Service Models.

The outcomes of this task are:

- Obtained via a methodological approach that has been selected to manage the complexity of many variables, with many levels of possible connections, at the same time. None of the existing European projects adopted a methodology similar to the SAFESPOT approach (definition and ranking of alternative business models)
- Representing a first, fundamental step for the SAFESPOT deployment programme.

1.3. Methodology used

After an extensive review of the literature and of the existing European Projects[2], the Harvard definition of a Business Model by Chesbrough & Rosenbloom seemed to be the most suitable scheme for the purpose, so BLADE decided to follow this approach for two main reasons:

1. The first reason is that the Harvard approach is the only that integrates the earlier perspectives into a coherent framework that takes technological characteristics and potentials as inputs, converting them into economic outputs for the stakeholders[3], the markets and the actors. SAFESPOT needs a methodology focused on radical innovations, perfectly consistent with it as it is a completely new cooperative system.
2. The second reason is that it's doesn't exist at international level one accepted definition of Business Model. Now there are hundreds of ways in which Business Models concepts are used, and above all with different meanings and definitions, depending for instance on their focus or range, their function or goal.

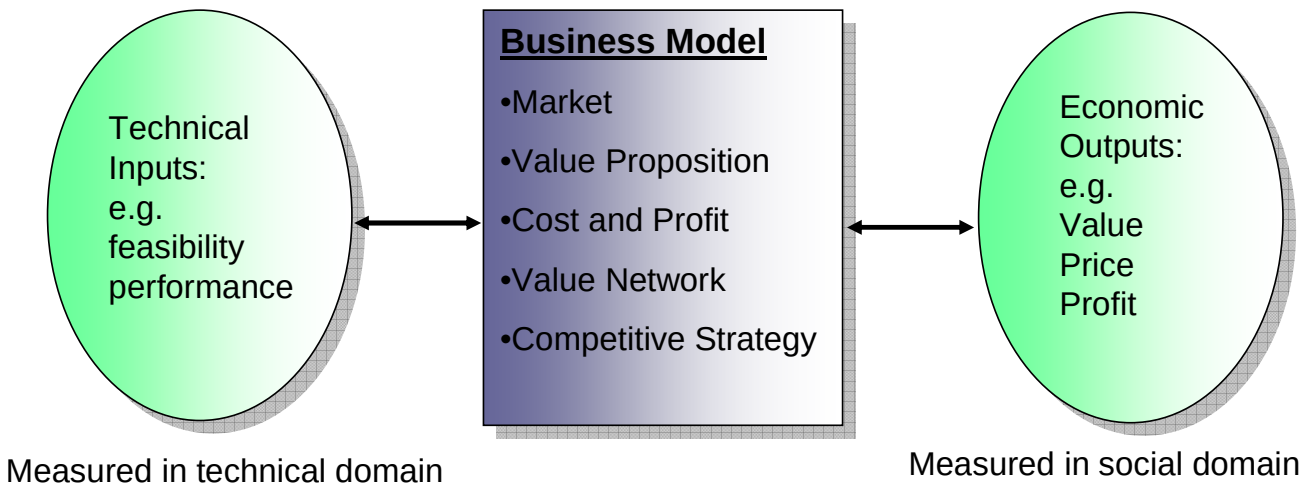
Harvard University based its approach on an international benchmarking whose purpose is to investigate and to research the existence of common BUSINESS MODELS features (see table 1).

[2] See Deliverable 6.2.1 "Report on Preliminary Analysis And Initial Deployment Program"
[3] See Chapter 2.3.1

The two authors mentioned above explored the role of the business model in capturing value from technology, and in the same time they explained that a successful business model unlocks latent value from a technology.

One of the questions that have been researched was:
"….Why do successful companies often fail to capture value from new technology that they helped to create?..."

According to them the business model is conceived as a focusing device that mediates between technology development and economic value creation. Firms need to understand the central role of the business model, in order to commercialize technology in ways that will allow firms to capture value from their technology investments
The business model maps the route from the technical domain of inputs to the social domain of outputs. The challenging aspect of defining the business model for technology managers is that it requires linking the physical domain of inputs to an economic domain of outputs, sometimes in situations of great technical and market uncertainty. As Figure 2 shows, the business model can be regarded as a construct that links these domains. Because of the richness and complexity of each domain, companies usually specialize personnel to focus within each domain.



Source: Harvard Business School Review

Figure 2 Capturing value from technologies

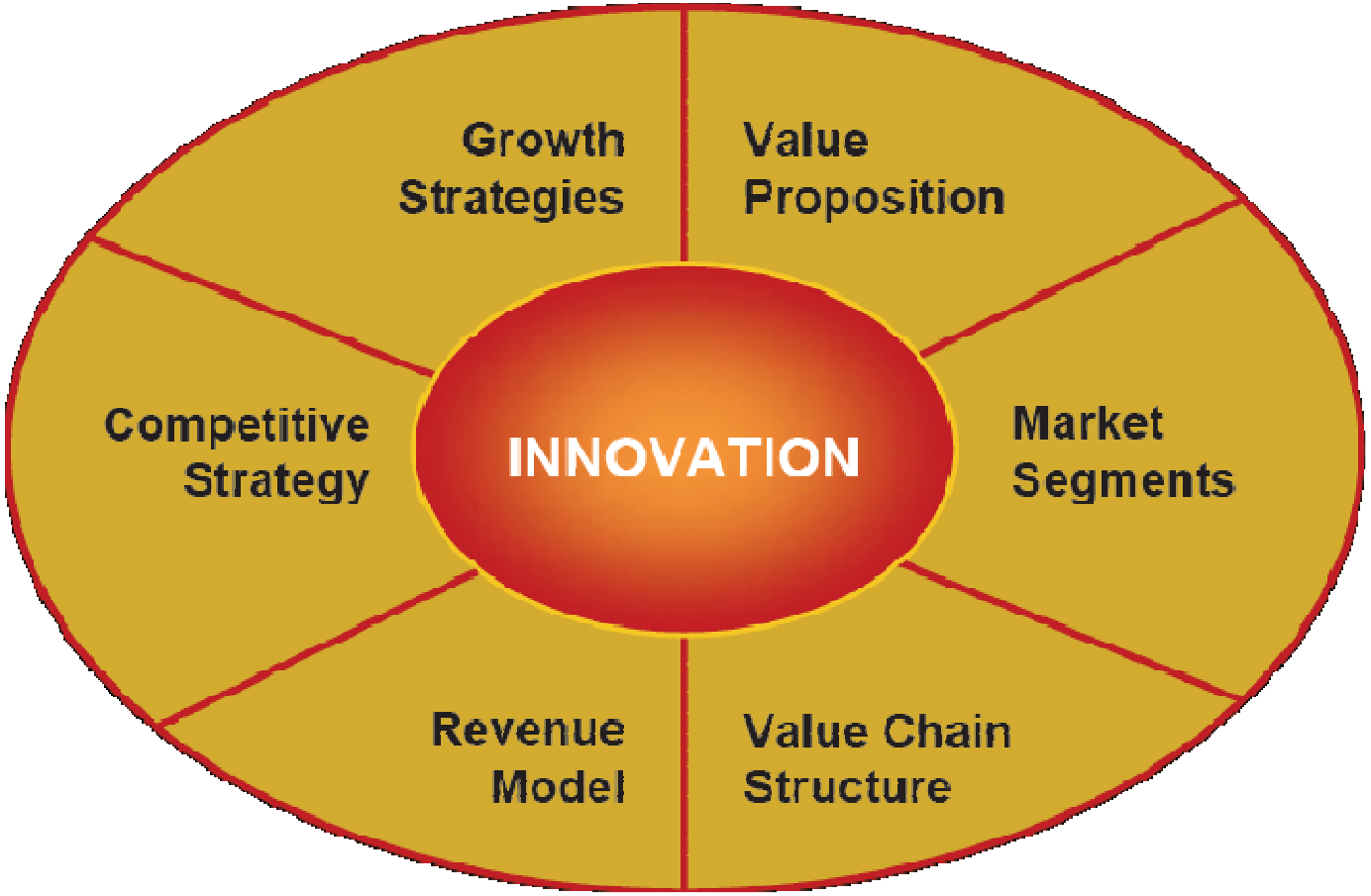


Figure 3 Business Model converts Innovation to Economic Value

Chesbrough and Rosenbloom proposed the following definition:
"… a Business model is a description of how your company intends to create value in the marketplace. It includes that unique combination of products, services, image, and distribution that your company carries forward. It also includes the underlying organization of people, and the operational infrastructure that they use to accomplish their work".
A more operational definition of a business model should address the following issues:

- Value proposition
- Market segment
- Firm organisation and value chain
- Cost structure and profit potential
- Firm in value network
- Competitive Strategy

A market focus is needed to begin the process in order to know what technological attributes to target in the development phase, how to define and configure the offering and how to solve the many trade-offs that arise along the development process.
The identification of a market is also required to define the "architecture of the revenues" – i.e. how a customer will pay, how much to charge and how the value created will be apportioned between customers, the firm itself, and its suppliers. Having some sense of what the market will bear helps to inform on what cost structure is indicated, indeed mandated, by the value proposition. In any market of reasonable size, there will probably be many technical alternatives and possible competitors. Targeting a specific market with a clear value proposition makes easier to chose what has to be done and what can be omitted in the technical domain. Target margins provide the justification for the real and financial assets required to realize the value proposition. The margins and assets together establish the threshold for financial scalability of the technology into a viable business.

As it has been highlighted on page 13, Harvard University based its approach on an international benchmarking.

12 main definitions have been found in publications during the years 1998-2003. Across these ones, 42 different business models components (see table 1) have been discovered.

The most cited are: Value network, Customer (target market, scope, etc), Resources/assets and Value proposition. Only in one definition most of these components appeared. For this reason, through a "Six sigma"4 tool, the authors tried to categorise the 20 business models components that have been cited twice or more. They have been classified in four groups according to their underlying similarity. A descriptive name for each of them has been developed. The results are shown in figure 4.

[4] The affinity diagram approach has been used. This method helps identifying patterns and establishing related groups that exist in a quantitative datasets.

Combining the results summarized in the affinity diagram shown below, business models can be defined as: "*representation of a firm's underlying core logic and strategic choices for creating and capturing value within a value network…..*"

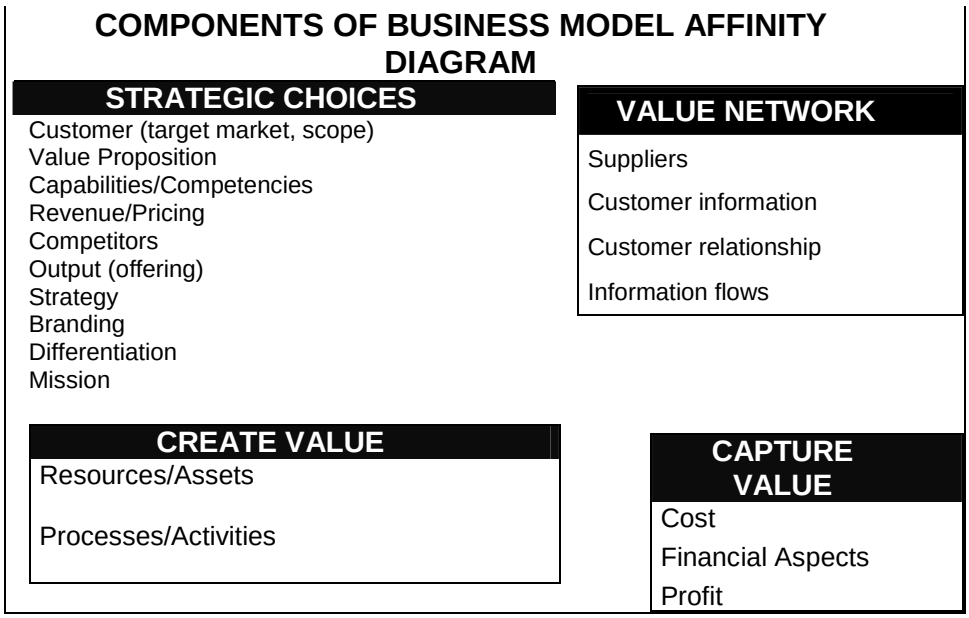


Figure 4: Component Of Business Model Clustered with an Affinity Diagram

Source: Harvard Business School

Table 1: Components of a Business Model (Source Harvard Business School)

Authors	Timmers	Hamel	Afuah and Tucci	Amit and Zott	Weill and Vitale	Dubosson Torbay	Magretta	Rayport and Jaworsky	Van Der Vosrst	Hoque	Chesbrought	Hedman and Kalling
Components												
Value Network (supplier)	x	x			x	x			x	x	x	x
Customer (Target market, scope)		x	x		x		x	x		x	x	
Resources/Assets		x		x		x		x		x		x
Value Proposition			x			x	x	x	x		x	
Capabilities/Competences		x	x	x		x						x
Processes/activities		x	x			x			x		x	x
Revenues/pricing	x	x	x			x						
Competitors								x		x		x
Cost						x	x				x	
Information Flows	x			x	x							
Output (offering)				x				x				x
Product/Service Flows	x			x	x							
Strategy		x								x	x	
Branding						x				x		
Customer Information		x				x						
Customer Relationship		x				x						
Differentiation		x								x		
Financial Aspects						x		x				
Mission		x				x	x			x		
Profit				x								
Business Opportunities				x								
Cash Flows					x							
Create value				x								
Culture										x		
Customer Benefits								x				
Customer Interface		x										
Economic logic							x					
Environment										x		
Firm identity										x		
Firm reputation										x		
Fulfilment and support		x										
Functionalities									x			
Implementation			x									
Infrastructure-applications									x			
Infrastructure-management						x						
Management												x
Product Innovations						x						
Specific characteristics									x			
Sustainability			x									
Transaction content				x								
Transaction governance				x								
Transaction structure				x								

PART 1

Different SAFESPOT product-client-service scenarios

In order to identify the most suitable Business and Service Models for SAFESPOT system, an activity structured in three main phases, with the following objectives, has been foreseen:

- to select the proper approach
- to define the hypothesis in a correct way
- to define the main actors and stakeholders with their relationships

2. SAFESPOT's Business and Service Models

In this chapter the following aspects have been highlighted:

1. the SAFESPOT System description
2. the overall approach (the three steps) whose purpose is to define how to convert in the best way the SAFESPOT innovation into Economic value for the actors involved;
3. the hypotheses that have been made to define the different SAFESPOT Business and Service Models
4. the different B.M. and S.M. with the actors involved and their interactions

2.1. SAFESPOT System description

First of all, we need to clarify what SAFESPOT is and how it works, in order to find out the most useful elements on which we could base the Business and Service Models and to identify the stakeholders involved.
But how shall we describe SAFESPOT from the view point of Business and Service Model analysis?

SAFESPOT base and SAFESPOT plus
When SAFESPOT applications will be deployed on the market, a basic system configuration will be available:

Vehicles will have on board a system that will be able to:

- detect potentially dangerous traffic / environmental situation (via on board data or sensors);
- communicate safety-related messages to the other vehicles and to the road infrastructure (via an on board communication unit that communicates using a dedicated frequency band that is free of charge);
- receive the same typology of information from other vehicles and from the road infrastructure (via the same communication technology);
- signal to the driver potentially dangerous situations that can either be detected by the same vehicle or by other vehicles or by the road infrastructure (via an on vehicle HMI that includes real time updated maps).

Road infrastructure will be equipped with road side units that will be able to:

- detect potentially dangerous traffic / environmental situation (via on road sensors);
- communicate safety-related messages to the vehicles (via an "on road" communication unit that communicates using a dedicated frequency band that is free of charge – the same that is used by the vehicles);
- receive the same typology of information from vehicles (via the same communication technology);

- signal to the driver potentially dangerous situations that can either be detected by vehicles or by the road infrastructure (via an on road HMI like for example variable message panels).

This configuration is what is meant in this document by "**SAFESPOT base**".

However, when SAFESPOT applications will be deployed, a more extended cooperative scenario can already be identified integrating the exchange of information "free of charge" that build the network of information in the SAFESPOT base version with the exchange of information "via service media like UMTS for example" to and from traffic control centres. This is what is called here the "**SAFESPOT plus**" version. Specifically, all those time-critical safety messages that are exchanged via the SAFESPOT base network are also made available to traffic control centres that will then distribute these messages via a service provider. The difference is that in this case typically a safety critical message becomes a message to be used to improve traffic efficiency like for example: "there is an accident behind the curve" this message is time critical for the incoming vehicles that are driving nearby the area to avoid a crash, while it becomes a useful message later on for all other incoming vehicles to avoid that road section that is blocked by the accident.

Specifically, the nodes of SAFESPOT base version are:
1. Vehicles equipped with on board co-operative systems that include: sensors for traffic and for the environment, a communication unit, an on board display and updated navigation maps.

2. Road infrastructures equipped with road side units that include the cooperative system components: sensors for traffic and for the environment, a communication unit, an "on the road" display to provide the information to drivers (e.g. a variable message panel).

In the SAFESPOT plus version an additional node is included in the net: the road/city traffic centre that is connected to the other two nodes via a service provider.

2.2. SAFESPOT Approach

The purpose of BLADE Wp6.6 is to define the most promising Business or Service Models.

The complexity of the SAFESPOT architecture required, unlike existing projects, three different and sequential steps[5] (figure 7) in order to identify the most suitable one (at the end of third one, with Deliverable 6.6.3).

The scheme is like a "funnel", from the general to the particular: from the Business and Service Models identification (Deliverable 6.6.1, Step 1) to the definition/selection of the best one (D.6.6.3, step 3).

The first step conclusions are an important starting point, even if they are not final, and will be more detailed in the next steps. To define/select the final SAFESPOT Business or Service Model further analysis/ information will be needed (Market Aspects/BLADE Wp6.5, Socio-Economic Cost and Financial Aspects/BLADE Wp6.5, Competitive Strategies/BLADE Wp6.5, Final Recommendations/BLADE Wp6.4). Each BLADE WP partner will give its contribution to define the relevant SAFESPOT B.M. and S.M. functions (see figure below).

Harvard Business Models Functions	SAFESPOT Business and Service Models Functions	WP	BLADE PARTNER	TIMEFRAME (M)
VALUE PROPOSITION	To articulate the VALUE PROPOSITION	6.6.1	CRF	available
MARKET	To research the specific benefits and disadvantages for the different groups of end-users (the end user and the main stakeholders)	6.6.1	CRF	available
COMPETITIVE STRATEGY	To define Alternative Government Strategies	6.6.2	CRF/TNO/RWS	36
MARKET	To analyse the End User Position	6.6.2	CRF	36
MARKET	To analyse the potential business driver	6.6.2	CRF	36
MARKET	To identify the MARKET ASPECTS	6.6.5	BAST/ CRF	34
VALUE NETWORK	To define the ORGANIZATION AND VALUE CHAIN (Preliminary Version)	6.6.3	CSST	available
COST and PROFIT	To estimate COST, SOCIO-ECONOMIC AND FINANCIAL ASPECTS	6.6.5	Bast/UoC	42
COMPETITIVE STRATEGY	To formulate the COMPETITIVE STRATEGIES	6.6.5	BAST/ CRF	34
COMPETITIVE STRATEGY	To investigate the LEGAL ASPECTS	6.6.4	TNO/UoA	Available (this aspect will be analysed in D6.6.2.)

[5] During phase n.1 different Business and Service Models, with their strengths and weaknesses, have been identified. The relevant issues have been investigated under a double point of view (the "End User" and the "Stakeholders'" one).
In addition, a preliminary analysis to define what are the main international cooperative systems and the technological road maps of the components for a cooperative system has been done.
In phase n.2 (M36) a first preliminary ranking of each Business and Service Model will be produced.
In addition, the following activities will be done:

- Deep analysis of the user position, basing on user acceptance analysis (BLADE WP 6.1) and market assessment (WP5).
- Analysis of the potential business drivers of each Business and Service model, taking into account the role of all the stakeholders, both private and public ones.
- Alternative government intervention strategies, together with their expected impact on the possible business and service models.

Finally, during phase n.3the most suitable Business or Service Model for SAFESPOT will be selected.

Harvard Business Models Functions	SAFESPOT Business and Service Models Functions	WP	BLADE PARTNER	TIMEFRAME (M)
VALUE PROPOSITION	To articulate the VALUE PROPOSITION	6.6.1	CRF	available
MARKET	To research the specific benefits and disadvantages for the different groups of end-users (the end user and the main stakeholders)	6.6.1	CRF	available
COMPETITIVE STRATEGY	To define Alternative Government Strategies	6.6.2	CRF/TNO/RWS	36
MARKET	To analyse the End User Position	6.6.2	CRF	36
MARKET	To analyse the potential business driver	6.6.2	CRF	36
MARKET	To identify the MARKET ASPECTS	6.6.5	BAST/ CRF	34
VALUE NETWORK	To define the ORGANIZATION AND VALUE CHAIN (Preliminary Version)	6.6.3	CSST	available
COST and PROFIT	To estimate COST, SOCIO-ECONOMIC AND FINANCIAL ASPECTS	6.6.5	Bast/UoC	42
COMPETITIVE STRATEGY	To formulate the COMPETITIVE STRATEGIES	6.6.5	BAST/ CRF	34
COMPETITIVE STRATEGY	To investigate the LEGAL ASPECTS	6.6.4	TNO/UoA	Available (this aspect will be analysed in D6.6.2.)
COMPETITIVE STRATEGY	To formulate RECOMMENDATIONS	6.6.4	TNO	48

Figure 5: Functions of the SAFESPOT Business and Service Model

Figure 5 summarises and displays the complete SAFESPOT approach.
The first and the second column highlight the connections between the Harvard (figure 2) and the SAFESPOT methodology.
In particular the first column lists the Harvard Business Models functions while the second one the correspondents SAFESPOT functions.
The third one lists the BLADE Workpackage responsible of the activity that has been mentioned in the second column, the fourth one the BLADE partner that will give this contribution, finally the fifth one the expiration date.
This because the work inside BLADE SP has been mainly organized according to a ”step by step” approach. The output produced by Wp6.6.1 (several Business and Service Models) is going to be the initial data/information for the next steps.

Considering the objective of this task, two main phases have been identified:

1. “*Ad hoc”* value system definition
2. Relevant Business and Service Model aspects identification (in an actors’ point of view).

The results of this Chapter refer to point n.1.

“Ad hoc” value system definition

This phase was aimed at identifying the relevant actors and their interactions. It started with the analysis of the literature, the existing projects, the SAFESPOT Technical deliverables and other documents that could help to understand the main components of Business Models[6].

[6]See references

As a first step, a structured Questionnaire[7] was sent to all the SAFESPOT Sp leaders and to selected partners; their output has been used as a starting point to investigate the first results. Through our investigations we had reached a certain level of understanding, but we also reached the convincement that the expert vision was needed to extract useful additional elements to allow the BLADE team to perform a better work on the business models. The experts' vision helped us validating the initial BLADE WP6 hypothesis.

The survey was structured in seven main questions related to:
• Business and service models
• Business case elements
• Integration of functionalities
• Benchmarking
• User acceptance
• Main business/service models related risks
• Business/service models validation
In Annex2 the main results are shown.

After the initial identification of the possible business and service models, the available results of BLADE Wp6.5 (qualitative market assessment) and BLADE Wp6.3, have been analyzed to understand how they could be implemented.

This because BLADE Wp6.3 and Wp6.6 purposes are rather different:

- In BLADE Wp6 the overall SAFESPOT system has been analyzed, while in Wp6.3 only four selected applications were investigated[8]:
- Wp6.3 analysed exclusively the activities that are performed in order to operate SAFESPOT within the functional architecture context (the logical functions), therefore functionalities related to the marketing, installation, maintenance, support, insurance, administration areas are analyzed within other contexts;
- The variables of the Business Value System (Wp6) are the main stakeholders with their relationships, while in the Organization Value Chain (Wp3) they are the actions/activities of each stakeholder that make possible the functioning of the applications.

The decision to organize the work according to this scheme has been taken for two different reasons:

- to avoid a duplication of the work/roles between them,
- to use the results[9] of Wp6.3 in a sound way during the second Task of BLADE Wp6.6, to rank the different Business and Service Models.

Instead, the work with BLADE Wp6.5 has been mainly organized according to temporary criteria. The first outcomes of Wp6.5. (qualitative market assessment) have been the input data of Wp6.1 (definition of several Business and Service Model for Wp6). In the same way the output produced by Wp6 (several Business and Service Models) is going to be the initial data/information for the next steps of

[7] See Annex 8.1
[8] For V2I: Co-operative Intersection Collision Prevention - Basic application, Speed Alert - Critical Speed Limit. For V2V: Road intersection safety, Speed limitation and safety distance – General Use Case
[9] Basing on Wp3 results, will be investigated if there is a duplication of roles of each stakeholders, if there are any role not covered appropriately, etc.

Wp6.5.6[10] and Wp6.5.7[11] (Costs assessment) and so on. Figure 12[12] shows the links between the BLADE Wp5 and Wp6 and how the results flow between them.

Then the Business and Service Models hypothesis have been discussed with SP5 and SP4 people to verify their economical and technical feasibility and have been modified basing on their suggestions.
In addition, several meetings with relevant technical experts took place and the team is also in contact with CVIS and Cooper projects people, sharing with them results and methodologies.
In chapter 2 the results have been detailed.

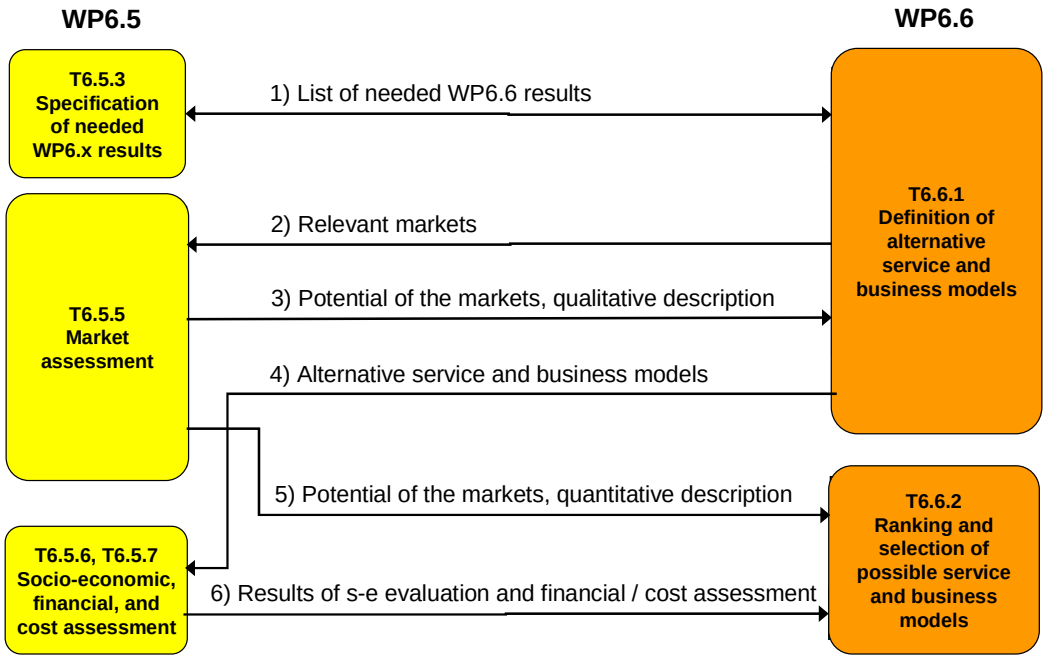


Figure 6:: Links between WP6.5 and WP6.6

[10] Socio-economic evaluation, financial and cost assessment of V2V-based applications
[11] Socio-economic evaluation, financial and cost assessment of V2I-based applications
[12] There was a technical meeting among CRF, BAST and University of Cologne on May 11th 2007(Cologne)

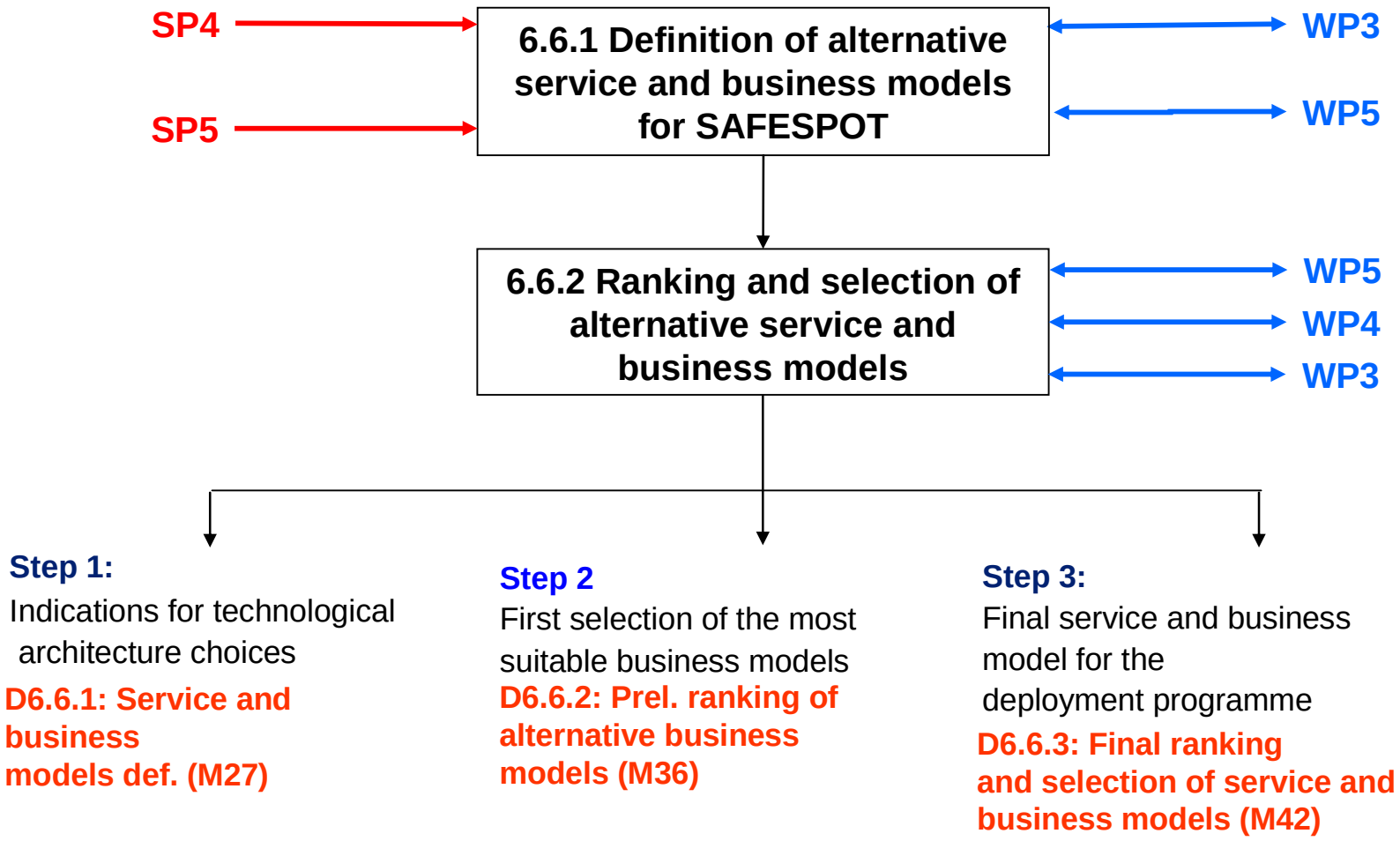


Figure 7 : WP6 Approach

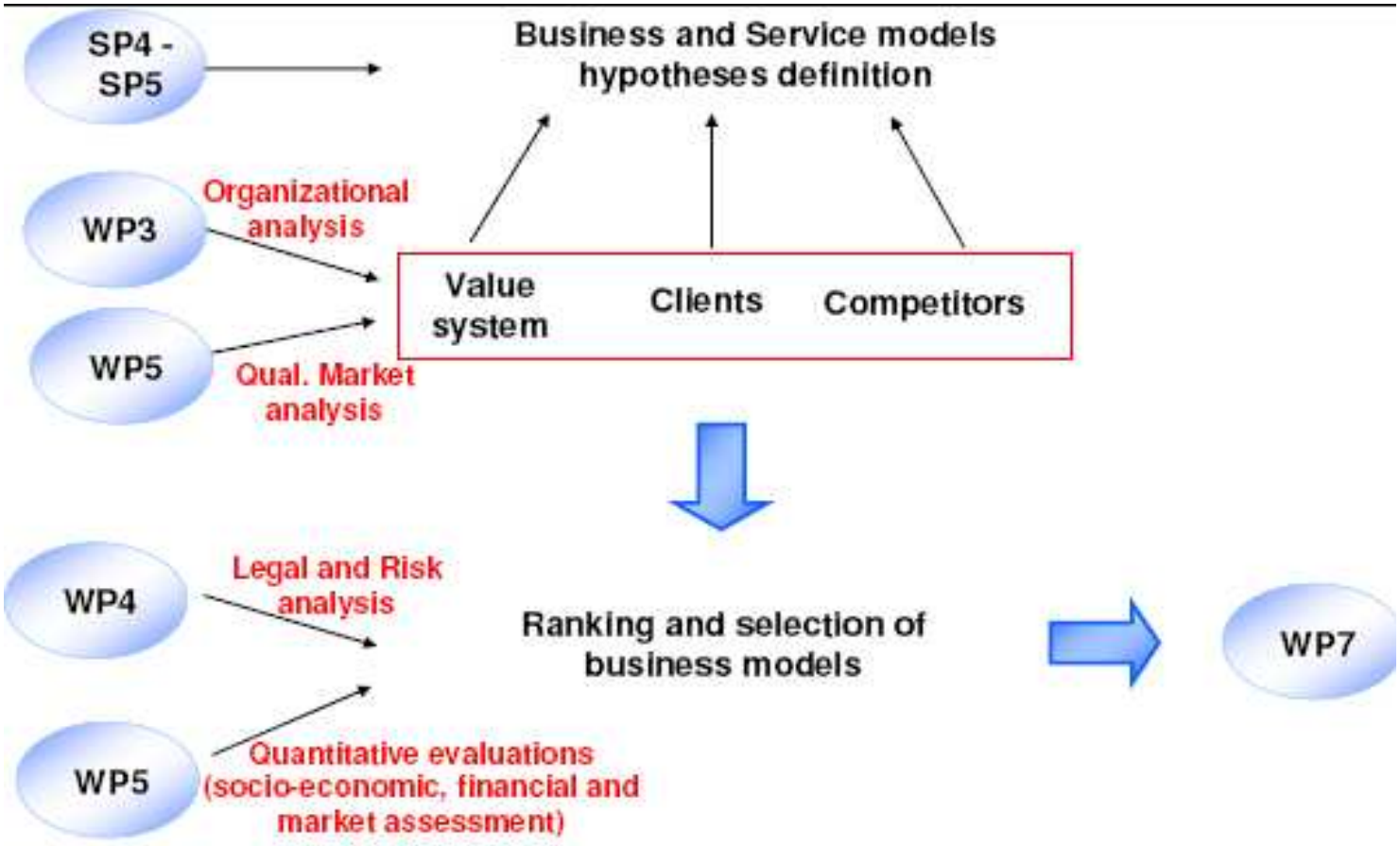


Figure 8: Connections among the WPs

2.3. The Business and Service Models Hypothesis

In order to build up the preliminary hypothesis, we had to establish the main criteria.
We came up to three elements:

1. Public/Private Reliance (from a deployment/financial point of view)
2. SAFESPOT Base/Plus (from a commercial/marketing point of view)
3. Vehicle To Vehicle / Vehicle To Infrastructure Configuration (from a technological point of view)

Public/Private Reliance
The distinction between a Business and a Service Model is based on the different Public/Private reliance.
In the Business Model hypothesis there is a public reliance: the SAFESPOT functions are paid from the general fiscal income, fully (not by the final user) or partially (with a contribution of the users).
In the Service Model hypothesis (direct payment) there is a private reliance: the cost of the service is completely in charge of the user.

SAFESPOT Base/Plus
Furthermore, in a marketing/commercial point of view, the team supposed <u>five hypotheses of business and service model</u> based on literature[13]:

1. Selling of a *"final" system ready to use;*
2. Selling of a *"final" system with integrations of further applications;*
3. Selling of a *"proof of concept"* (i.e. a prototype or a preliminary version of the product);
4. Selling of components within an *"original equipment manufacturing" relation;*
5. Selling or licensing of *know how.*

Two of them have been selected for the system deployment:

- SAFESPOT "Base": (Selling of a *"final" system ready to use):* the system is available only with SAFESPOT safety functions. In this case SAFESPOT works on a dedicated network that enables vehicles and infrastructures to communicate with each other. A vehicle relieves a problem (an accident, an obstacle on the road) and transmits a signal via an *ad hoc* network to other vehicles/infrastructure, and the warning starts diffusing in the interested area.
- SAFESPOT "Plus" (Selling of a *"final" system with integrations of further applications*): the system will be open to further integrations and could be a part of a "bundle of services". In particular, the possible interactions with CVIS services (Traffic Information, Automatic Road toll payment, Parking

[13] (Mohr *et al.*, 2005; Gardner *et al.*, 2000):

Reservation) have been considered. This additional information goes beyond SAFESPOT functions and needs to be provided by a Content Provider (e.g. a Traffic Control Centre) via a cellular and/or internet communication.

Vehicle to Vehicle or Vehicle to Infrastructure configuration

The hypotheses above have been made considering both V2V and V2I scenarios and are referred to the whole SAFESPOT system and not to single applications.

On the basis of these criteria, we built our Business and Service models' hypothesis; 10 possible scenarios have been defined, which are shown in the table below:

1. four of them are private-based: the cost of SAFESPOT is completely in charge of the user;
2. two of them are fully public-based: the price of SAFESPOT is paid from the community (and not by the final user) assuming that 'Safety is a public good".
3. the remaining four are partly private and partly public based.

Table 2: Different SAFESPOT Product-Client-Service Scenarios

Different SAFESPOT Product-Client-Service Scenarios

	Reliance	SAFESPOT System Configuration		V2V	V2I
BUSINESS MODEL	Only Public	SAFESPOT "Base".	The driver will be able to have only SAFESPOT functions. The S.F. funtions are fully paid from the general fiscality	Required SAFESPOT Installation	SAFESPOT Public Investment
BUSINESS MODEL	Public/ Private	SAFESPOT "Base"	The driver will be able to have only SAFESPOT functions. The S.F. funtions are partially paid from the general fiscality with a contribution of the users.	Subsidized SAFESPOT Installation	Public Subsidy
SERVICE MODEL	Only Private	SAFESPOT "Base"	The driver will be able to have only SAFESPOT functions. The S.F. funtions are fully paid from the users .	Market driven SAFESPOT	Market driven SAFESPOT Infrastructure Based
BUSINESS MODEL (*)	Public/ Private	SAFESPOT "Plus"(*)	In a Marketing/Commercial point of view, SAFESPOT will be open to possible integrations. The User will be able to have SAFESPOT functions and other Services: Traffic Information, Automatic Road toll payment, Parking Reservation. The S.F. funtions and/or the other Services are partially paid from the general fiscality with a contribution of the users.	Subsidized SAFESPOT Plus Installation	Subsidized SAFESPOT Plus Investment
SERVICE MODEL	Only Private	SAFESPOT "Plus"	In a Marketing/Commercial point of view, SAFESPOT will be open to possible integrations. The S.F. funtions and the other Services are both fully paid from the users .	Market Drive SAFESPOT Plus	Market Driven SAFESPOT Plus Infrastructure Based

(*) The "SAFESPOT Plus" configuration with only public reliance has been considered as not economically feasible as the costs for the additional functions will be basically a cost that will be paid to the service provider and thus replies on the principle of pay per use like for example for the use of a mobile phone for standard communication.

2.3.1. SAFESPOT basic assumptions

After the different Business and Service Models alternatives definition, further basic assumptions have been made in order to build up the different hypothesis and the “ad hoc” value system:

- The actors and stakeholders involved, with their roles and relations, have been identified;
- From a market point of view, the aftermarket solution have been foreseen;
- The pricing and the ways of payment have been addressed as another crucial issue for the system’s deployment;
- The distribution channels for each possible solution have been analysed;
- The market for vehicles, users and road categories has also been investigated

a. Actors and Stakeholders

The SAFESPOT actors and the stakeholders have been identified and then contacted with a survey (see Chapter 4 stakeholder consultation) in order to validate the preliminary hypothesis and add useful elements to the analysis.
BLADE called Actors the ones who are actively involved in the value chain, whereas a Stakeholder is influenced by SAFESPOT but not necessarily in the line of business.
In relation with the two SAFESPOT configurations (Base and Plus), different actors are involved. This means that in the Plus configuration additional actors are involved.

1.The Actors for the SAFESPOT Base configuration are:

- Insurance Companies
- Map Provider
- Public Authorities
- Road Operators
- C2C and/or Clepa and/or ASECAP and/or ACEA and/or other institution
- OEMs
- Suppliers

2. **The additional Actors for the SAFESPOT Plus configurations are**:

- Service Provider (Telecom Operator)
- Content Provider (Traffic Control Center)

3. The Stakeholders for SAFESPOT are:

- Users
- Lobbying Organisations
- Research Centers
- Universities
- Opinion Formers
- Motoring Clubs
- Media
- Financial Transaction House

An institution (C2C and/or ACEA and/or CLEPA and/or ASECAP and/or others), which is not a public administration, will be responsible about the SAFESPOT certification, monitoring and promotion. This is needed as a high standard is fundamental to reach the required levels of functionality of the applications and of the services and the necessary public acceptability.

b. After Market solution

The “After-Market” solution has been foreseen, even though it won’t be implemented during SAFESPOT project’s time frame. This hypothesis will be deployed in a second exploitation phase, when the safety benefits of a system like this will be shown.

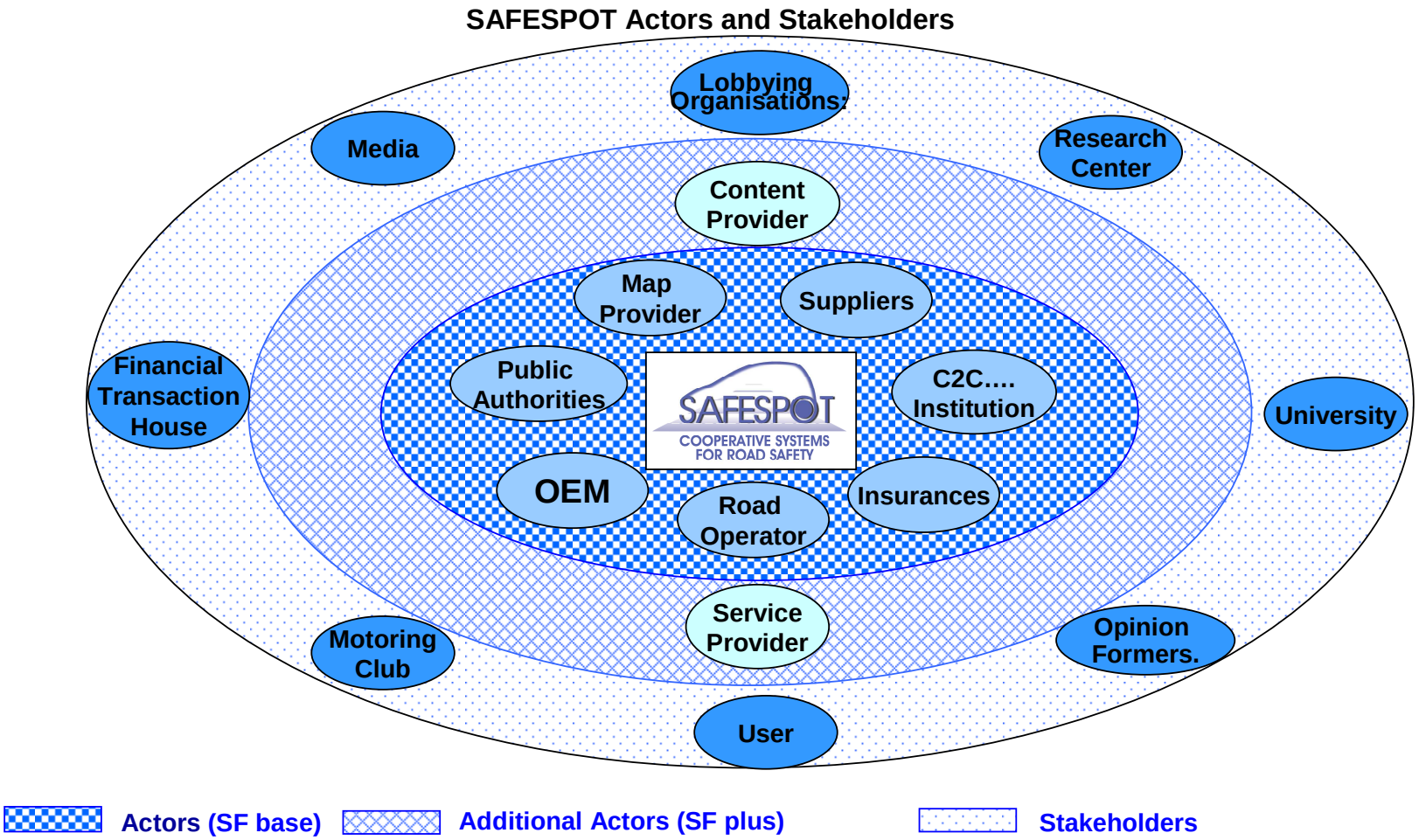


Figure 9: SAFESPOT A ctors and Stakeholders

c. Pricing

The price politics will be based on the following different criteria/parameters:
1) the Public/Private reliance
2) the different technical configuration (V2V and V2I),
3) the different commercial configuration (SAFESPOT Base or SAFESPOT Plus option).

For the **V2V** configuration, we can have the following hypothesis:

- In the BM Base configuration with a public reliance, the SAFESPOT system will be fully in charge of the community and completely free of charge for the user.
- In the BM Base configuration with a private + public reliance, the SAFESPOT system will be partly in charge of the user and partly in charge of the community.
- In the SM Base configuration with a private reliance, SAFESPOT system is completely in charge of the user (without pay per use principle).
- In the BM Plus configuration with a public + private reliance, the SAFESPOT system will be partially in charge of the user and in part of the community but the additional services are in charge of the user, according to the pay per use principle.
- In the SM Plus configuration with a private reliance, the SAFESPOT system is completely in charge of the user together with the additional services (that will be paid according to the pay per use principle).

Concerning the **V2I** configuration, the user should pay to the Road Operator a toll for the road segment which is equipped with this service.
In this case the SAFESPOT toll will be defined as an additional percentage of the toll that the user normally pays to use motorways, bridges, tunnels etc**.** The principle is to make the customers pay the effective use of the roads equipped with SAFESPOT devices, instead of imposing a taxation that involves all the citizens regardless to the effective use.
The variables for the toll configuration can be grouped in two main categories:

- **Target market**, that is the community of vehicles/users to whom the toll is going to be available.
- **Fee policies,** that include different fees related to vehicles typologies or particular users (frequent users, etc.).

The target market can be represented by:

- All the vehicles typologies, regardless to their weight/body and their characteristics in terms of correspondence to certain criteria.
- Only some classes of vehicles: trucks, buses, etc.

As regards users, the options can be:

- All user typologies
- Only some categories of users (e.g. professional drivers)
- The users resident in a certain area

This issue has been investigated both in the user and in the stakeholder survey.

The fee policies can be chosen in relation to certain parameters:

- Type of road, type of area (urban, extra-urban, highways, etc.)
- Type of vehicle (motorcycle, car, truck, weight/body, number of axles)
- Type of users (resident/not resident, private/company, professional user, user belonging to protected categories)
- Distance/duration of the transit
- Way of payment

The possible SAFESPOT price politics are summarized on the following table.

Table 3: SAFESPOT Price Politics

	Reliance	V2V	V2I
		Pricing	
BUSINESS MODEL (Basic)	Only Public	free	free
BUSINESS MODEL (Basic)	Public/ Private	The user has to pay partially the SAFESPOT system	The user has to pay partially the SAFESPOT system and a toll for the roads equipped with SAFESPOT
SERVICE MODEL (Basic)	Only Private	The user has to pay the SAFESPOT system	The user has to pay the SAFESPOT system and a toll for the roads equipped with SAFESPOT.
BUSINESS MODEL (Plus)	Public/ Private	The user has to pay partially the SAFESPOT system. The user has to pay, according to the pay per use criteria, the connection to the other services like: traffic information, automatic road toll payment and parking reservation	The user has to pay partially SAFESPOT System and a toll for the roads equipped with SAFESPOT. The user has to pay, according to the pay per use criteria, the connection to the other services.
SERVICE MODEL (Plus)	Only Private	The user has to pay the SAFESPOT system, and, according to the pay per use criteria, the connection to the other services.	The user has to pay the SAFESPOT system , and ,according to the pay per use criteria, the connection to the other services. In addition the user has to pay a toll for the roads equipped with SAFESPOT.

d. The pay per use insurance approach (telematics based pay-as-you-drive car insurances)

Telematics based pay-as-you-drive car insurance is defined as the insurance system that uses a GPS receiver and a GSM module for communication to track the entire route covered by a passenger car and thereby evaluate the insurance premium that is based on a pre-designed tariff.

The key parameters that go into the tariff as inputs are: where people drive, when they drive and how they drive. Actually the “how they drive” is limited to the number of accidents, future systems are expected to include more details on this factor.

Savings on net premium for low-mileage and low-risk drivers is the primary objective of the telematics based insurance system.
Other objectives are:
• As the telematics based insurance system is based on GPS technology, the vehicle’s route and speed is completely traceable. This makes insurance frauds more difficult to commit.
• eCall and stolen vehicle tracking are some of the other highly valuable telematics features.

The telematics pay-as-you-drive insurance cannot be applied to the SAFESPOT B&S Models as it is: in fact, the “how they drive” parameter will have to include among its options the availability or not of “safety functions” on board the vehicle. In any case insurance companies of the future can also apply a simple insurance reduction rate to those vehicles that will be equipped with safety functions, as the probability to cause or to take part of an accident will be sensibly reduced.
However, it should be stated that the only reliable enabling factor for insurances to promote the aforementioned policies related to safety functions are the future statistical data that will indicate the effectiveness of the use of safety systems (like cooperative systems) to reduce the number of accidents. Only under this evidence the insurances will be able to tune their business cases balancing the loss of income due to a reduced tariff with the reduced number of accidents to be reimbursed.

e. The distribution channels

The possible distribution channels are different depending on the SAFESPOT version (base or plus) and on the type of applications that can be V2V or V2I:

V2V configuration

The main distribution channels for the V2V configuration could be the car makers and the electronic stores (in case of aftermarket solution). When the driver buys the car, he/she is able to have the SAFESPOT system functions on board. The user acceptance survey results show that the respondents prefer to have SAFESPOT when they buy a new car, not as an extra (optional), with the price included in the overall vehicle’s price.

The SAFESPOT system could be sold through the supplier distribution channel and the distribution chains related to electronics (aftermarket solution). The after market

solution implies that the user buys the device and installs it via a plug-and-play solution.
Possible alternative typologies of contract, through which the user could become the owner of SAFESPOT HW and SW, might be:
- (**free) renting contract**: foreign and/or occasional users could get the device that allows the access to SAFESPOT functions, depositing a key money. The selling channels could be positioned also next to the network access areas. This solution is characterized by extreme flexibility and extreme acceptability.
-(**free) leasing contract:** the device would be provided freely to the user, after depositing a key money, and it remains a property of the system producer.

The installation of the SAFESPOT system (in a case of aftermarket solution) would be executed by a properly selected and trained supporting centre. Beyond the installation of the on board unit, other operations could be made. The costs for the SAFESPOT installation and the other related costs (round-trip, dwell time) would be in charge of the user, as well as the final uninstalling at the end of the contract and the costs for the supporting service. The user will be responsible in case of device damage.

However, it should be stated that the actual development of the SAFESPOT system does not foresee yet the possibility to sell HW and SW SAFESPOT components via after market. The main reason is that SAFESPOT functions should be connected to the in-vehicle network to operate at full the functionalities; in any case the hypothesis of selling some of the functionalities (or all) in future as optional will be evaluated in the project's outcome deployment phase.

V2I configuration
The main distribution channels for the SAFESPOT base V2I configuration will be the same of the V2V ones, adding the road operators that will distribute system functionalities via a specific fee that will have to be accessible via different typology of payments (like for example the Telepass of today). The fee will typically be pay-per-use based.

In the case of the SAFESPOT plus version the additional distribution channel is the service provider that can offer the service at a defined cost per use via the cellular of the web network.

f. Vehicle categories
A detailed analysis on the vehicle targets (the most promising vehicle segment for SAFESPOT) will be provided in BLADE Wp6.6.2. The output it's going to be referred to five European Countries that will be used as reference: Germany, France, Italy, Spain and UK.
Recent studies[14] of the current status of Advanced Driver Assistance Systems (ADAS) in Europe and Japan show that:

- the European market for ADAS is not yet very mature while Japan is ahead of about two to three years;

[14] CHVS projects

- the main focus for passenger cars is on applications that assist the driver through a warning and/or control for accident prevention.

The deployment strategies of cooperative systems based on vehicle to vehicle and on vehicle to infrastructure communication cannot follow a long term deployment time frame: the main reason is that the effectiveness of the related functions relies on the number of vehicles and on the number of road equipped. For this reason a short to medium time to market exploitation must be foreseen or the market introduction will never start up. The deployment strategy will have to take into account from the beginning the use of very low-cost technologies and component that can (in a time frame of 3 to 5 years) enable on a mass market of vehicles, basic SAFESPOT functions both based on V2V and V2I communication. The identification of starting up applications will have to become the flag to be used to enable the subsequent implementation of more complex (and more costly) functions.

g. Road categories

From the vehicle makers point of view the selected Business and Service Model will have to include from the beginning not only high end class vehicles but also family cars, while from the road operators perspective the selected Business and Service Model will have to foresee the implementation of specific functions in the so-called “black spots” i.e. road segments whose dangerousness is evident in road accident statistics.

In both cases the media can play an important role in increasing public awareness of the proposed functions thus enabling the demand for such functions to increase with positive impact on the market.

2.4. Different product-client-service scenarios

After formulating the hypothesis and describing all the assumptions, the actors and the stakeholders involved, in the following paragraphs the Business and Service Models are analysed. Each hypothesis has been illustrated with a diagram showing the actors involved, their roles and interdependencies and the flow of products, services or information among them.
In all cases an Institution (C2C and/or ACEA and/or CLEPA and/or others), which is external from public administration, will be responsible about the SAFESPOT certification, monitoring and promotion.

2.4.1. REQUIRED SAFESPOT INSTALLATION

Business Models – SAFESPOT Base, with Public Reliance (V2V)
The price is paid from the general taxation (and not by the final user). The User will be able to have (for free) the SAFESPOT functions.
Funding might be covered by general taxation or by a combination of policies.
Insurances will have the opportunity to increase their competitiveness by providing the driver incentives keeping their Return On Investment always at a high level, as the number of accidents will be sensibly reduced.

SAFESPOT Actors (SF base)

- **Public authorities (European/National/Regional entities).**

They will provide the grants for communication channels and frequency bands.
They will define the SAFESPOT Legal Framework (legislative aspects for all the stakeholders involved: car makers, suppliers, distribution channel, insurance, distribution channel, etc).
They will communicate the Rules affecting the traffic circulation.
They will finance the overall SAFESPOT system, perhaps providing tax incentives to the cars equipped with it too.

- **OEM (Car Makers)**

They will supply the SAFESPOT system to the user (working product installed on the vehicle). They will be (fully) financed by the Public Authorities.

The After-Sale Support, that could be made available by the car maker, will provide the driver the customer support. It will be financed by the system producer or by the OEM.

- **Automotive Supplier**

They will provide to the OEM the SAFESPOT components.
They could provide the SAFESPOT system to the user, through the after market solution. They will be financed by the Public Authority and/or the OEM (through the Public Authorities). They will receive the standard navigation maps from the Map Provider (paying for it) and will supply it to the OEM or directly to the driver (in case of after market solution).

- **Map providers**

They will elaborate the navigation maps and will supply them to the automotive supplier. They will be financed by the supplier..

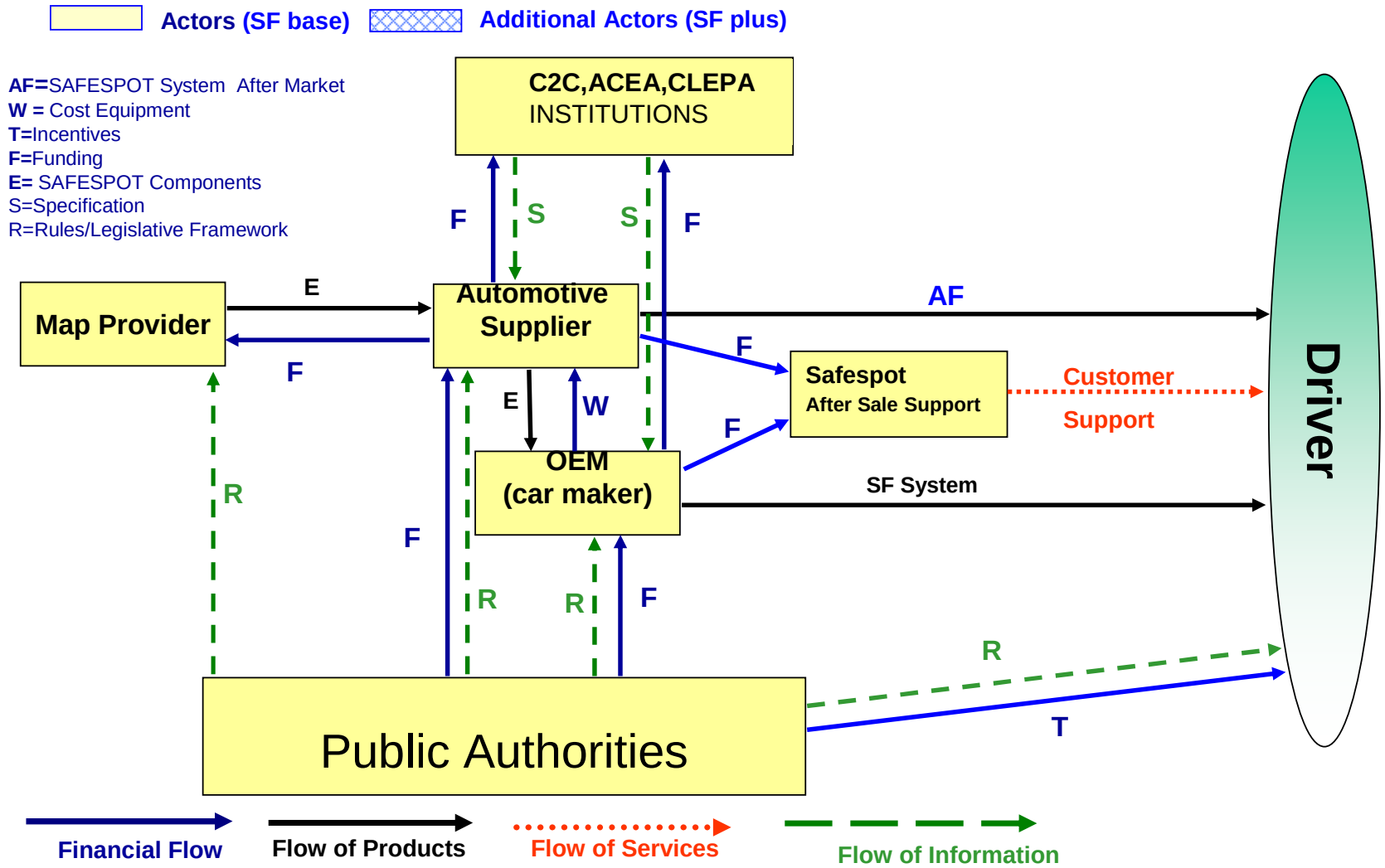


Figure 10: Required SAFESPOT Installation (V2V)

2.4.2. SAFESPOT PUBLIC INVESTMENT

Business Models – SAFESPOT Base, with Public Reliance (V2I)
The price is paid from the general taxation (and not by the final user). The User will be able to have (for free) the SAFESPOT functions.
Funding might be covered by general taxation or by a combination of policies.

Insurances
Same role as in paragraph 2.4.1.

SAFESPOT Actors (SF base)

- **Public authorities (European/National/Regional entities).**

Same role as in paragraph 2.4.1.

- **OEM (Car Makers)**

Same role as in paragraph 2.4.1.

- **Automotive and Infrastructure Supplier**

They will provide to the OEM and the Road Operators the SAFESPOT components.
They could provide the SAFESPOT System to the user, through the after market solution. They will be financed by the public authority and/or the OEM/road operators (through the Public Authorities). They will receive the navigation maps from the map provider (paying for it) and will supply it to the OEM or directly to the driver (in case of after market solution).

- **Map providers**

Same role as in paragraph 2.4.1.

- **Road managers:**

They will provide and maintain the SAFESPOT system. They will be financed by the Public Authorities. They will install the technological infrastructure along the roads.
The Road Manager provides the user the relevant information, visualizing them also along the road of its competence.
They will pay to the Infrastructure Supplier the SAFESPOT System.

The after sale road support, that could be a separated company in respect to the road operator, will supply free the customer support (SAFESPOT customer service/operator services). It will be financed by the road operator.

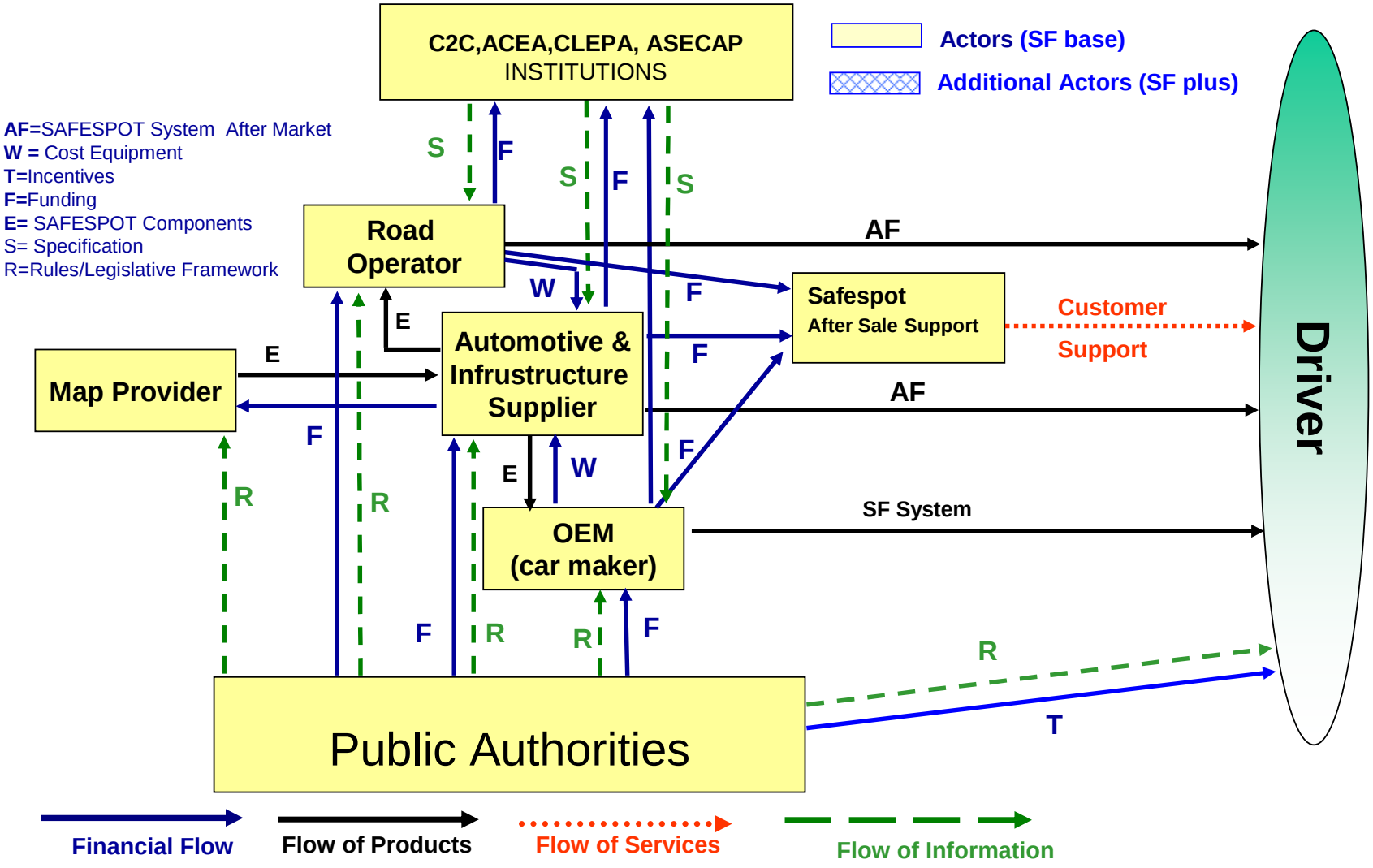


Figure 11:SAFESPOT Public Investment (V2I)

2.4.3. SUBSIDIZED SAFESPOT INSTALLATION

Business Models – SAFESPOT Base, with Public and Private Reliance (V2V)
The price is partially paid from the general taxation and partly from the users. The user will be able to have (with a partial contribution) the SAFESPOT functions.
Funding might be covered by general taxation or by combination of policies together with the direct user contribution.

SAFESPOT Actors (SF base)

- **Public authorities (European/National/Regional entities).**

They will provide the grants for communication channels and frequency bands.
They will define the SAFESPOT legal framework (legislative aspects for all the stakeholders involved: car makers, suppliers, distribution channel, insurance, distribution channel, etc).
They will communicate the rules affecting the traffic circulation.
They will finance (partially) the overall SAFESPOT system, perhaps providing tax incentives to the cars equipped with it too.

- **OEM (Car Makers)**

They will supply the SAFESPOT system to the user (working product installed on the vehicle). They will be (partially) financed by the Public Authorities together with a user contributions/ payment.

The after-sale support, which could be managed by the Car Maker, will provide the driver the customer support. They will be partly financed by the system producer (through the public authorities) and partly by the user.

- **Automotive Supplier**

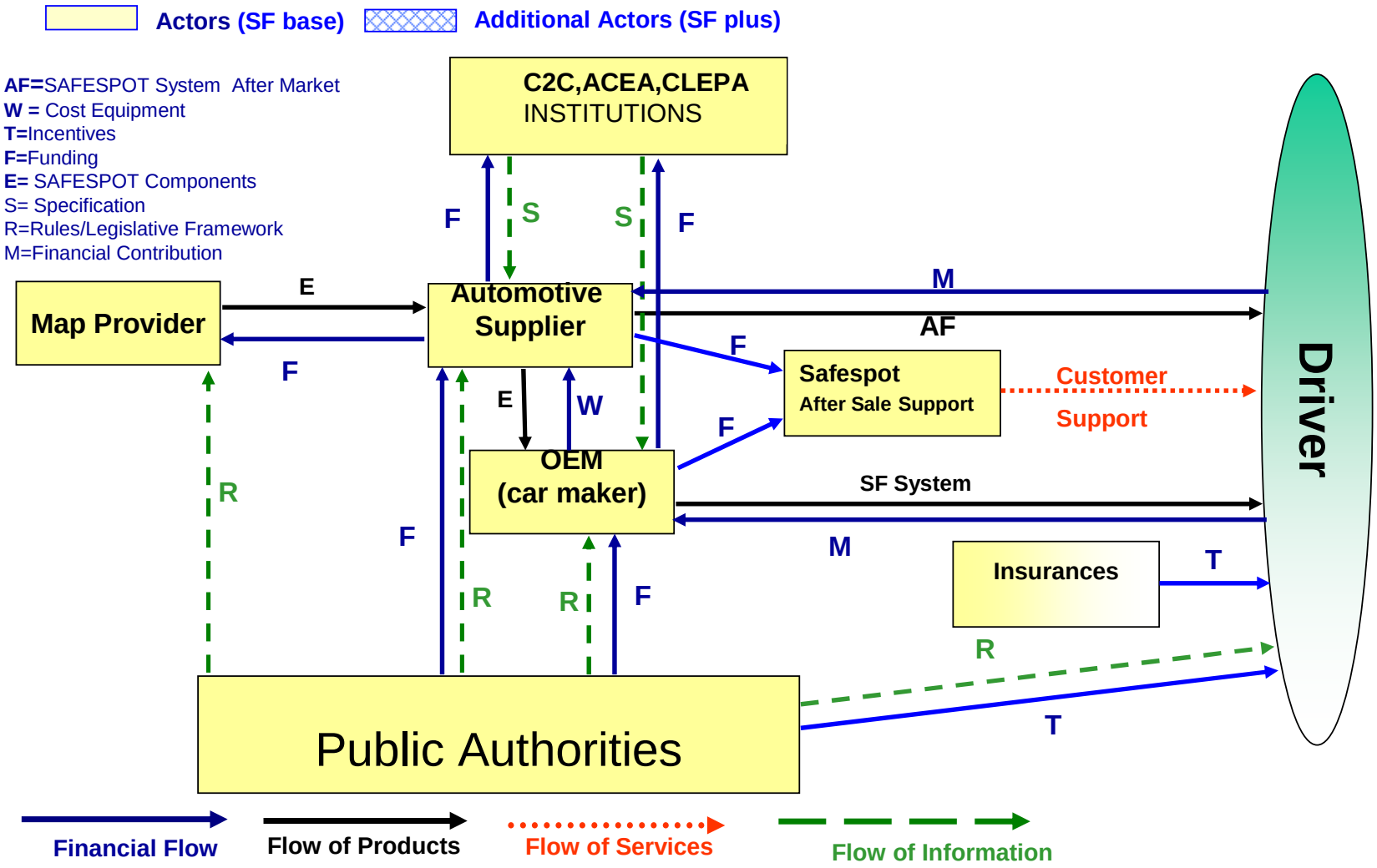
They will provide to the OEM the SAFESPOT components.
They could provide the SAFESPOT system to the user, through the after market solution. They will be (partially) financed by the public authority and/or the OEM. They will receive the navigation maps from the map provider (paying for it) and will supply it to the OEM or directly to the driver (in case of after market solution).

- **Map providers**

Same role as in paragraph 2.4.1.

- **Insurance company.**

They will have the opportunity to increase their competitiveness by providing the driver a reduction of the insurance tariff while keeping their Return On Investment always at high level as the number of accidents will be sensibly reduced.



Subsidized"SAFESPOT Installation (V2V)

2.4.4. PUBLIC SUBSIZIDED

Business Models – SAFESPOT Base, with Public and Private Reliance (V2I)
The price is partially paid from the general taxation. The User will be able to have (with a partial contribution) the SAFESPOT functions.
Funding might be covered by general taxation (for example through fuel taxes) or by a combination of policies together with the direct user contribution.

SAFESPOT Actors (SF base)

- **Public authorities (European/National/Regional entities)**

Same role as in paragraph 2.4.3.

- **OEM (Car Makers)**

Same role as in paragraph 2.4.3.

- **Automotive and Infrastructure Supplier**

They will provide the OEM and the road operators the SAFESPOT components.
They could provide the SAFESPOT system to the user, through the after market solution. They will be financed (partially) by the public authority and/or the OEM/road operators. They will receive the static image from the map provider (paying for it) and will supply it to the OEM or directly to the driver (in case of after market solution).

- **Map providers**

Same role as in previous cases.

- **Insurance company**

Same role as in paragraph 2.4.3.

- **Road managers**

They will provide and maintain SAFESPOT system. They will be (partially) financed by the public authorities and the users.
They will install the technological infrastructure along the roads.
The road manager provides the user the relevant information, visualizing them along the road of its competence.
They will have to provide the SAFESPOT system to the user (for example via road operator's concessionaires/points) to cover the costs that are not supported by public funding.
They will pay to the infrastructure supplier the SAFESPOT system.

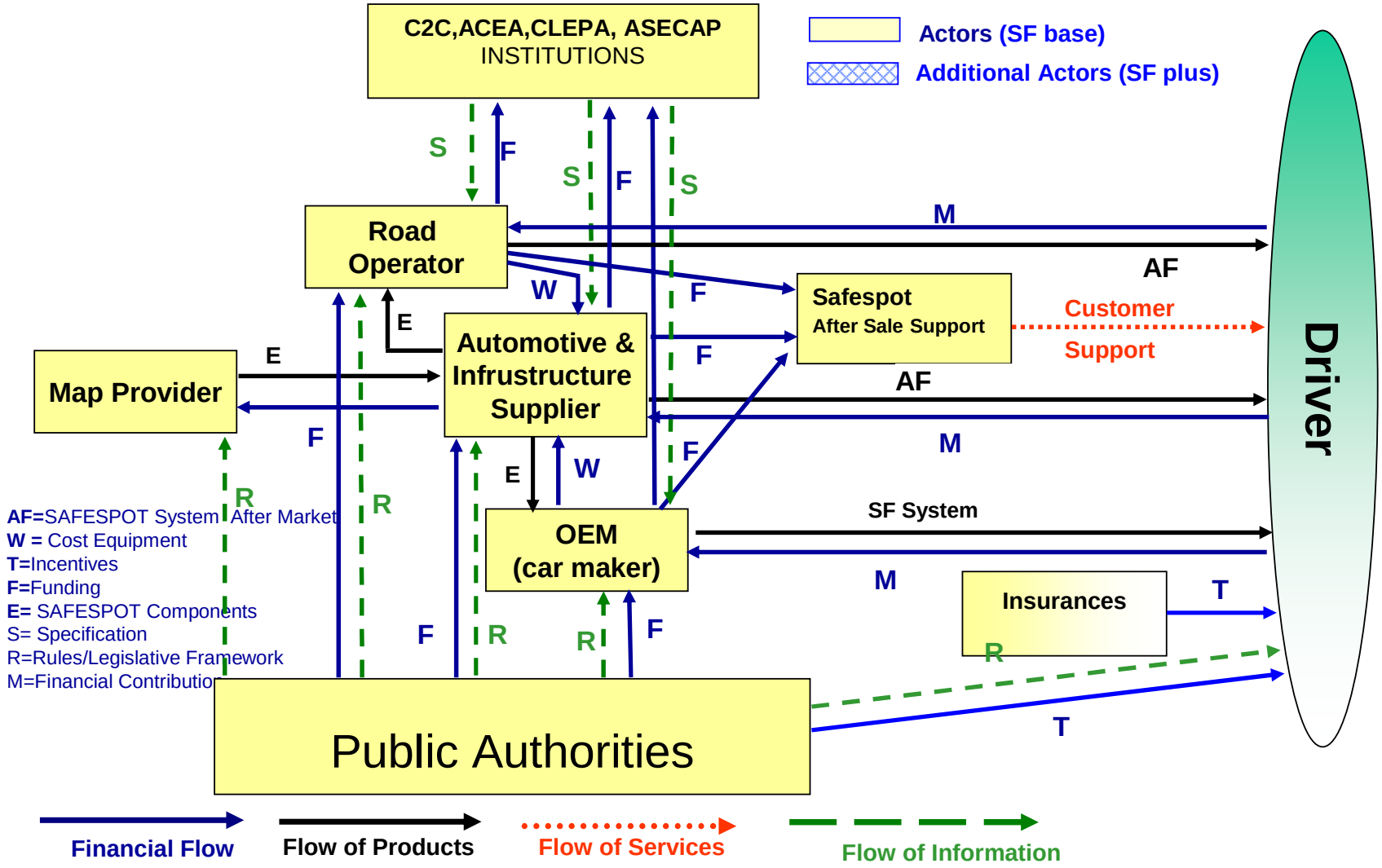


Figure 12: Public Subsidized (V2I)

2.4.5. MARKET DRIVEN SAFESPOT

Service Models – SAFESPOT Base, with Private Reliance (V2V)

The cost of the service is completely in charge of the user. The user will pay the SAFESPOT system. The price politics will be based on different criteria/ parameters.

SAFESPOT Actors (SF base)

- **Public authorities (European/National/Regional entities).**

They will provide the grants for communication channels and frequency bands.
They will define the SAFESPOT legal framework (legislative aspects for all the stakeholders involved: car makers, suppliers, distribution channel, insurance, distribution channel, etc).
They will provide tax incentives to the cars equipped with the SAFESPOT system.

- **OEM (Car Makers)**

They will supply the SAFESPOT system to the user (working product installed on the vehicle). They will be (fully) financed by user (direct payment).
The after-sale support will provide the driver free the customer support. they will be financed by the system producer (through the Public Authorities).

- **Automotive Supplier**

They will provide to the OEM the SAFESPOT components.
They could provide the SAFESPOT system to the user, through the after market solution. They will be (fully) financed by the OEM/Road Operators. They will receive the navigation maps from the Map Provider (paying for it) and will supply it to the OEM or directly to the driver (in case of after market solution).

- **Map providers**

Same role as in paragraph 2.4.1.

- **Insurance company.**

Same role as in paragraph 2.4.3.

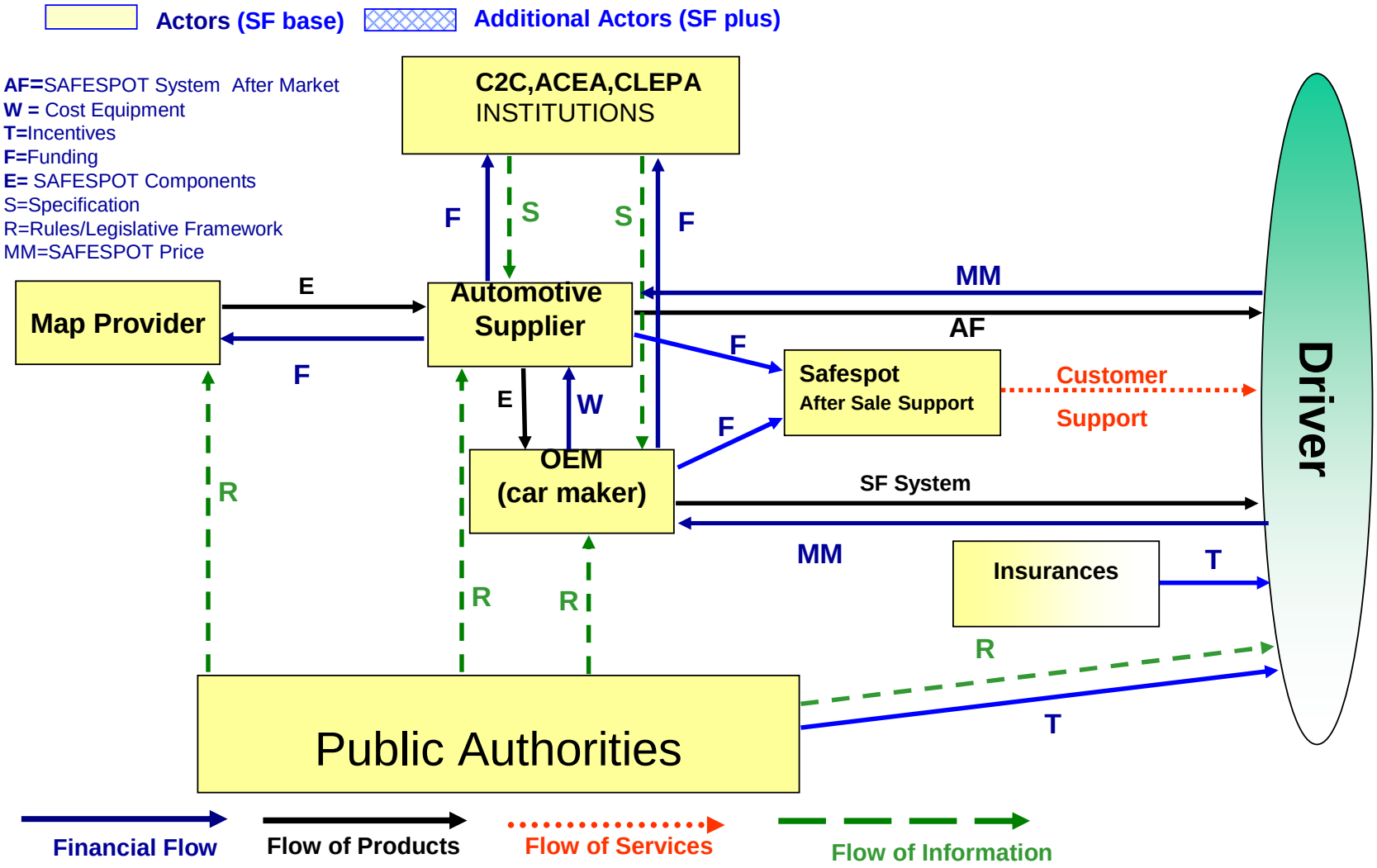


Figure 13:Market Driven SAFESPOT (V2V)

2.4.6. MARKET DRIVEN SAFESPOT INFRASTRUCTURE BASED

Service Models – SAFESPOT Base, with Private Reliance (V2I)

The cost of the service is completely in charge of the user. The user will pay the SAFESPOT system. The price politics will be based on different criteria/ parameters.

SAFESPOT Actors (SF base)

- **Public authorities (European/National/Regional entities).**

They will provide the grants for communication channels and frequency bands.
They will define the SAFESPOT legal framework (legislative aspects for all the stakeholders involved: car makers, suppliers, distribution channel, insurance, distribution channel, etc).
They will communicate the rules affecting the traffic circulation.
They will provide tax incentives to the cars equipped with SAFESPOT System.

- **OEM (Car Makers)**

They will supply the SAFESPOT system to the user (working product installed on the vehicle). They will be financed (fully) by the users (direct payment).

The after-sale support, which could be managed by the car maker, will provide the driver free the customer support. They will be financed by the system producer.

- **Automotive and Infrastructure Supplier**

They will provide to the OEM and the road operators the SAFESPOT components.
They could provide the SAFESPOT system to the user, through the after market solution. They will be financed by the OEM. They will receive the static image from the Map Provider (paying for it) and will supply it to the OEM or directly to the driver (in case of after market solution).

- **Map providers**

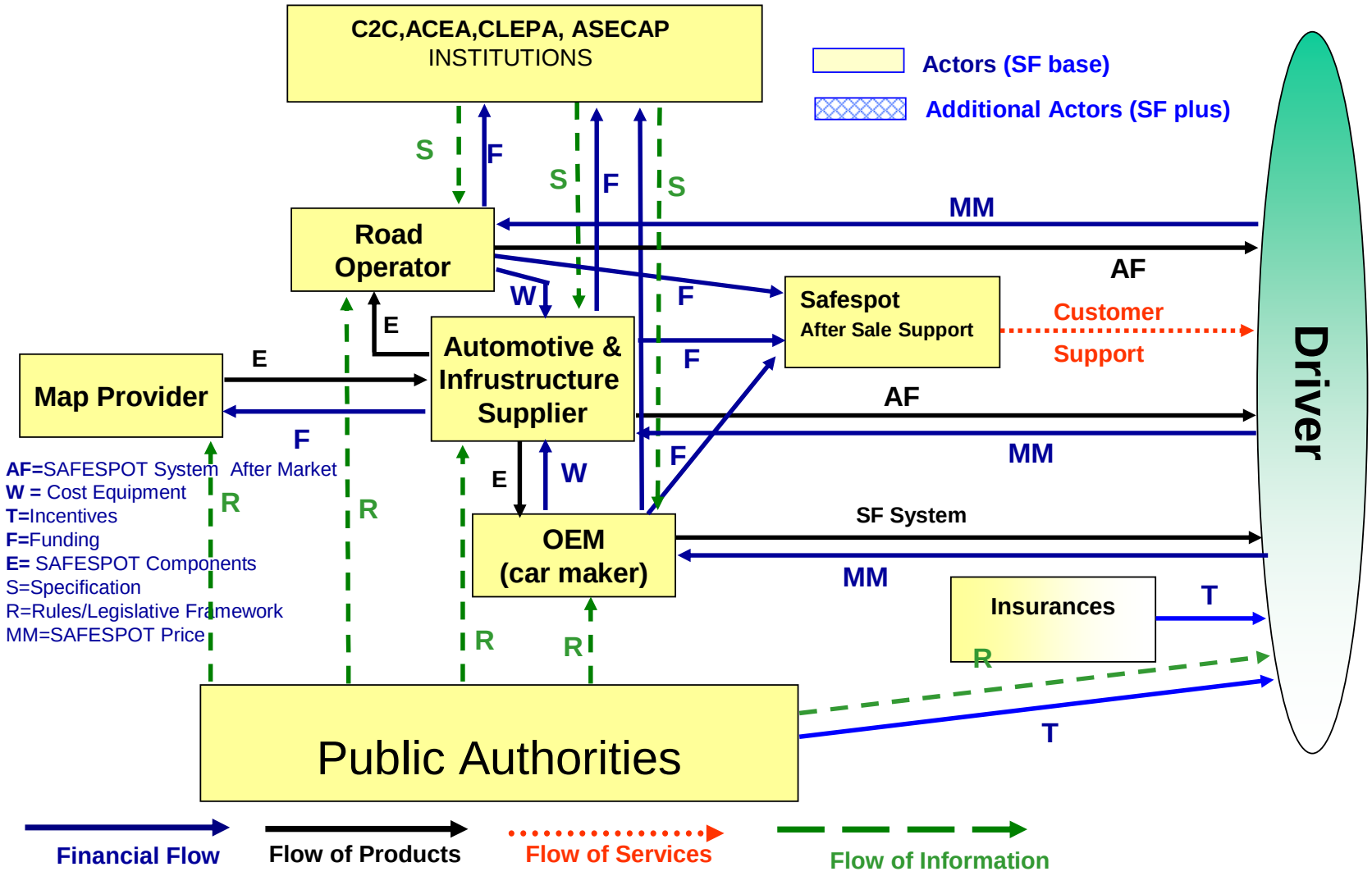
Same role as in paragraph 2.4.1.

- **Insurance company.**

Same role as in paragraph 2.4.3.

- **Road managers:**

They will provide and maintain the SAFESPOT system. They will be (fully) financed the users.
They will install the technological infrastructure along the roads.
The road manager provides the user the relevant information, visualizing them along the road of its competence.
They will pay to the infrastructure supplier the SAFESPOT System.



Market Driven SAFESPOT Infrastructure Based (V2I)

2.4.7. SUBSIDIZED SAFESPOT PLUS INSTALLATION

Business Models – SAFESPOT Plus, with Public and Private Reliance (V2V)
The price is partially paid from the general taxation.
Funding might be covered by general taxation or by a combination of policies together with the direct user contribution.

The system is open to possible integrations with additional services like: traffic information, automatic road toll payment and parking reservation
The user will have to pay for these services. The price politics will be based on different criteria/ parameters.

SAFESPOT Actors (SF base)

- **Public authorities (European/National/Regional entities).**

They will provide the grants for communication channels and frequency bands.
They will define the SAFESPOT legal framework (legislative aspects for all the stakeholders involved: car makers, suppliers, distribution channel, insurance, distribution channel, etc).
They will communicate the rules affecting the traffic circulation.
They will finance (partially) the SAFESPOT system, perhaps providing tax incentives to the cars equipped with it too.

- **OEM (Car Makers)**

They will supply the SAFESPOT system to the user (working product installed on the vehicle). They will be (partially) financed by the public authorities together with an user contributions/ payment.

The after-sale support, which could be managed by the car maker, will provide the driver free the customer support. They will be financed by the system producer (through the public authorities).

- **Automotive Supplier**

They will provide to the OEM the SAFESPOT components.
They could provide the SAFESPOT HW and SW to the user, through the after market solution. They will be (partially) financed by the public authority and/or the OEM. They will receive the navigation maps from the map provider (paying for it) and will supply them to the OEM or directly to the driver (in case of after market solution).

- **Map providers**

Same role as in paragraph 2.4.1.

- **Insurance company.**

Same role as in paragraph 2.4.3.

Additional Actors (SF Plus)

- **Content providers (Traffic Control Center)**

They will provide “not time-critical safety message” in order to improve a safer and more efficient traffic (road works, ice on the road, information services, etc) to the drivers through a Service Provider (Telecom Operator, Internet, etc). they will be financed/paid by the service providers (with a possible public contribution).

- **Service Providers (Telecom operator, etc)**

They will provide the connections to content providers in the SAFESPOT plus configuration. They will be financed by the user (with a possible public contribution).

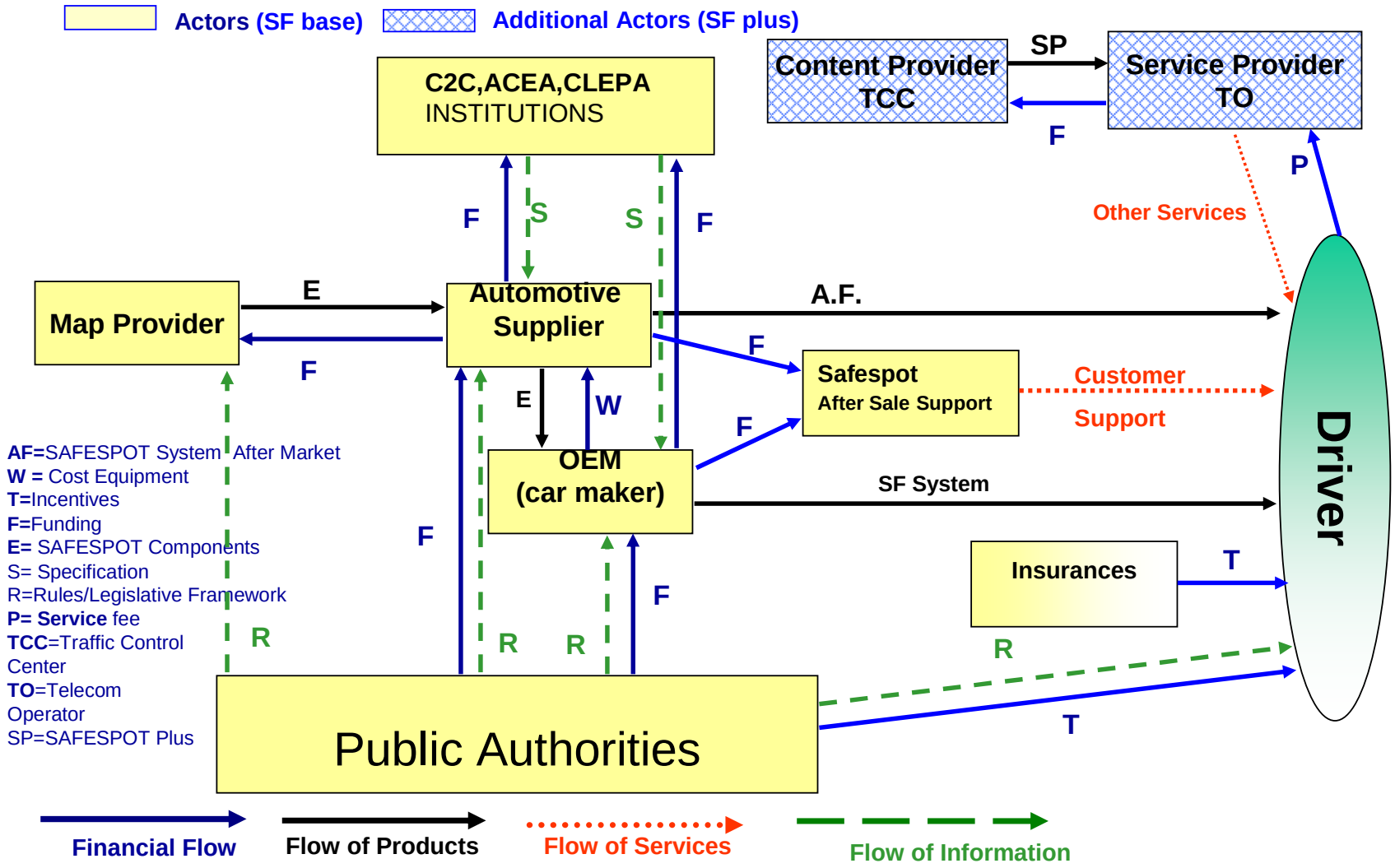


Figure 14: . Subsidized SAFESPOT Plus installation (V2V)

2.4.8. SUBSIDISED SAFESPOT PLUS INVESTMENT

Business Models – SAFESPOT Plus, with Public and Private Reliance (V2I)
The price is partially paid from the general taxation. Funding might be covered by general taxation or by a combination of policies.

The system is open to possible integrations with additional services like: traffic information, automatic road toll payment and parking reservation.
The user will have to pay for these services. The price politics will be based on different criteria/ parameters.

SAFESPOT Actors (SF base)

- **Public authorities (European/National/Regional entities).**

They will provide the grants for communication channels and frequency bands.
They will define the SAFESPOT Legal Framework (legislative aspects for all the stakeholders involved: car makers, suppliers, distribution channel, insurance, distribution channel, etc).
They will finance (partially) the SAFESPOT System, perhaps providing tax incentives to the cars equipped with it too.

- **OEM (Car Makers)**

They will supply the SAFESPOT system to the user (working product installed on the vehicle). They will be (partially) financed by the public authorities together with a user contributions/ payment.

The after-sale support, that could be provided by the car maker, will provide the driver free the customer support. They will be financed by the system producer (through the public authorities).

- **Automotive and Infrastructure Supplier**

They will provide to the OEM and the road operators the SAFESPOT components.
They could provide the SAFESPOT system to the user, through the after market solution. They will be financed (partially) by the public authority and/or the oem/road operators. They will receive the navigation maps from the map provider (paying for it) and will supply it to the OEM or directly to the driver (in case of after market solution).

- **Road managers:**

They will provide and maintain SAFESPOT system. They will be financed (partially) by the road operators and the users.
They will install the technological infrastructure along the roads.
The road manager provides the user the relevant information, visualizing them along the road of its competence.
They will pay to the infrastructure supplier the SAFESPOT system.

- **Map providers**

Same role as in paragraph 2.4.1.

- **Insurance company.**

Same role as in paragraph 2.4.3.

SAFESPOT additional Actors (SF plus)

- **Content providers (Traffic Control Center)**

Same role as in paragraph 2.4.1.

- **Service Providers (Telecom operator, etc)**

Same role as in paragraph 2.4.7.

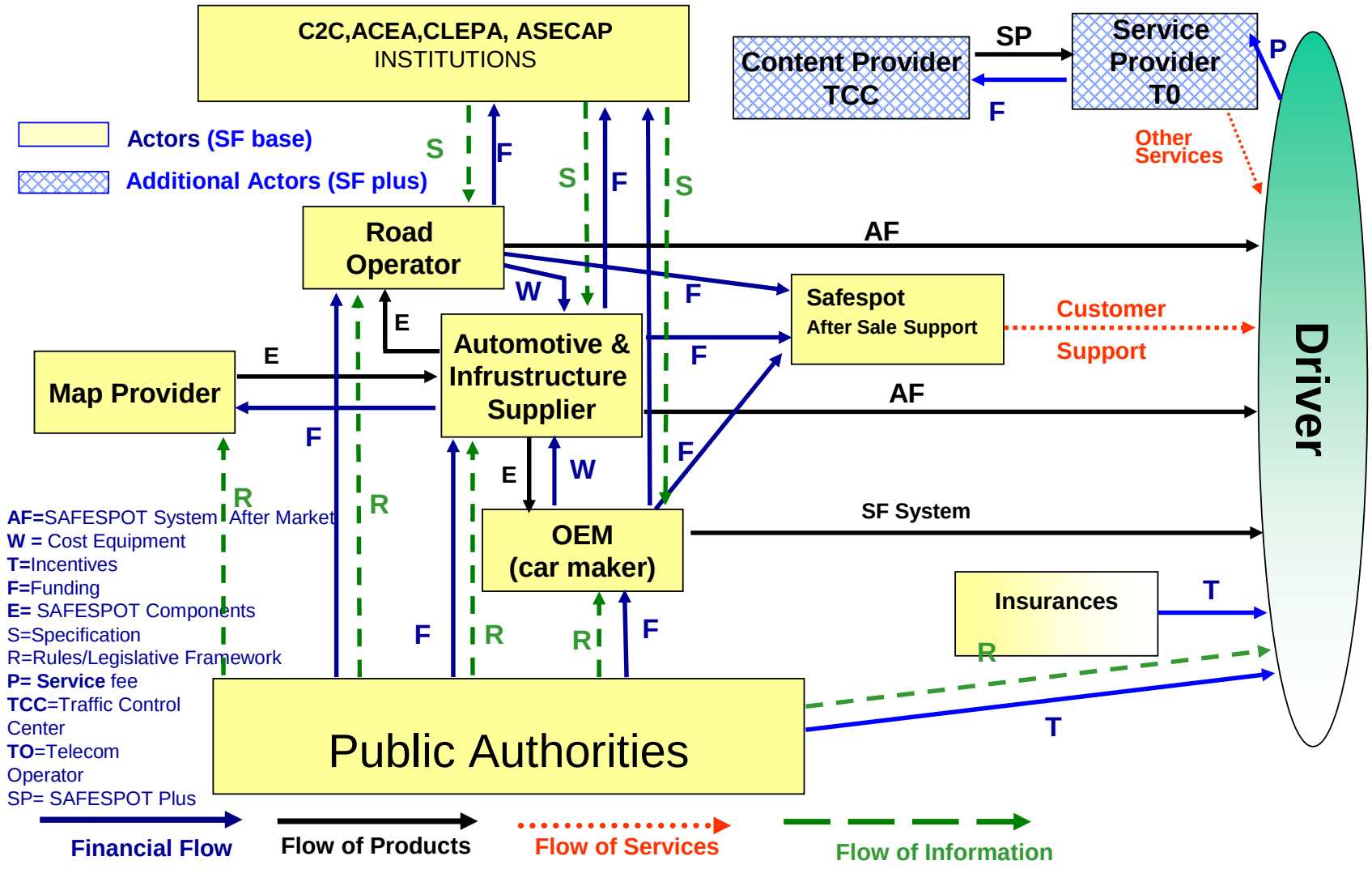


Figure15: Subsidised SAFESPOT Plus investment (V2I)

2.4.9. MARKET DRIVE SAFESPOT PLUS

Service Models – SAFESPOT Plus, with Private Reliance (V2V)

The cost of the service is completely in charge of the user. The user will pay the SAFESPOT system.
The system is open to possible integrations with additional services like: traffic information, automatic road toll payment and parking reservation
The user will have to pay for these services.

The Price Politics will be based on different criteria/ parameters.

SAFESPOT Actors (SF base)

- **Public authorities (European/National/Regional entities).**

They will provide the grants for communication channels and frequency bands.
They will define the SAFESPOT legal framework (legislative aspects for all the stakeholders involved: Car Makers, Suppliers, Distribution Channel, Insurance, , etc).

- **OEM (Car Makers)**

They will supply the SAFESPOT system to the user (working product installed on the vehicle), assembling all the components in order to make the whole system work as well. They will be financed by the user (direct payment).

The after-sale support, which could be provided by the Car maker, will provide the driver the customer support.

- **Automotive Supplier**

They will provide to the OEM the SAFESPOT components.
They could provide the SAFESPOT system to the user, through the after market solution. They will be financed by the OEM. They will receive the navigation maps from the Map Provider (paying for it) and will supply them to the OEM or directly to the driver (in case of after market solution).

- **Map providers**

Same role as in paragraph 2.4.1.

- **Insurance company.**

Same role as in paragraph 2.4.3.

SAFESPOT Additional Actors (SF Plus)

- **Content providers (Traffic Control Center)**

Same role as in paragraph 2.4.7.

- **Service Providers (Telecom operator, etc)**

Same role as in paragraph 2.4.7.

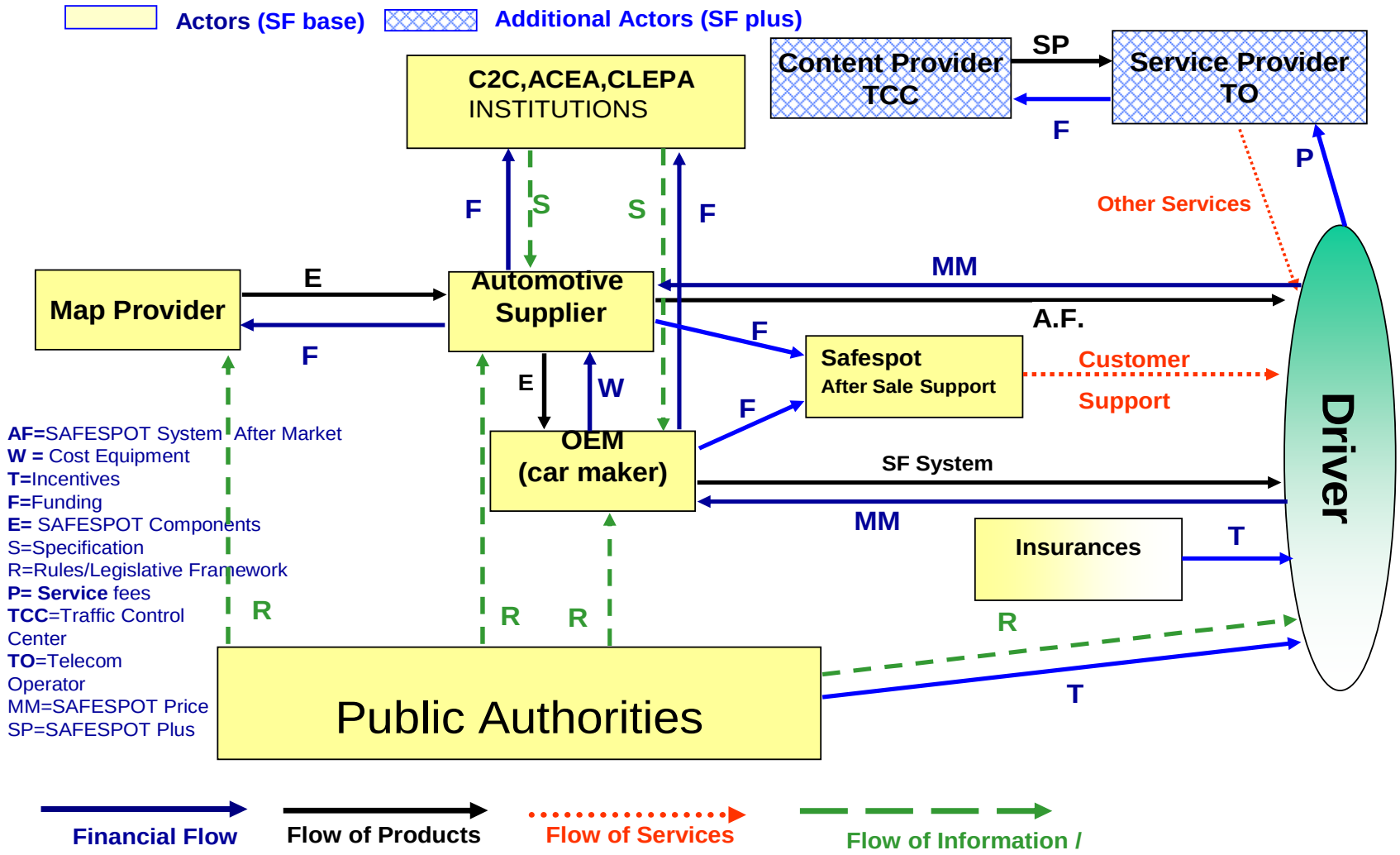


Figure16. Market Drive SAFESPOT Plus (V2V)

2.4.10. MARKET DRIVEN SAFESPOT PLUS INFRASTRUCTURE BASED

Service Models – SAFESPOT Plus, with Private Reliance (V2I)
The cost of the service is completely in charge of the user. The user will pay the SAFESPOT System.

The system is open to possible integrations with additional services like: traffic information, automatic road toll payment and parking reservation.
The user will have to pay for these services.

The price politics will be based on different criteria/ parameters.

SAFESPOT Actors (SF base)

- **Public authorities (European/National/Regional entities).**

They will provide the grants for communication channels and frequency bands.
They will define the SAFESPOT legal framework (legislative aspects for all the stakeholders involved: car makers, suppliers, distribution channel, insurance, distribution channel, etc).

- **OEM (Car Makers)**

They will supply the SAFESPOT system to the user (working product installed on the vehicle).

The after-sale support, which can be managed by the car maker, will provide the driver free the customer support. They will be financed by the system producer (through the public authorities).

- **Automotive and Infrastructure Supplier**

They will provide to the OEM and the road operators the SAFESPOT components.
They could provide the SAFESPOT system to the user, through the after market solution. They will be financed by the OEM/road operators. They will receive the navigation maps from the Map Provider (paying for it) and will supply it to the OEM or directly to the driver (in case of after market solution).

- **Road managers:**

They will provide and maintain SAFESPOT system. They will be financed by the users.
They will install the technological infrastructure along the roads.
The road manager provides to the user the relevant information, visualizing them also along the road of its competence.
They will pay to the infrastructure supplier the SAFESPOT system.

The after sale road support will supply the customer support (SAFESPOT customer service/ operator services). They will be financed by the road operator.

- **Map providers**

Same role as in paragraph 2.4.1.

- **Insurance company.**

Same role as in paragraph 2.4.3.

SAFESPOT Additional Actors (SF plus)

- **Content providers (Traffic Control Center)**

Same role as in paragraph 2.4.7.

- **Service Providers (Telecom operator, etc)**

Same role as in paragraph 2.4.7.

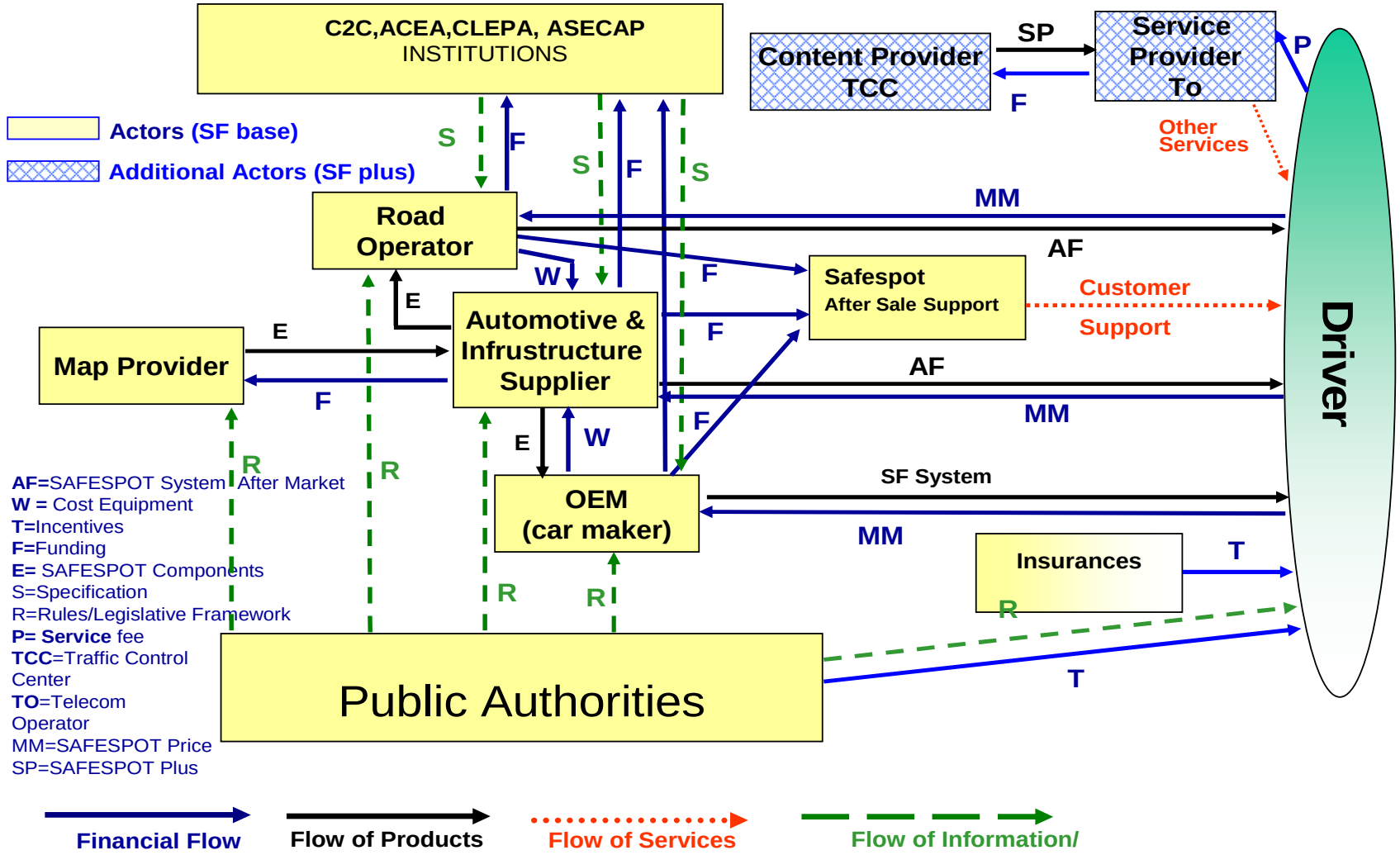


Figure 17:. Market Driven SAFESPOT Plus Infrastructure Based (V2I)

2.5. Political and Social Interest

In spite to the early level of development for SAFESPOT, it is not superfluous to spend some words on the social and political interest. This activity, of relevance for the deployment phase, is here mainly dedicated to provide evidence of the factors influencing the identified B&SM. The identification of potential drivers and barriers to adopt the SAFESPOT project is an important process to guide the developments.

At the same time it is relevant to underline the evidence that in different EU regions the culture, as consequence the sensibility to consider road safety as a public good, create the basis for different acceptability of business models where the public authorities are directly involved.

To perform this short analysis it is useful to consider that "the interventions recommended as essential components of any country's road safety programme, consist of measures to manage speed, eliminate drink-driving, increase seatbelt use, improve road and roadside infrastructure, enhance vehicle safety, manage the safe introduction of novice drivers to the road system, provide a safer environment for vulnerable road users and improve the medical management of people involved in crashes." [15]

Most of these "essential components" have a benefit from ITS applications. For this reason it is fundamental to share what it was evaluated also in other projects (i.e. COOPERS[16], CVIS[17]) and to have a look to the EU actions. In particular, regarding the ITS applications it was recognized[18] the need to adopt EU policies in order to accelerate the market introduction and to overcome aspects that are creating difficulties to the ITS introduction in the transport area.

2.5.1. Positive drivers

- The **improvement of road safety** is obviously the main driver

[15] " TOWARDS ZERO: AMBITIOUS ROAD SAFETY TARGETS AND THE SAFE SYSTEM APPROACH" - ISBN 978-92-821-0195-7 © OECD/ITF, 2008
[16] COOPERS - D11-B-IR 2600/2700-2 Market and user Assessment Focus on cost/benefit consideration and privacy issues
[17] DEL_DEPN_7.1_Draft Guidelines for policy makers_v1.0.pdf -- http://www.cvisproject.org/download/Deliverables/DEL_DEPN_7.1_Draft%20Guidelines%20for%20policy%20makers_v1.0.pdf
[18] [Commission staff working document - Accompanying document to the communication from the Commission : action plan for the deployment of Intelligent Transport Systems in Europe and the proposal for a directive of the European Parliament and of the Council laying down the framework for the deployment of Intelligent Transport Systems in the field of road transport and their interfaces with other transport modes - Summary of the impact assessment {COM(2008) 886 final} {COM(2008) 887 final} {SEC(2008) 3083} http://eur-lex.europa.eu/SECMonth.do?year=2008&month=12]

- **"No stakeholders opposing** to vehicle navigation and information services. Infrastructure operators favour services, where **stepwise market introduction** is possible" [19]..
- "**In car displays** are being perceived as **less expensive** and less investment intensive than VMS by infrastructure operators" [20].
- The excessive or inappropriate speed is one of the main causes of vehicle accidents (services such as ISA can help to reduce speeding and thus improve road safety)
- "Some infrastructure operators stated that **investment cycles** for telematic applications are relatively short, i.e. 5-6 years. One of the main challenges when developing such services is the get-together of car manufacturers and infrastructure operators"[21]..

2.5.2. Potential barriers

For the SAFESPOT project are of high interest the following points, also recognized at EU level [22] :

- "Lack of robust business models: business models for several ITS applications are unclear or even lacking". "Finding a **business model** is a difficult task. Basic Information are not marketable" [23]
- "No clear rules of legislation on privacy of data: ITS implicitly require collection and exchange of (traffic) data, partly sensitive in terms of privacy policy, such as pay-as-you-drive insurance schemes, eCall, road charging etc."
- "Unclear distribution of responsibilities, absence of agreements on service ownership: most ITS applications or services rely on integration of data to provide assistance to the user or even take over control from the driver in critical situations (e.g. in-vehicle systems such as emergency breaking, crash avoidance systems, etc)"
- "standardisation issues have to be tackled at EU level. The same applies to some legal aspects such as liability in case of failure, potentially leading to accidents, which are faced by all Member States and justify a common EU approach."

[19] COOPERS - D11-B-IR 2600/2700-2 Market and user Assessment Focus on cost/benefit consideration and privacy issues - http://www.coopers-ip.eu/index.php?id=150
[20] COOPERS - D11-B-IR 2600/2700-2 Market and user Assessment Focus on cost/benefit consideration and privacy issues
[21] COOPERS - D11-B-IR 2600/2700-2 Market and user Assessment Focus on cost/benefit consideration and privacy issues
[22] [Commission staff working document - Accompanying document to the communication from the Commission : action plan for the deployment of Intelligent Transport Systems in Europe and the proposal for a directive of the European Parliament and of the Council laying down the framework for the deployment of Intelligent Transport Systems in the field of road transport and their interfaces with other transport modes - Summary of the impact assessment {COM(2008) 886 final} {COM(2008) 887 final} {SEC(2008) 3083} http://eur-lex.europa.eu/SECMonth.do?year=2008&month=12]
[23] COOPERS - D11-B-IR 2600/2700-2 Market and user Assessment Focus on cost/benefit consideration and privacy issues

- "Low market demand keeps prices high, again reducing interest from potential customers, and possibly impairing the effectiveness of a service as well, e.g. in the case of equipped vehicles exchanging warnings on hazardous situations, where the overall impact of the application/service is strictly dependent on the number of vehicles equipped. As an overall result little progress will be made regarding core policy objectives such as road safety."
- **"**Perceived investment and running cost can be a barrier when implementing such a service for infrastructure operators and drivers" [24]

2.5.3. Relevance for the final ranking

In the document "Intelligent transport systems A smart move for Europe 2009-Feb". it is underlined that " The adoption of the ITS action plan is a response to the slow and fragmented uptake and deployment of ITS in road transport. " [25]

In the same document it is also declared that "In recent years there has been a significant increase in sales of in-car electronics devices, especially of portable navigation devices. Conservative estimates suggest that the market penetration in the EU of dynamic traffic information and navigation services, as a percentage of all road vehicles, will rise from 1.5 % in 2005 to some 9 % in 2010 and 43 % in 2020. And — as another example — electronic fee collection is expected to be used by nearly half of all vehicles (about 46 %) by 2020, compared with 3.7 % in 2005. As these and other ITS technologies are taken up faster and are more widely used, economies of scale are likely to bring down their cost to the benefit of both citizens and professionals."

Similar estimation can be found in different studies and research programs. In some cases there are more optimistic opinion as it was presented during the ITF-IMTT Seminar Lisbon, 2 October 2009 "Innovation in Road Transport: Opportunities for Improving Efficiency" [26]

[24] COOPERS - D11-B-IR 2600/2700-2 Market and user Assessment Focus on cost/benefit consideration and privacy issues

[25] "Intelligent transport systems A smart move for Europe 2009-Feb" - http://ec.europa.eu/transport/publications/index_en.htm

[26] Mr. Pedro Pedreira, Executive Director of European GNSS Supervisory Authority in the ITF-IMTT Seminar (Lisbon, 2 October 2009) during his lecture "Satellite-based navigation for efficient use of road infrastructure" http://www.internationaltransportforum.org/Proceedings/Lisbon2009

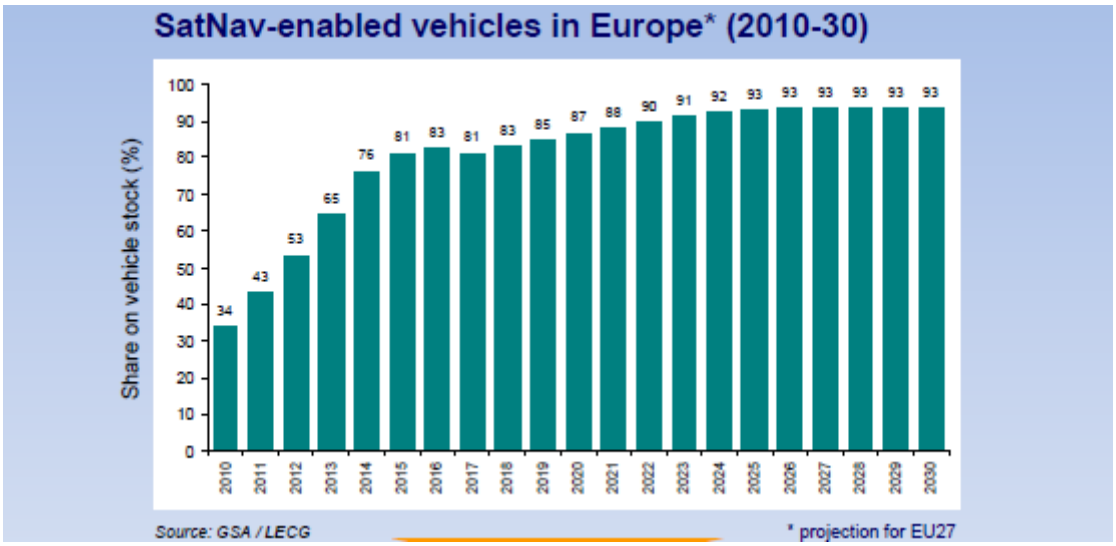


Figure18 – SatNav enabled vehicles in Europe (2010-2030)

Despite the differences in numbers, completely justified by the estimation nature, it is clear that the amount of running initiatives and the level of attention for the pros and cons concerns to enable the ITS applications, not only for safety but also for efficiency and greening, are part of the everyday working debate for a better future. It is also obvious that there is a wide shared consensus to consider a positive political and social acceptability for the application under study and development.

At the same time in different EU regions the culture and the consequent sensibility to consider road safety as a public good can be the origin of different acceptability of business models where the public authorities are mentioned as partners: not only in terms of active actors (regulations, standard bodies etc.) but also in terms of funding partners of the potential business case. For somebody the public involvement is fully acceptable; for others, recalling the liberal market, this involvement is not possible. To find a balance within these two visions it is an important future action that it is necessary to pursue during the clarification activities necessary to solve the deeper problem that: ”in some cases investment and operation (costs) fall on specific stakeholders while benefits are hard to allocate” [27]

Political acceptance will not be investigated in SAFESPOT, however in this analysis the political and societal interest is assessed by means of the drivers and barriers. This will provide a criterion for the ranking of the B&SM. Since the acceptability of one single business or service model within the European context is very unlikely, it is important to create a consistent policy on national level. This will be further investigated in D6.6.2.

[27] [Commission staff working document - Accompanying document to the communication from the Commission : action plan for the deployment of Intelligent Transport Systems in Europe and the proposal for a directive of the European Parliament and of the Council laying down the framework for the deployment of Intelligent Transport Systems in the field of road transport and their interfaces with other transport modes - Summary of the impact assessment {COM(2008) 886 final} {COM(2008) 887 final} {SEC(2008) 3083} http://eur-lex.europa.eu/SECMonth.do?year=2008&month=12]

Other important factors for societal and political interest are the applications providing the safety where these are designed for, and the positive Benefit-Cost ratio. The Benefit-Cost ratio will be investigated in WP6.5. The validation of the applications is tested in WP4.6 and WP5.6.

PART 2

Relevant Business and Service Model aspects identification

In order to investigate the most important Business and Service Models aspects from different perspectives, two surveys, with different objectives, have been foreseen.

1. Stakeholders Survey. To investigate the relevant Business and Service Models Aspects from a “Stakeholder” point of view. A specific methodology together with the results is described in Chapter 3.

2. User Acceptance Analysis. To investigate the relevant Business and Service Models Aspects from an “End user” point of view. The Methodology used, together with the results, is illustrated in Chapter 4.

3. Stakeholders' Consultation

The objective of the stakeholders' consultation was to investigate some important issues related to SAFESPOT from an expert point of view, in order to develop the Business and Service Models hypothesis.

The survey has been re-launched in order to increase the number and categories of respondents. From the results we obtained, we saw no differences in respect to the first survey. So it seems not necessary to undertake additional analysis like a Delphi round with relevant stakeholders, to validate the results

3.1. Methodology

At the beginning of this phase of the study we considered that there were different possible SAFESPOT configurations to be analyzed, with essentially different characteristics. We made a distinction between Business and Service Model, based on the way of payment: "indirect" in the Business Model, "direct" in the Service Model.

- In the **Business Model hypothesis** (indirect payment), there is a public reliance: the SAFESPOT functions are paid by the general taxation, fully (no contribution of the final user) or partially, (with a contribution of the final user).
- In the **Service Model hypothesis** (direct payment) there is a private reliance; the cost of the service is completely in charge of the user.

We applied these hypothesis to the different possible SAFESPOT configurations, which are **V2V (vehicle to vehicle)** and **V2I (vehicle to infrastructure),** coming up to this classification:

1. Business Model with Public Reliance
2. Business Model with Public/Private Reliance
3. Service Model with Private Reliance
4. V2V + V2I configuration matched together
5. Business and Service Models with the integration of further applications (additional services like CVIS)

We had several aspects to investigate, so we decided to use the Experts' opinions methodology through a survey: well informed people are selected, they're asked to assign a certain degree of importance and of probability to several possible future events.

3.1.1. The survey structure

We decided to submit 19 questions grouped in 4 chapters:

1. Stakeholder typology :
   - Category (type of organization)
   - Country
2. System configuration

Questions related to the optimal configuration for a cooperative system and to the strengths and/or weaknesses, together with the possible business drivers of each business and service models.

3. Market penetration rate

Questions related to the potential of the market for SAFESPOT system, with a first estimation that will be updated during the project with further analysis.

4. Deployment

Questions aimed at defining some preliminary deployment guidelines for SAFESPOT.

3.1.2. The sample

We tried to address different typologies of respondents, so that they could represent all the actors and the stakeholders involved in SAFESPOT deployment, with different background, perspectives and ideas**.** In order to reach as many respondents as possible, we used a four-step approach (figure 19).

First (first step), we submitted 120 target questionnaires during the SAFESPOT and WATCH-OVER User Forum in Stuttgart (31° January). These were in paper version and we collected 31 questionnaires during that session.

Then (second step) we submitted the same survey by e-mail to all the SAFESPOT partners.

In order to reach a more representative amount of actors and stakeholders, we contacted 300 relevant stakeholders, actors and experts from several EU countries via an “on-line” survey (third step) containing the same questions as the previous one. At the end we were able to collect 60 complete questionnaires.

Finally (fourth step) we submitted the questionnaire to further stakeholders in order to enlarge the participation of different stakeholders’ categories, as in the previous step some stakeholders were not represented properly by the sample. So, via an on-line survey, we were able to collect 30 more responses by insurances, public authorities, road operators, service and content providers, telecom operators and so on.

3.2. Response and composition of the stakeholder group

We obtained 90 answers from 16 European countries. Figure 18 shows the number of participants for each country. The most represented countries are Germany, Italy and the Netherlands.

The composition of the sample can be seen in the following figures:

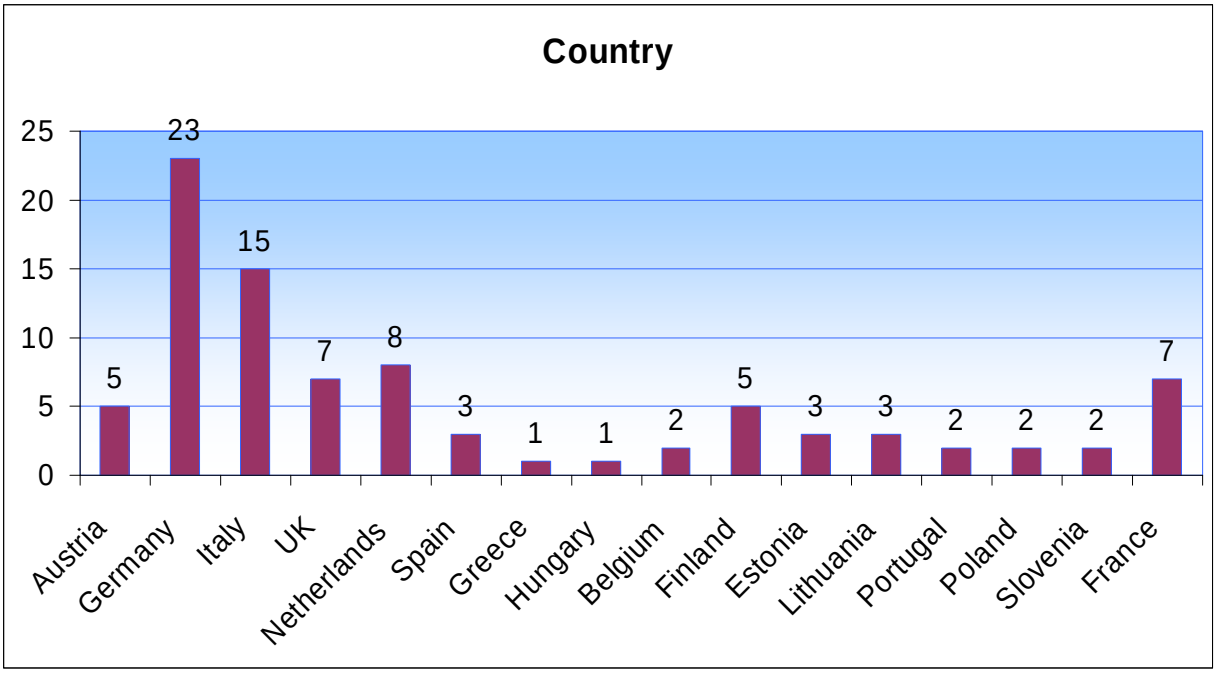


Figure 19: Stakeholders and Actors Country

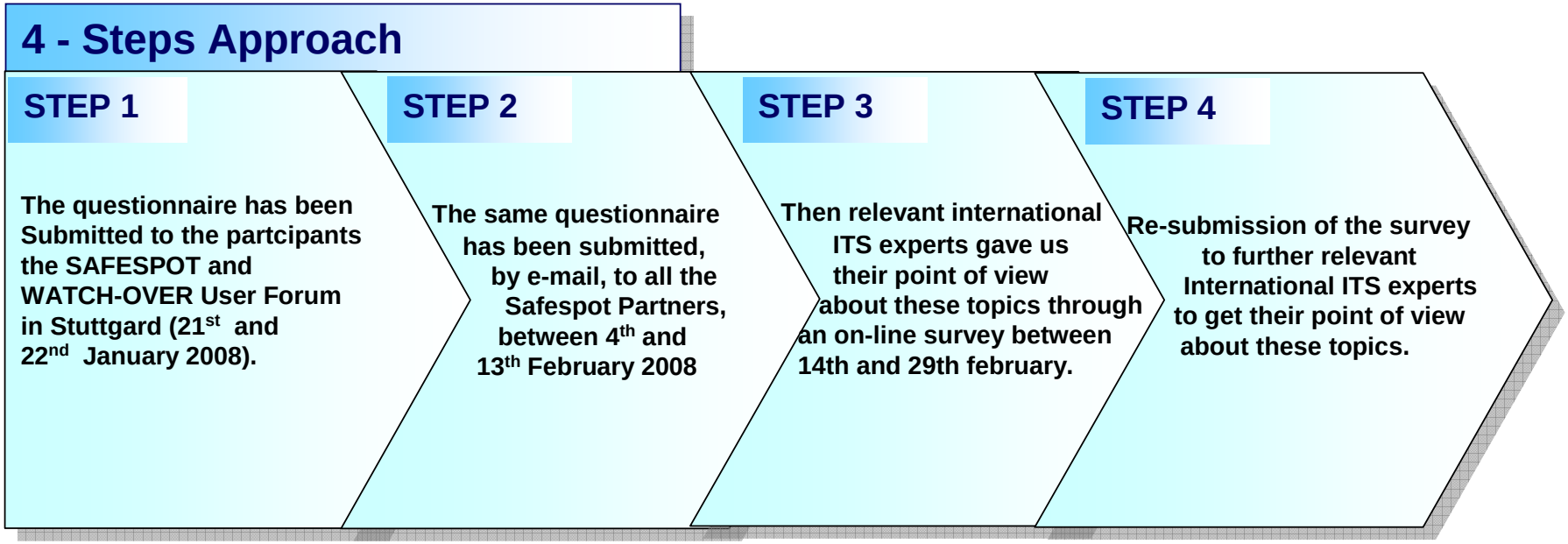


Figure 20: BLADE Wp6 Stakeholder Consultation

Stakeholders' Categories

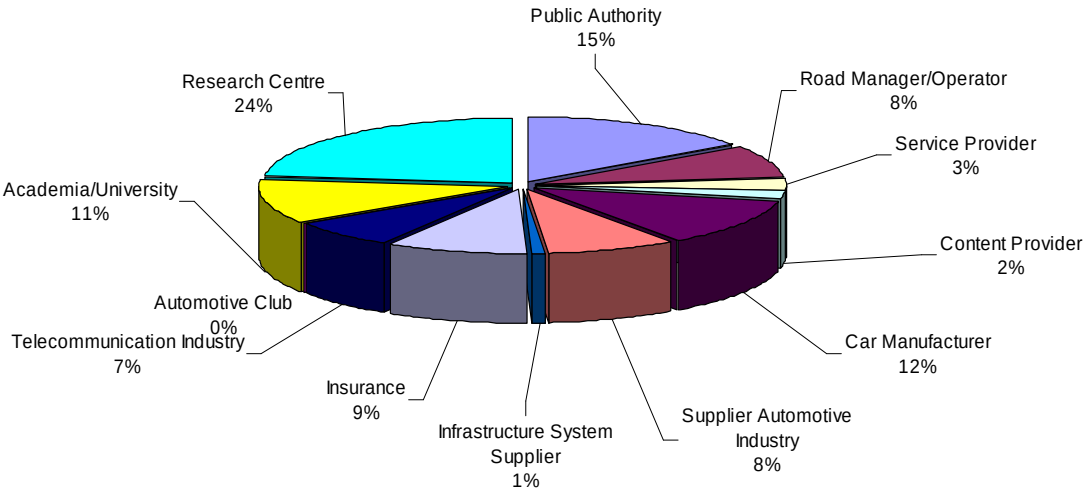


Figure 21: Stakeholders' and Actors typology

The categories we established are closely related to the typology of the stakeholders and the actors involved in SAFESPOT project and to the different roles they're going to assume during the various phases (see Chapter 2).

The categories are:

- Public authority
- Road manager/operator
- Service provider
- Content provider
- Car manufacturer
- Supplier automotive industry
- Infrastructure system supplier
- Insurance
- Telecommunication industry
- Automotive club
- Academia/university
- Research centre

3.3. Deployment aspects

3.3.1. SAFESPOT system financing

Starting from the assumption that the initial deployment of the system will require significant investments, the stakeholders were asked who is most likely to finance the installation of the infrastructures/devices necessary for the realization of SAFESPOT applications in both the configurations, i.e. vehicle to vehicle and vehicle to infrastructure.

We can see the results in figure 21 and figure 22. We noticed sensible changes in the stakeholders and actors roles between the answers related to the two different SAFESPOT configurations (V2V and V2I) .

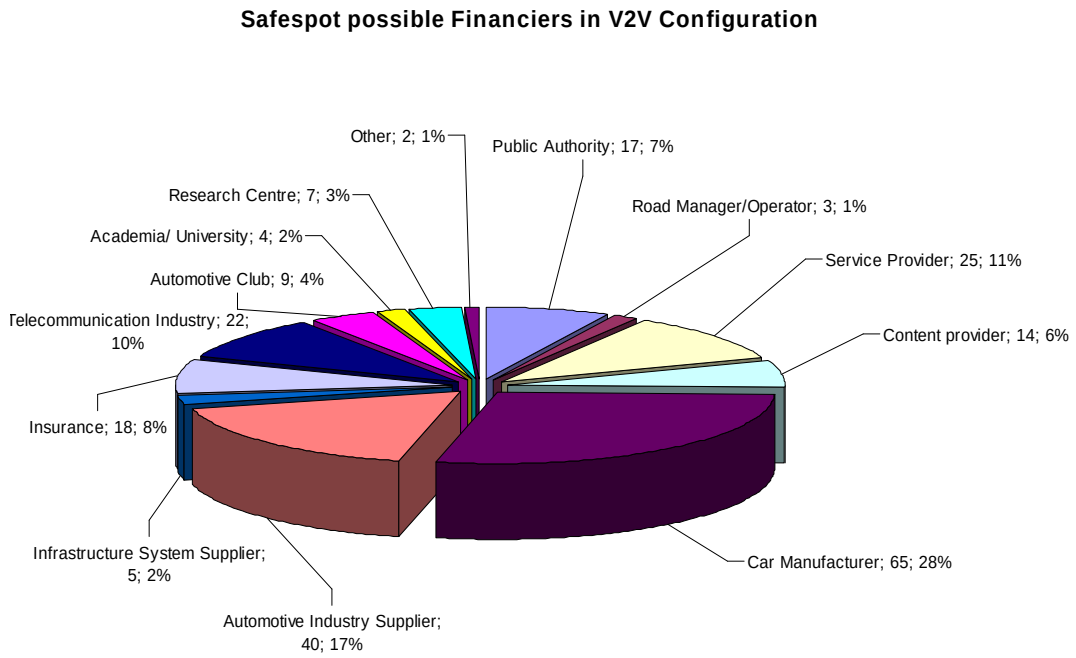


Figure 22: Who is more likely to finance the infrastructure necessary for the realization of SAFESPOT Application in the V2V configuration?

In the V2V configuration, the actors that are expected to finance the system are the ones who have the most important roles: first of all the car manufacturers, who were indicated by the 28% of the respondents, then the automotive industry suppliers and the service providers.

A group of actors that was selected by the 10% of the sample is the telecommunication Industry. In fact, according to the current SAFESPOT technical configuration, this category of actors shouldn't have a prominent role in SAFESPOT deployment, while it could be a supporting one.

Safespot possible Financiers in the V2I Configuration

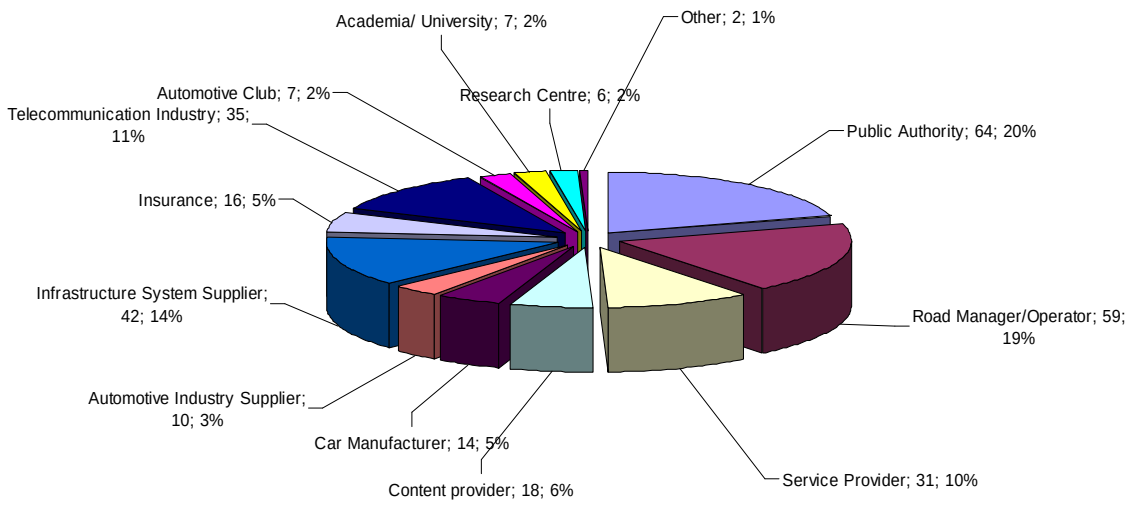


Figure 23: Who is more likely to finance the infrastructure necessary for the realization of SAFESPOT Application in the V2I configuration?

Asking the same question concerning the V2I configuration, the actors involved change: the Public Authority (20%) here becomes the actor who is more likely to finance SAFESPOT installation, together with the Road Manager/Operator (19%). The other relevant roles are the Infrastructure System Supplier, the Telecommunication Industry and the Service Provider.

Possible Incentives

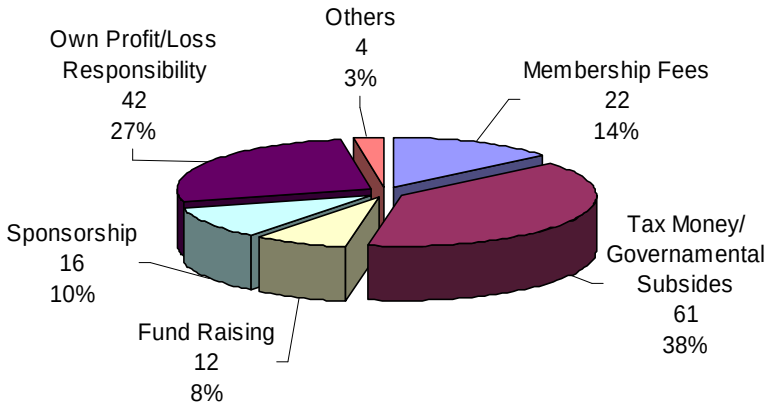


Figure 24: How to finance SAFESPOT system deployment?

As regards how to finance SAFESPOT system introduction, the use of Tax Money/ Governmental Subsides seems to be the best solution for the 38% of the respondents, followed by Own Profit/Loss Responsibility (27%). Another possible solution, for the 14% of respondents, is the Membership Fees.

The respondents gave also a little preference to the Sponsorship option (10%); this possibility could be further investigated in the next steps.

3.3.2. SAFESPOT System adoption

We asked the actors and the stakeholders whether, according to their point of view, SAFESPOT system introduction should be market driven, regulated by government or if a combination of both could be the best solution. This is a delicate aspect, because an innovation like SAFESPOT, which aims at improving safety all across Europe and for all the drivers, should be ideally mandatory. But there are many obstacles related to costs, system integration on the existing vehicles, standardization and so on. This is the reason why it's necessary to mediate and find out a compromise between the voluntary adoption of the system and the compulsory installation on the vehicles.

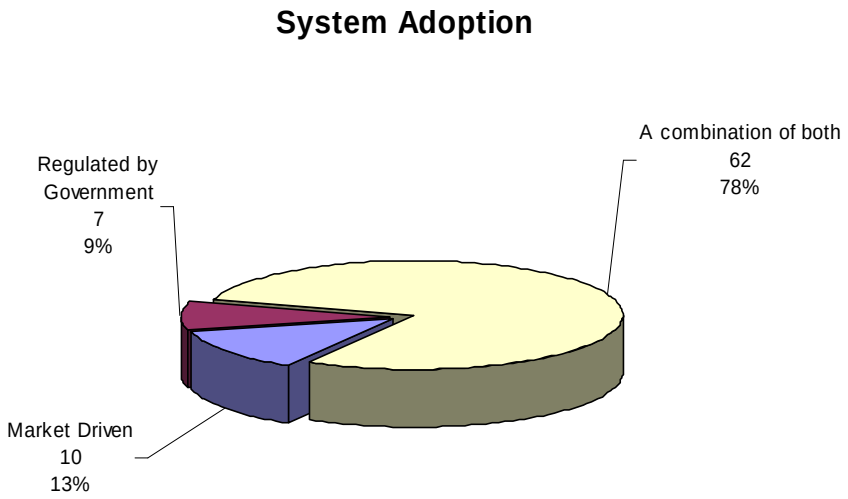


Figure 25: SAFESPOT system adoption

As we can clearly see in figure 24, most of them think that in order to reach a certain level of SAFESPOT 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.

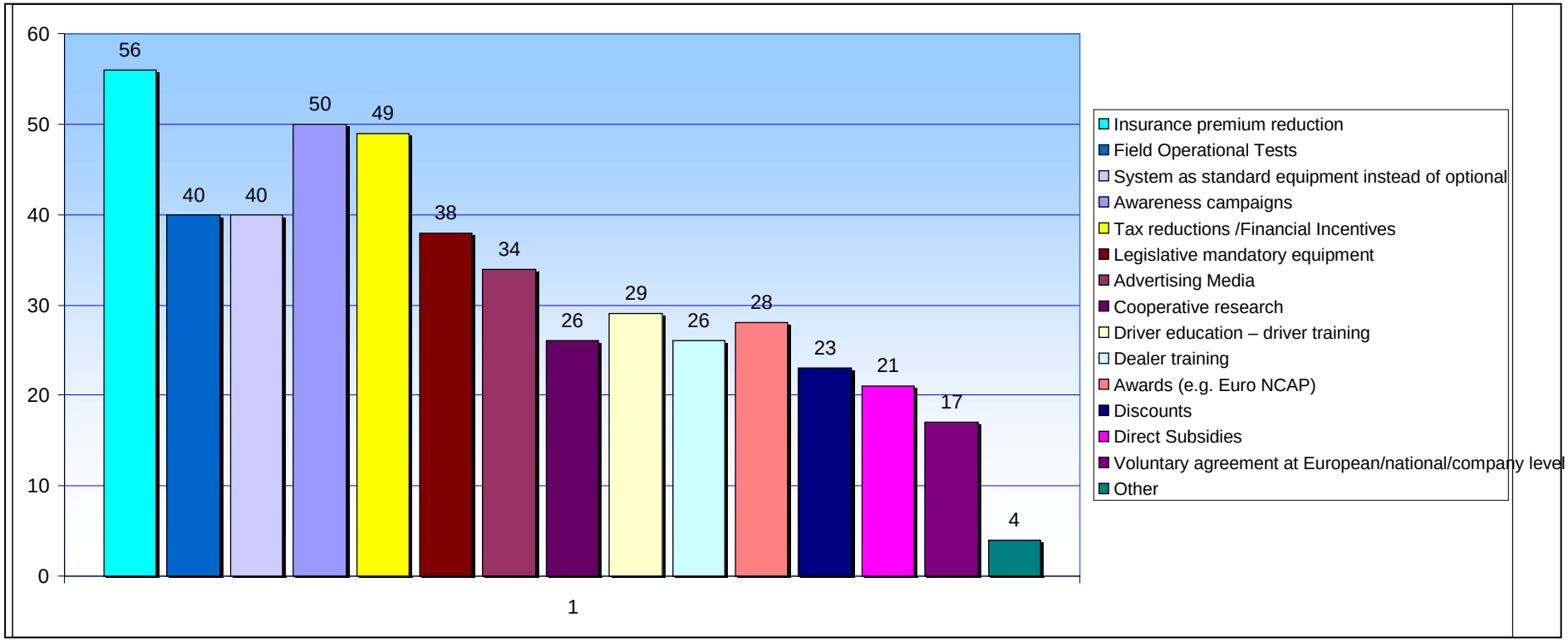


Figure 26: Instruments to promote SAFESPOT diffusion

As figure 25 shows, the actors and the stakeholders were also asked to indicate the most useful instruments in order to promote SAFESPOT system diffusion.

According to the majority of respondents, the insurance premium reduction would be a good incentive for SAFESPOT potential users (especially in a market-driven scenario). Field Operational tests are also considered very important, especially for increasing the user awareness and confidence in a completely new system like SAFESPOT. For similar reasons, the system should also be promoted via awareness campaigns.

Another option selected by the majority of them is to propose the system as a standard equipment instead of optional. Here we can make the same considerations as before, about the difficulties in installing the device on all the vehicles. This is also linked to another important aspect, which is to make the system adoption mandatory by law. An issue on which many actors agree is the possibility of establishing tax reductions and financial incentives for SAFESPOT adoption, as it is a safety device which aims at reducing accidents so people who decide to have it on board should be favored.

3.3.3. System configuration

The optimal configuration for a cooperative system

We made some questions related to cooperative systems' functionalities and we also investigated the strengths and weaknesses for each Business and Service Model configuration, both in the V2V and V2I configuration, in relation to different issues.

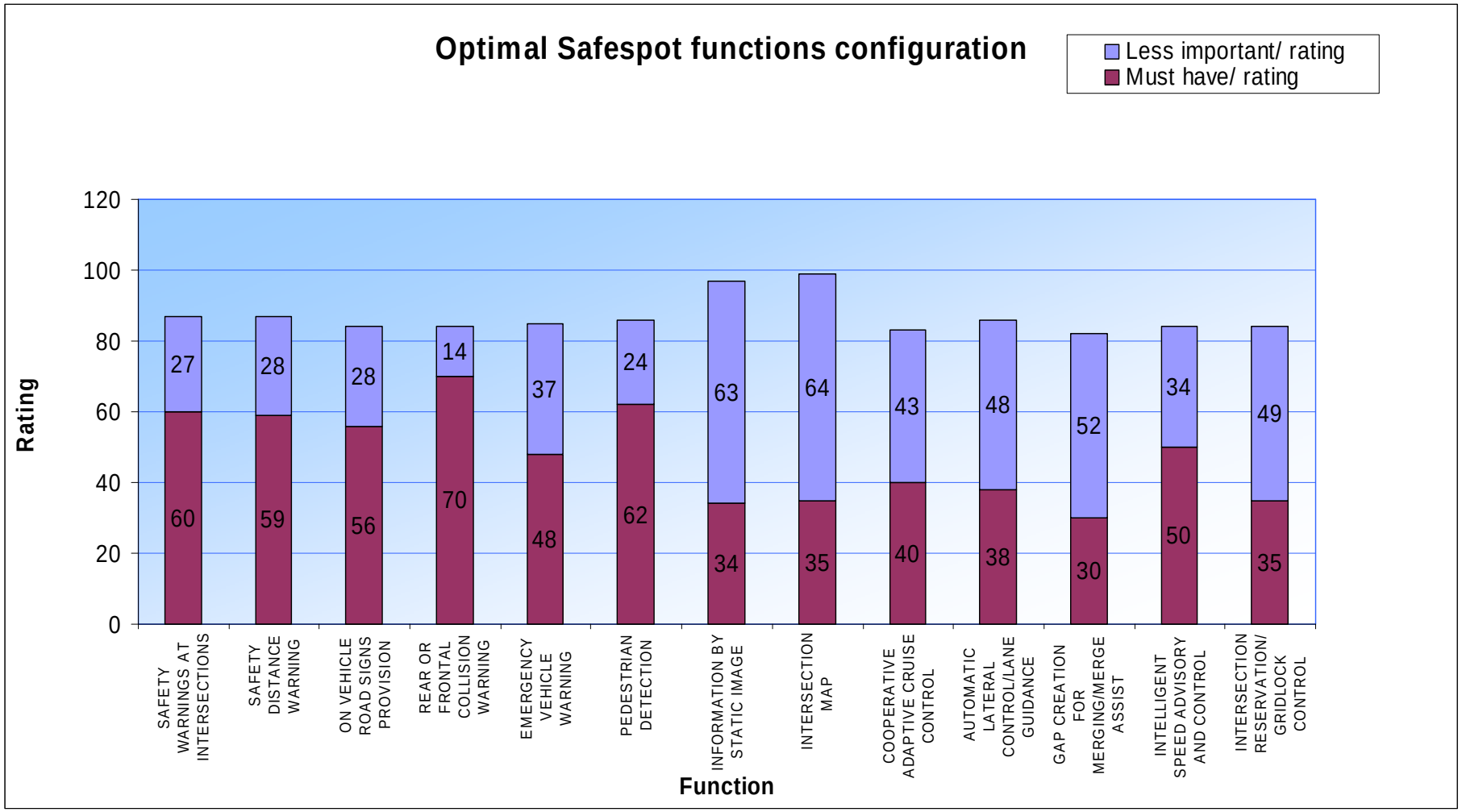


Figure 27: Optimal SAFESPOT Configuration

We wanted to know what the actors consider the optimal configuration for a cooperative system, giving them a list of possible functions coming from SAFESPOT but also from international cooperative projects, like the US MV-II and the Japanese Smartway (see Chapter 5). Then we asked them to classify the applications as must have or less important ones.

For the majority of the respondents, the must have functions are, in order of preference:

- Rear or frontal collision warning
- Pedestrian detection
- Safety warnings at intersections
- Safety distance warning
- On vehicle road signs provision

These are in fact the SAFESPOT functions, and their ranking according to the stakeholders' perspective is quite similar to the output of the end user survey (see chapter 4 about user acceptance analysis).

The less important functions (with a lowest number of preferences) are:

- Intersection map
- Information by static image
- Gap creation for the merge assist
- Intersection reservation gridlock control
- Automatic lateral control/lane guidance

Maybe these functions were less preferred because are less known or considered not very appropriated to the European scenario.

3.3.4. Strengths and Weaknesses

We made a first analysis of the relevant aspects that could represent strengths or weaknesses in the different configurations. These issues will be further investigated in BLADE WP5.5 (Market Assessment).

First of all, we noticed that the respondents didn't make a real distinction between the V2V and the V2I configuration. They saw more differences in the aspects that could affect in a positive or negative way the Business or Service Model hypothesis.

Table 4 and 5 summarize the answers of the majority of the sample.

Table 4: Strengths and weaknesses in the Business Model hypothesis

BUSINESS MODEL (V2V/V2I)	
STRENGHTS	WEAKNESSES
▪ Attractiveness/Acceptability for user ▪ Attractiveness/ acceptability for the system installer/financer ▪ Market penetration ▪ Ease of implementation ▪ Organization ▪ Technological feasibility ▪ Performances in energy, efficiency, emissions reduction ▪ Universality (possibility of use in every road and weather situation, etc.) ▪ HMI aspects ▪ Possibility of integration with other existing safety devices ▪ Possibility of updating ▪ Possibility of retrofitting ▪ Reliability ▪ Legal Aspects	▪ Operating costs ▪ Liability/responsibility in case of malfunctioning ▪ Time to market (availability of the solution on a short or long term) ▪ Price of the system ▪ Liability problems when an accident happens or for violations of a breakdown ▪ Possibility of customization

For the Service Model hypothesis (in which, as we explained, the system is considered as well as a service and users have to pay for it), there seem to be more negative aspects than in the previous hypothesis: in particular, the problems could be related to the operating costs and to the market penetration, but also to the ease of implementation and the attractiveness for the user.

Table 5: Strengths and Weaknesses in the Service Models hypothesis

SERVICE MODEL (V2V/V2I)	
STRENGHTS	WEAKNESSES
▪ Attractiveness/ acceptability for the system installer/financer ▪ Possibility of customization ▪ Technological feasibility ▪ Return on investment of the configuration (ROI) ▪ Universality (possibility of use in every road and weather situation, etc.) ▪ HMI aspects ▪ Possibility of integration with other existing safety devices ▪ Possibility of updating ▪ Possibility of retrofitting	▪ Investment costs ▪ Operating costs ▪ Attractiveness/Acceptability for user ▪ Market penetration ▪ Ease of implementation ▪ Liability/responsibility in case of malfunctioning ▪ Time to market (availability of the solution on a short or long term) ▪ Price of the system ▪ Liability problems when an accident happens or for violations of a breakdown

As we can see in table 4 and 5, there are some issues that most of the stakeholders interviewed consider strengths for both the hypothesis:

- Attractiveness/acceptability for the system installer/ financier

- Technological feasibility
- Universality (possibility of use in every road and weather situation, etc.)
- Hmi aspects
- Possibility of integration with other existing safety devices
- Possibility of updating
- Possibility of retrofitting

As well as for the strengths, there are also some aspects that are considered weakness for the SAFESPOT system overall, without any distinction in the business configuration.

- Operating costs
- Liability/responsibility in case of malfunctioning
- Time to market (availability of the solution on a short or long term)
- Price of the system
- Liability problems when an accident happens or for violations of a breakdown

3.4. Market penetration

For each Business and Service Model hypothesis, we considered the possible SAFESPOT market penetration for the year 2015, 2020 and 2030 in both the V2V and V2I configuration.

1. Business Model V2V (with Public Reliance)
2. Business Model V2I (with Public Reliance)
3. Service Model V2V (with Private Reliance)
4. Service Model V2I (with Private Reliance)
5. V2V and V2I with public/private reliance together (Business Model**)**
6. Introduction of further applications

We asked the respondents to indicate the possible SAFESPOT penetration rate in the years we mentioned above, and then we divided the answers in three percentiles (33% each).

Then we computed the average response for each percentile in each time portion and we represented the possible scenarios.

For each possible configuration, we defined three scenarios of penetration: pessimistic, intermediate and optimistic. The first one, represented by the 33% of respondents, is composed by people who don't believe that SAFESPOT could have a wide market penetration in the time frame we considered (we called this category of respondents "sceptics"). The optimistic scenario (33% of respondents) is composed by the "enablers", i.e. people who strongly believe in the innovation spread out. The third scenario (represented by the so called "bystanders") is the intermediate one (another 33% of respondents).

At this stage we didn't consider incentives (for example: reduced road tax or insurance premiums if SAFESPOT systems are installed) and/or mandatory/legislation scenarios (government legislation requires SAFESPOT systems to be fitted in certain/all types of vehicles like seat belts, and so on).

3.4.1. Business Models Average Market Penetration

For both the V2V and V2I configuration, we calculated the average market penetration according to the stakeholders who answered this question.

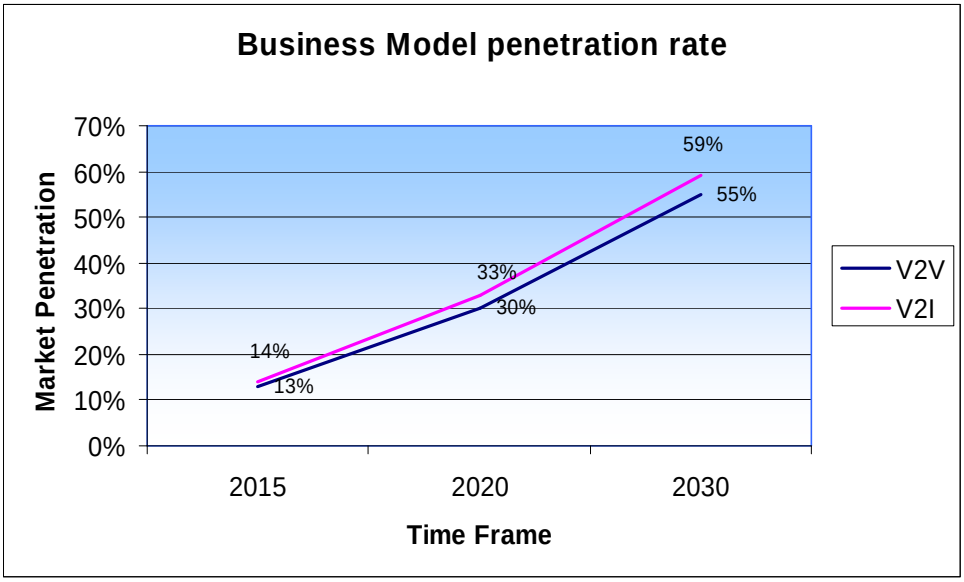


Figure 28: Average penetration for the Business Model hypothesis in both the V2V and V2I configuration

The average market penetration shows almost the same values for the V2V and the V2I configuration,

- starting from a 13%-14% penetration in 2015,
- growing up to the 30%-33% in 2020 and
- increasing in 2030 with a 55%-59% penetration rate.

Possible scenarios for the Business Model (Public Reliance) in V2V and V2I configurations

We asked the respondents to indicate the possible SAFESPOT penetration rate in the years we mentioned above, and then we divided the answers in three percentiles (33% each). Then we computed the average response for each percentile in each time portion and we represented the possible scenarios. For each possible configuration, we defined three scenarios of penetration: pessimistic, intermediate and optimistic.

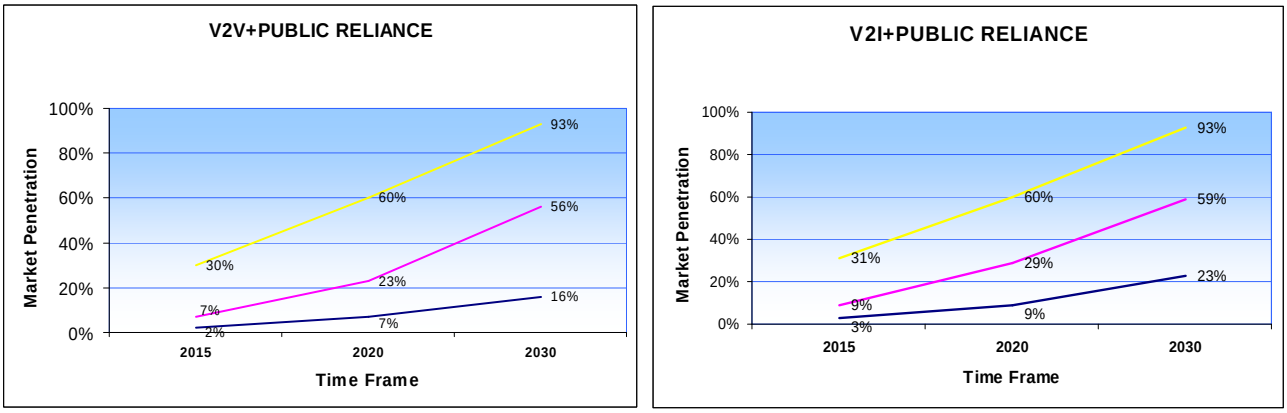


Figure 29: Business Models: possible market penetration scenarios

In the Business Model hypothesis there is a substantial similarity between the V2V and the V2I configuration.

- The pessimistic scenario (sceptics) shows a very low penetration in 2015 (2% V2V-3% V2I), which slowly increases up to 7%-9% in 2020 and reaches the 16%-23% in 2030.
- In the second scenario (bystanders), it goes from the 7%-9% in 2015, to the 23%-29% in 2020 and finally in 2030 we can notice a sensible growth of the penetration rate, corresponding to the 56% in the V2V configuration and to the 59% in the V2I one. This means that on a long period more than a half of the vehicle park could be equipped with SAFESPOT devices.
- The optimistic scenario (enablers**)** shows a curve which goes from the 30% V2I- 31% V2V to over a half of the vehicle park in 2015 (60% V2I,V2V) and then reaches nearly the totality of the vehicles in 2030 (93% in both the configurations).

Service Models - Average Market Penetration

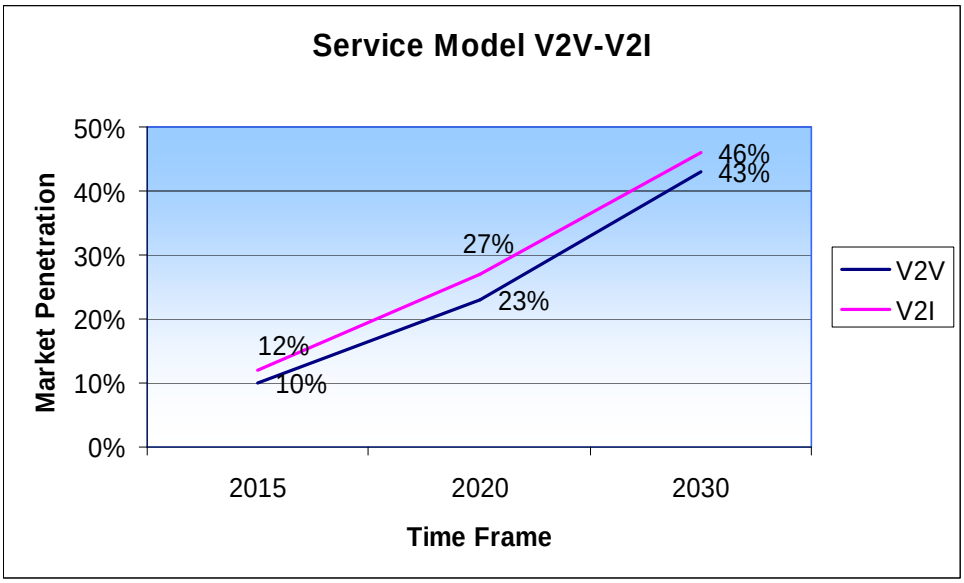


Figure 30: Average penetration for the Service Model hypothesis in both the V2V and V2I configuration

The average market penetration shows lower values than the Business Model hypothesis.
The ratings for the V2V and the V2I configuration are similar,

- starting from a 10%-12% penetration in 2015,
- growing up to the 23%-27% in 2020 and
- increasing in 2030 with a 43%-46% penetration rate (not reaching the half of the total market).
- possible scenarios for the Service Model (Private reliance) in both V2V and V2I configuration.

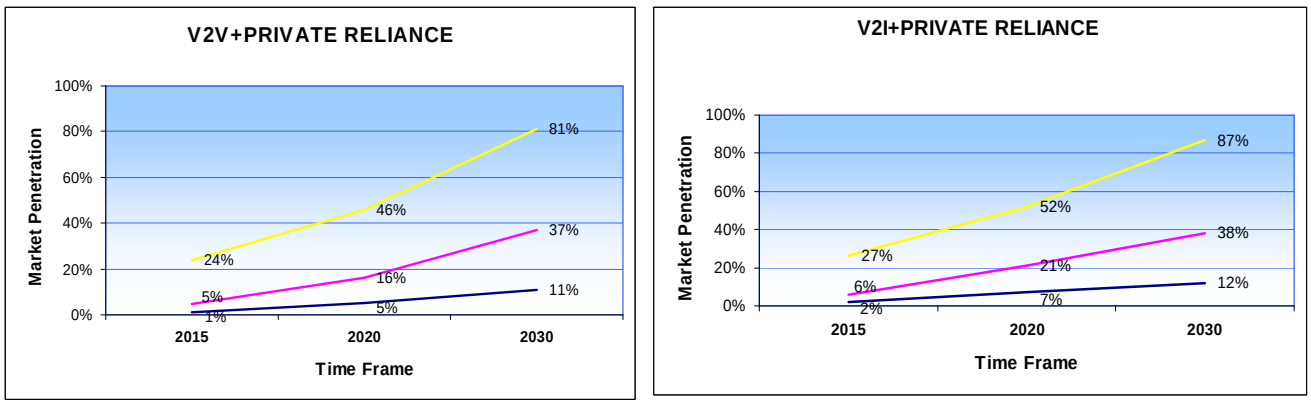


Figure 31: Service Models: possible market penetration scenarios

In the service model hypothesis the situation is quite similar and there is a substantial analogy between the V2V and the V2I configuration.

- The pessimistic scenario (sceptics) shows almost no penetration at all in 2015 (1% V2V- 2% V2I), which slightly increases up to 5%-7% in 2020 and reaches the 11%-12% in 2030.
- The situation lightly changes in the second scenario (bystanders**)**: it goes from the 5%-6% in 2015, to the 16%-21% in 2020 and finally in 2030 the 37% in the V2V configuration and to the 38% in the V2I one.
- The optimistic scenario (enablers) shows a curve which goes form the 24% V2I- 27% V2V to over a half of the vehicle park in 2015 (46% V2I, 52% V2V) and then grows sensibly in 2030 (84-87%)

Possible scenarios in the Integration of V2V and V2I configuration hypothesis

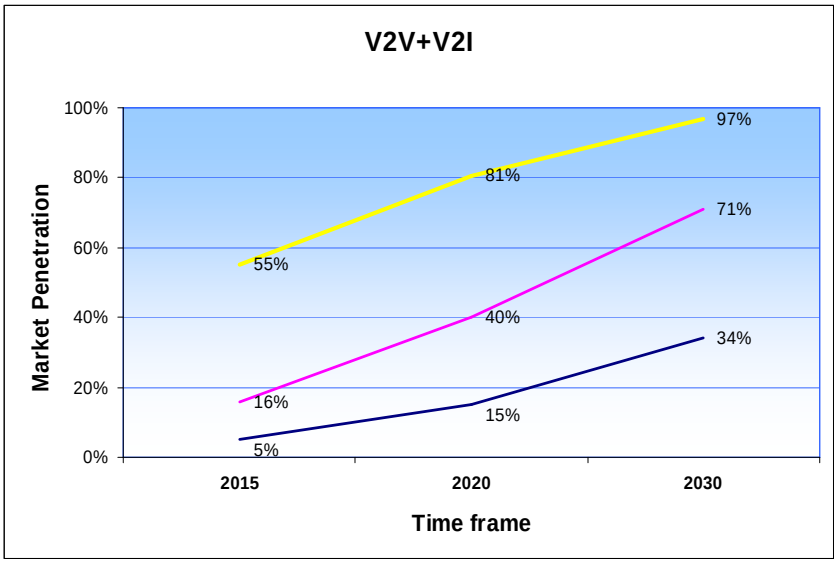


Figure 32:Integration V2V+V2I: possible market penetration scenarios

In the V2V+V2I integration hypothesis the rate of penetration increases:

- The pessimistic curve (sceptics) starts from a 5% penetration in 2015, then goes to a 15% in 2020 and grows up to the 34% in 2030, while in the other hypothesis it reached at most at a 22%.
- In the second scenario (bystanders) we can notice a high slope, in fact the respondents hypothesizes a 16% penetration in 2015, which becomes more than double in 2020 (40%) and grows up to the 71% in 2030.
- The optimistic scenario (enablers) shows a high confidence in the possible SAFESPOT diffusion: 55% in 2015. In 2020, the rate of penetration according to the optimistic respondents will be the 81%, reaching almost the totality of vehicle park in 2030 (97%).
- According to these results, it seems that combining Vehicle to vehicle and Vehicle to Infrastructure configuration could help the SAFESPOT system diffusion, especially on a short range timing.

Business and Service Models with the integration of further applications

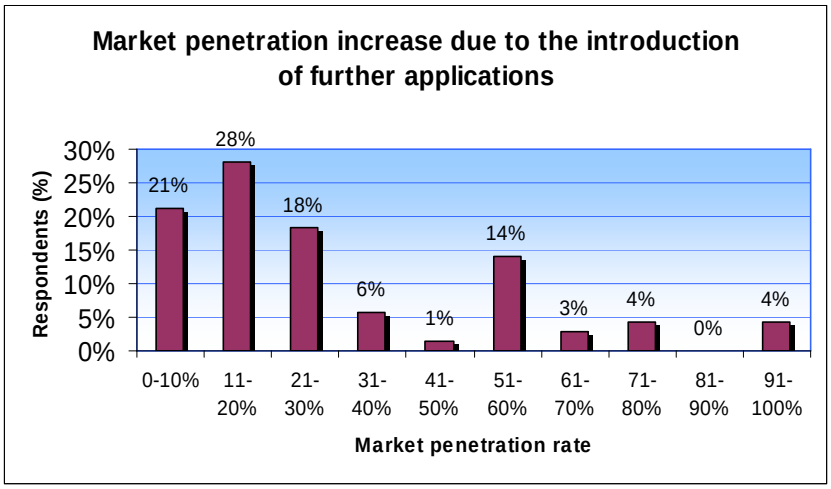


Figure 33: Possible market penetration increase due to the integration of further applications

Introducing the following additional functions:

- traffic information,
- automatic road toll payment,
- parking reservation

The 68% of respondents think that the possible market penetration increasing, with respect to the percentages indicated for the other hypothesis, could be comprised between 0% and 30%.

Target Users, Vehicles and Roads

In this section of the survey we investigated the aspects related to the typology of drivers, vehicles and roads that according to the expert could be the target group for SAFESPOT market introduction.

Target drivers

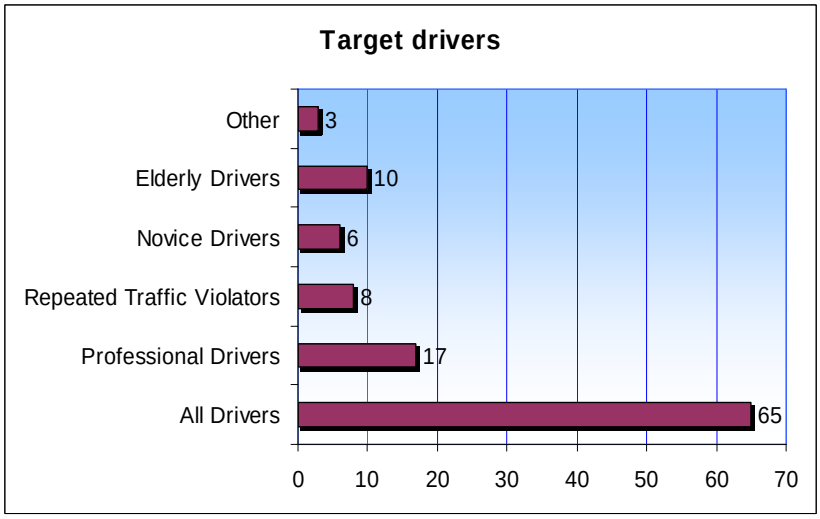


Figure 34: SAFESPOT target drivers

We asked the respondents who should use SAFESPOT system (all drivers without distinction, professional drivers, repeated traffic violators, novice drivers, elderly drivers or other groups). The respondents could choose more than a group.

Most of the respondents chose to a great extent the introduction of SAFESPOT for everyone. In fact they think that every driver should have a cooperative safety system on board, and the reason why some of them chose other options is that they are aware of the difficulty of a huge market penetration from the beginning of SAFESPOT introduction: so, if they had to select a category of drivers who'd better have SAFESPOT for first, they would indicate Professional and Elderly Drivers (see figure 35). In fact, the respondents think that professional drivers have a big responsibility for the goods and the passengers they transport. This category spends a lot of time on the road, driving in traffic condition and being exposed to several accidents. Elderly drivers could need the help of a safety system because their level of attention and their time of response are lower.

Target vehicles

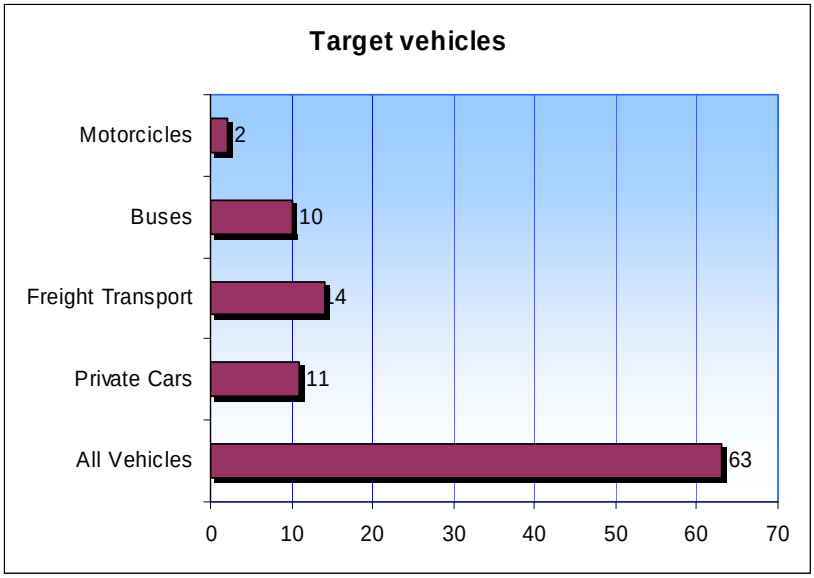


Figure 35: SAFESPOT Target vehicles

Concerning the target vehicles for SAFESPOT installation, we can make the same deduction as above: the best solution for the majority of the stakeholders would be to equip all the vehicles with SAFESPOT system. Some respondents say that the effects can only be reached if all vehicles are equipped with SAFESPOT, but others (few) think that it shouldn't be put on each vehicle or at least not from the earlier adoption phases. The category of vehicles on which system should be installed at first is the freight transport. This is in line with the selection of the professional drivers that we mentioned above. Some respondents chose the buses, because they transport a lot of people even for long travels.

Target Roads

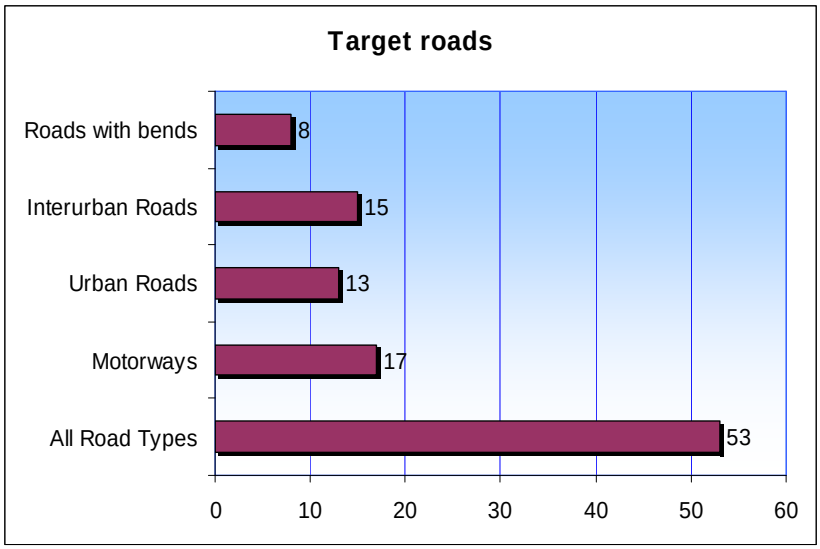


Figure 36: SAFESPOT target roads

Finally, the stakeholders were asked to choose the target roads for SAFESPOT installation. This particularly regards the V2I configuration. In fact, in order to make the system work, there should be a device on the vehicle and a series of devices along the road, that make the vehicle and the infrastructure communicate. The final aim for the majority of respondents is to have SAFESPOT along all road types (see figure 35). Of course, this would really increase safety, but would also be expensive and need a lot of time and efforts. As the experts are aware of this, they also chose motorways and interurban roads as the typologies on which the system installation could be more urgent, as they are more dangerous and many severe accidents occur. Also the urban roads are indicated as relevant for this purpose, due to the massive presence of vulnerable road users.

3.4.1. Conclusions of the Stakeholders Survey

This survey tried to gather as many cooperative safety related issues as possible from different stakeholders in different countries.

The main results are:

- In the V2V configuration, the actors that are expected to finance the system are the Car Manufacturers, then the Automotive Industry Suppliers and the Service Providers. Concerning the V2I configuration, the actors involved change: the Public Authority here becomes the actor who is more likely to finance SAFESPOT installation, together with the Road Manager/Operator. As regards how to finance SAFESPOT system introduction, the use of tax money/ governmental subsides seems to be the best solution, followed by own profit/loss responsibility.
- Most of the respondents think that in order to reach a certain level of SAFESPOT diffusion it would be 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.
- The insurance premium reduction would be a good incentive for SAFESPOT potential users (especially in a market-driven scenario). Field operational tests are also considered very important, especially for increasing the user awareness and confidence in a completely new system like SAFESPOT.
- As regards the optimal configuration for a cooperative safety system, the “must have/first level” functions are, in order of preference:
    1. Rear or frontal collision warning
    2. Pedestrian detection
    3. Safety warnings at intersections
    4. Safety distance warning
    5. On vehicle road signs provision
- We made a first analysis of the relevant aspects that could represent strengths or weaknesses in the different configurations. The issues that most of the stakeholders interviewed consider strengths for both the Business and Service Models hypothesis are:
    - attractiveness/acceptability for the system installer/ financier
    - technological feasibility
    - universality (possibility of use in every road and weather situation, etc.)
    - HMI aspects
    - possibility of integration with other existing safety devices
    - possibility of updating
    - possibility of retrofitting

The aspects that are considered weaknesses for the SAFESPOT system overall, without any distinction in the business configuration, are:

- Operating costs
- Liability/responsibility in case of malfunctioning
- Time to market (availability of the solution on a short or long term)
- Price of the system

- Liability problems when an accident happens or for violations of a breakdown

Market Penetration has been also investigated.
For the Business models the average market goes from a 13%-14% penetration in 2015, growing up to the 30%-33% in 2020 and increasing in 2030 with a 55%-59% penetration rate.
The average market penetration for the Service Models shows lower values, starting from a 10%-12% penetration in 2015, growing up to the 23%-27% in 2020 and increasing in 2030 with a 43%-46% penetration rate (not reaching the half of the total market).
In addition three possible scenarios[28] of penetration in both the V2V and the V2I configurations, for each Business and Service Model, have been developed:
In the V2V+V2I integration hypothesis the rate of penetration increases: according to the results we collected, it seems that combining vehicle to vehicle and vehicle to infrastructure configuration could help the SAFESPOT system diffusion, especially on short range timing.

The majority of the respondents think that introducing additional functions (traffic information, automatic road toll payment and parking reservation) the possible market penetration increasing with respect to the percentages indicated for the other hypothesis could be comprised between 0% and 30%.

Most of the respondents chose to a great extent the introduction of SAFESPOT for everyone. In fact they think that every driver should have a cooperative safety system on board, but if they had to select a category of drivers who'd better have SAFESPOT for first, they would indicate professional and elderly drivers.

Concerning the target vehicles, the best solution would be to equip all the vehicles with SAFESPOT system. The category of vehicles on which SAFESPOT should be installed at first is the freight transport.

Finally, the aim for the majority of respondents is to have SAFESPOT along all road types. In an earlier phase, Motorways and Interurban roads are the typologies on which the system installation could be more urgent, as they are more dangerous and many severe accidents occur. Also the urban roads are indicated as relevant for this purpose, due to the massive presence of vulnerable road users.

[28]The "pessimistic" (sceptics), the "intermediate" (bystanders), and the "optimistic" (enablers)

4. User Acceptance Survey

This chapter shows the results from the SAFESPOT User Acceptance survey, whose purpose was to collect a priori feedbacks on cooperative systems from driver perspective. The outcomes will be relevant and used as input for further analysis inside the BLADE Sub project:

- the Analysis of the User Position, Wp 6.6.2
- the Cost Benefit Assessment , Wp6.6.5
- the definition of the Deployment Programme, Wp6.6.7

Methodology

The selected approach from the literature is the C.J.G. Van Direl/B.Van Arem Approach.

In the C.J.G. Van Direl/B.Van Arem approach, through an Internet questionnaire, more than 1000 Dutch car drivers indicated their needs for driver assistance in respect to different driving tasks (e.g. congestion driving) and situations (e.g. driver fatigue).

Survey Structure

In SAFESPOT the team aimed to collect around 2000 questionnaires[29] to have a representative overview at least in biggest European countries.

The target was not to reach only technical colleagues, but also users independently from their occupation and age. The only requirement for participation was internet access availability and being a car driver.

An on line questionnaire[30] in 5 languages[31] was prepared and administered via Internet.

The structure of the questionnaire is as follows:

1. Evaluation of SAFESPOT safety functions
2. Willingness to pay
3. Driving Habits
4. Road Safety
5. Driver features

Scope of the survey results

The goal of the survey was to collect responses from several countries and especially from those countries that are more populated. The nature of the survey is an *a priori* investigation and does not contain elements that may result in sensible differences into the responses in different European countries.

An extensive and representative survey for the whole of the EU-27 was not foreseen and would not have been affordable within the resources available for this sub-task. The overall idea was not to address a specific differentiation

[29] The survey is included in Annex 8.2
[30] The questionnaire has been available for 8 weeks, uploaded on the CSST web site address-server (From December 2007 to February 2008).
[31] English, Italian, French, German and Spanish

among European countries but to consider at this stage the sample of European population at the same level, without looking for specific differences among countries. Thus, even if the geographic distribution of the replies is indicated in this deliverable, it does not include elements of differentiations.

As a consequence the sample collected is obviously unevenly distributed among the different European countries, specifically the outcomes resulted to have been collected in most but not all the 27 European countries and in particular around 40% of the replies have been provided by Italian respondents (Figure 36).

In order to make use of the survey data for this purpose the BLADE team analysed the results obtained on the various answers that have been weighted in relation to the population of the various countries. A comparative analysis among the weighted results, with respect to the population, highlighted differences of light entity, always few points of percentage or less.(normally less than 2% and in few cases up to 5%).
This means that the hypothesis of undifferentiated sample is correct.
But more than the strict numbers it is important to underline a positive evaluation of the functionalities, a good willingness to pay for the functions considered most useful and a convergence about the modality of payment.

The results of the survey can be used for this analysis, taking into account that in the SAFESPOT project timeframe we are still at this early stage. Further usage of the data should be limited and treated with care, taking into account the limitations mentioned.

4.1. DESCRIPTION OF SAFESPOT SAFETY FUNCTIONS

SAFESPOT functions are based on radio communication between neighbouring vehicles, and also between vehicles and the infrastructure. Safety-relevant information is provided to the driver in different ways: as icons or text messages visualized on an on-board display, acoustics warnings or spoken messages, as well as signals given by roadside devices.
In the survey it was decided not to use any pictures to describe SAFESPOT functions, in order to avoid to influence users' attitude and perception towards the functions. This is how the applications are explained:

Table 6: Description of SAFESPOT functions

A Safety warnings at intersections When you approach an intersection, this function will warn you of approaching vehicles whose trajectories intersect with yours.
B Safety distance warning This function will warn you if you are driving too close to the vehicle in front to be able to stop safely if it should suddenly brake hard.
C On-vehicle road signs provision This function is able to provide safety information normally contained in road sign. The function could include Speed Alert, Hazard (potentially also accident warnings) that could be hidden from your view due to poor visibility conditions (rain, fog, behind a bend, etc.)
D Rear or frontal collision warning This function warns you about the presence of an obstacle on the road ahead which is hidden from your view (for example behind a bend, or invisible due to foggy conditions).
E Emergency vehicle warning This function provides on an onboard display a visual warning of the presence of an emergency vehicle, and also the direction in which it is travelling.
F Pedestrian detection This function uses sensors which are able to detect cyclists or pedestrians. So even when a vulnerable road user is hidden from your view by another vehicle or is hard to see because of low visibility, you will receive a warning.

4.2. Drivers Features and Habits

4.2.1. User typology

The survey, either for the specific issues and the innovative contents – which are not yet of common use and therefore not tangible - or for the chosen instrument (Internet), was obviously oriented towards a target of customers particularly familiar with technologies and interested in safety issues.
This means to have a sample with an upper-middle cultural level and a lot with an employment of upper-middle level. The other categories of people generally leave the survey because they're not interested or because it is too complicated.
The European sample was composed by 1825 respondents from different[32] European countries.

It has already been underlined that the survey has not been conducted to identify elements of differentiations among the replies per categories (geographic area, sex, occupation, etc.) but from the beginning the sample was addressed to make an estimation on the average of population without specific

[32] Austria, Belgium , Bulgaria, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden , United Kingdom, Other

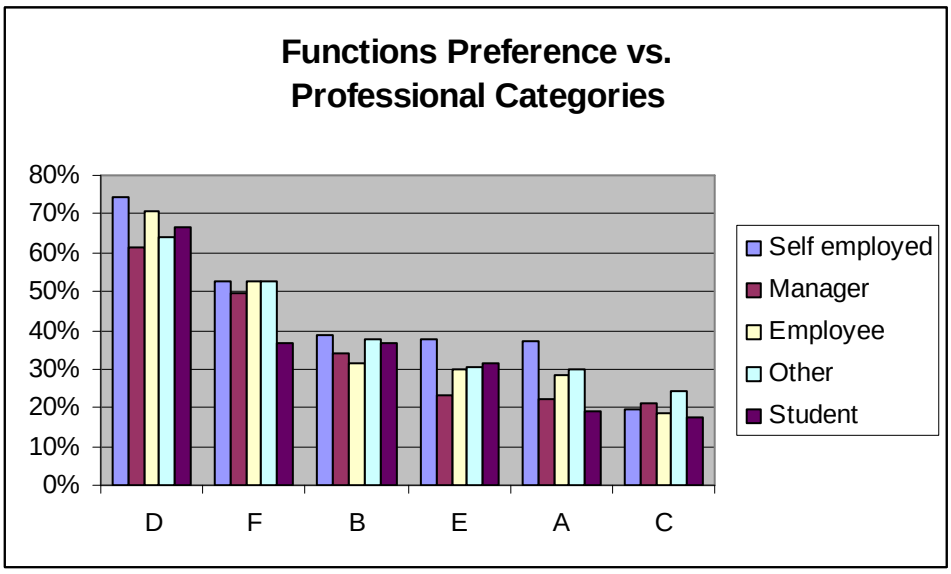
classification of the repliers. As previously mentioned, the reason for keeping the sample undifferentiated is that the collected information should represent a preliminary indication of "how the average population would be oriented towards the novelty brought by the SAFESPOT applications" and the outcomes of this survey is one of the inputs to the selection of the promising Business or Service Model/s.
Several analyses in order to verify the significance of the sample have been made in relation to the professional categories. In particular the verification has been made considering, for the various professional categories, two key elements:

- preference as regards the usefulness of the 6 SAFESPOT functions (A-F, as explained in table 6, section 4.1)
- preferred modality of payment.

The 17 professional categories foreseen in the questionnaire have been combined in 5 meaningful clusters. From the analysis carried out, like it was expected, the following conclusions can be made:
- all the categories choose as preferential (and also with the same order) the functions D, F and B, in line with the average European.
- for the other functions there are not meaningful differences.

As a conclusion, it is confirmed that the hypothesis of undifferentiated sample is correct, also in respect to the professional categories.

As an example of the different analysis performed a distribution diagram is reported in the figure below for the SAFESPOT function preference respect to the Professional categories, similar results were obtained for the preferred modality of payment and in the previous mentioned analysis versus the country distribution.



SAFESPOT Functions Preference vs. Professional Categories

In the following some more details about the sample typology is provided.

The following figure shows a summary of the response distribution by European country.

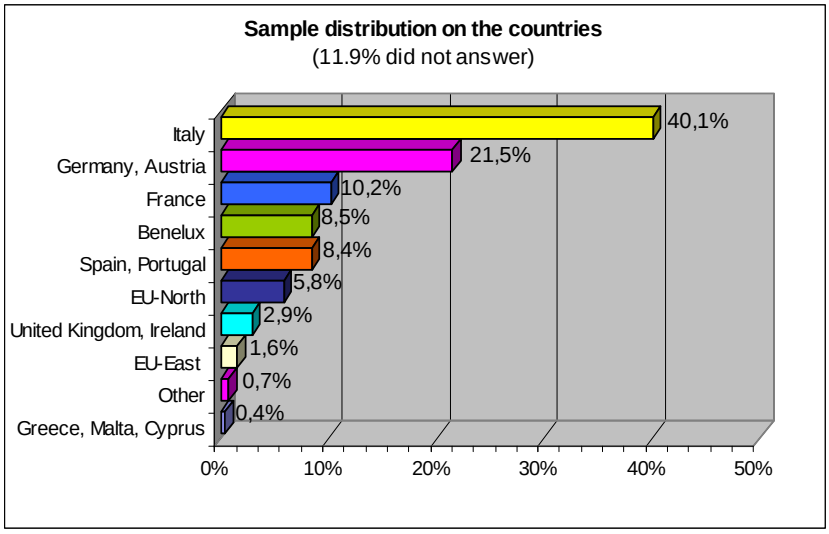


Figure 37: sample distribution on the countries

Table 7 shows some characteristics: 1428 respondents are male and 397 are female. Most of them are between 26 and 40 years old, with a high level of education. The most cited profession is the employee (in a private or public company).

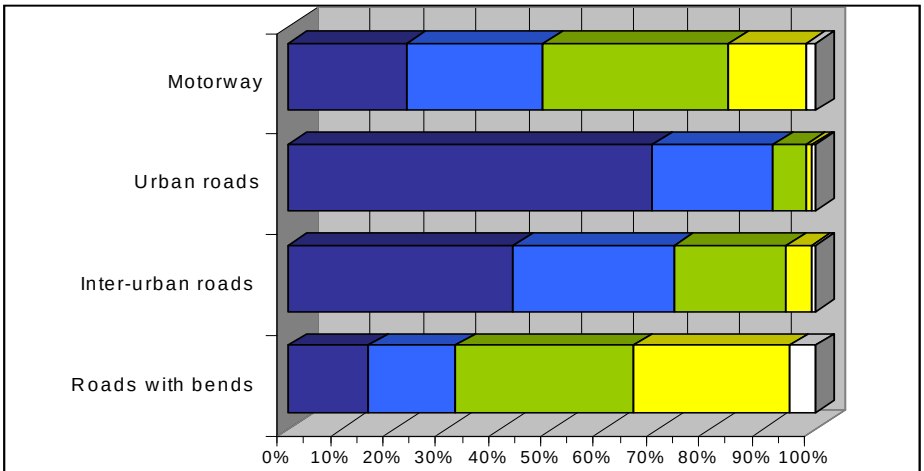
The 68,9% has more then 6 years of driving experience, and the most part has an average annual mileage over 15.000 Km, only 7,5 % are professional drivers.

Table 7*: Characteristics of the sample*

Gender		*Sample*
	male	78,7%
	female	21,3%
Age		
	18-25 years	7,5%
	26-40 years	55,1%
	41-55 years	28,9%
	56-65 years	7,7%
	> 65 years	0,7%
Education		
	Primary education	2,2%
	High School Certificate	21,7%
	University Degree	76,1%
Profession		
	Freelancer (lawyer, doctor, etc.)	4,6%
	Salesman, commercial agent	2,0%
	Businessman (industrial, commerci	2,1%
	Dealer, shopkeeper	0,3%
	Craftsman, self-employed	1,2%
	Farm manager (not employee)	0,1%
	Manager in a private company	6,3%
	Manager in a public company	3,4%
	Employee in a private company	46,0%
	Employee in a public company	18,2%
	Workman (specialized/not specializ	2,3%
	Farm worker (employee)	0,0%
	Housewife	0,1%
	Student	3,5%
	Retired	1,4%
	Unemployed	0,4%
	Other	8,2%

4.2.2. Driving habits

As regards to the driving habits, most of them are used to drive along urban roads every day, and respectively the 73,3% and about the 50%, at least once or twice at week in inter-urban roads and motorways. Almost the 15% of the respondents are used to drive along drive roads with bends every day (Figure 37).



	Roads with bends	Inter-urban roads	Urban roads	Motorway
Never	4,9%	0,7%	0,4%	1,6%
once a year	29,5%	4,7%	1,3%	14,7%
once a month	33,7%	21,3%	6,1%	35,2%
once-twice a week	16,6%	30,5%	23,0%	26,0%
Almost every day	15,2%	42,8%	69,2%	22,4%

Figure 38: response per road typology

About the car possession, the most cited car engine were between 1200-1800 cc (47,3%) and over 1800 cc (40,5%). FGA[33], Volkswagen, Ford and Renault are the most selected brands. Figure 48 shows the brand car possession in details:

[33] FGA: Fiat Group Automobiles, PSA: Peugeot Citroen Automobiles, S.U.V: Sport Utility Vehicle

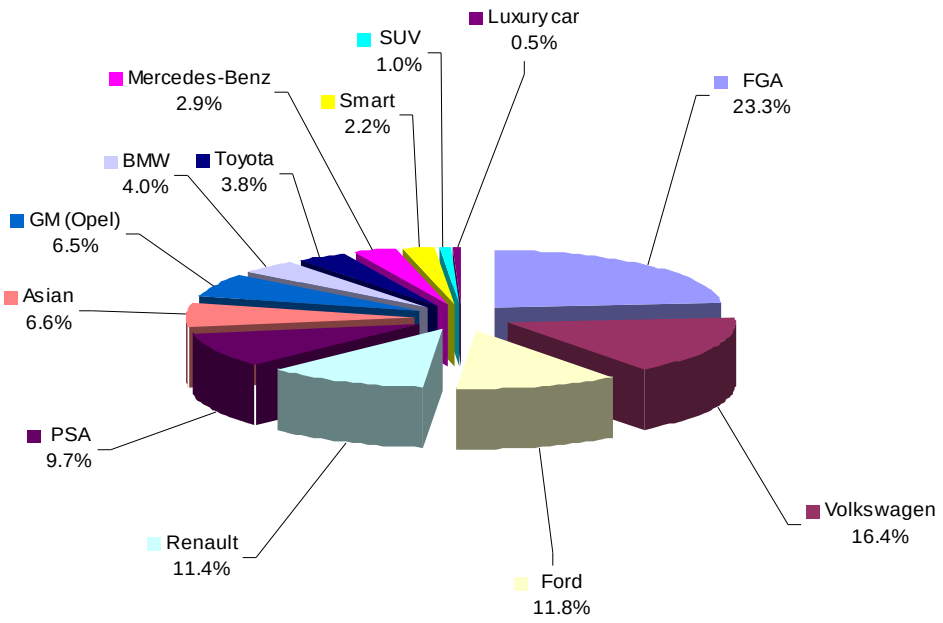


Figure 39:: Brand Car possession

Figure 39 lists the safety car equipments (Standard and Optional modality) owned by the respondents.

The most cited are lateral airbags (61,1%) and stability control (50,6%):

Table 8*: Car equipment distribution table*

	Standard	Optional	not installed
Stability control	39.6%	11.0%	49.4%
Lateral airbags	52.5%	8.6%	38.8%
Parking sensors	11.0%	17.5%	71.5%
Aut. Speed control	18.6%	10.9%	70.5%
Lane Departure	1.9%	3.0%	95.1%
Built-in phone	5.0%	11.8%	83.3%
Navigation	5.1%	24.4%	70.5%
Internet conn.	0.8%	4.2%	94.9%
Rescue call	1.7%	5.2%	93.1%

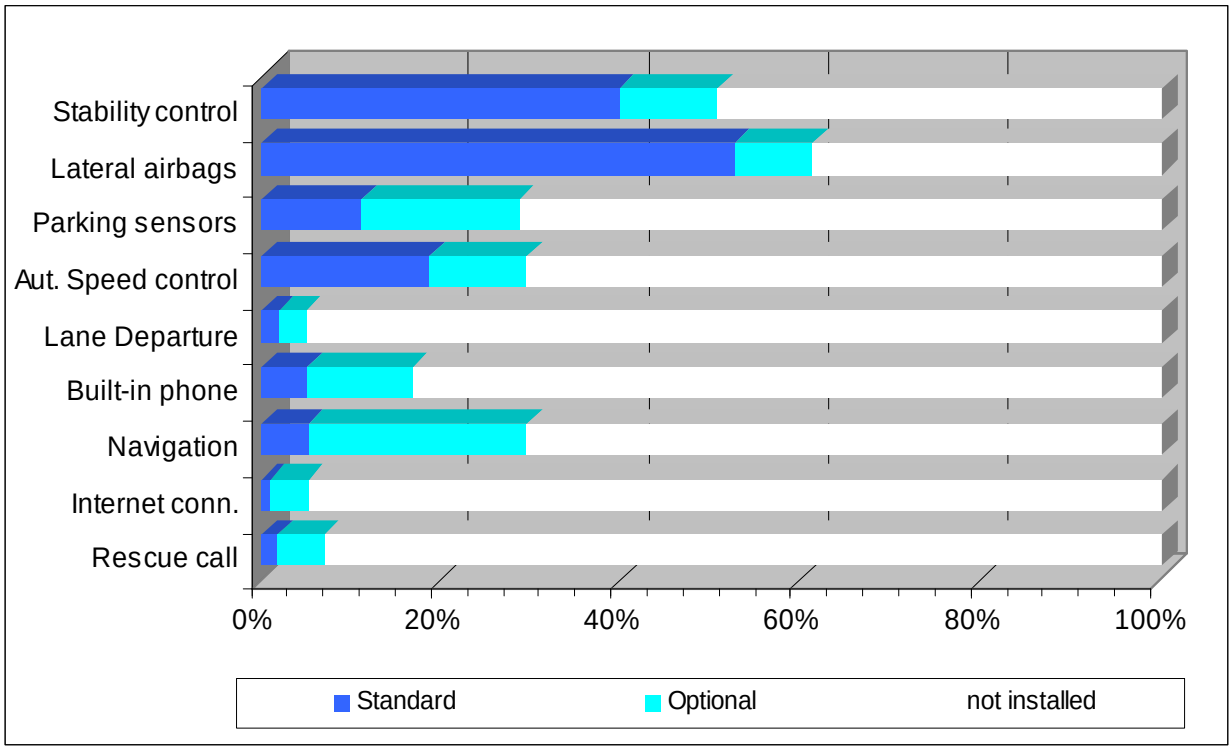


Figure 40: car equipment

4.3. Evaluation of SAFESPOT safety functions

The evaluation made by European users regarding SAFESPOT applications is quite positive (very useful + useful). Figure 40 shows the results in decreasing order. The most popular SAFESPOT functions are Rear of frontal collision warning (92%) and Pedestrian detection (85%). On-vehicle road signs provision was the less preferred function.

	1 - very useful	2 - useful	3 - neutral	4 - useless	5 - very useless	average	useful (1 + 2)	useless (4+5)
D - Rear or frontal collision warning	68.9%	23.1%	4.2%	1.8%	2.1%	2.25	91.9%	3.9%
F - Pedestrian detection	51.9%	33.4%	9.4%	3.6%	1.8%	2.11	85.3%	5.4%
B - Safety distance warning	33.4%	38.0%	16.7%	8.2%	3.7%	2.46	71.5%	11.8%
A - Safety warnings at intersections	30.0%	37.0%	17.2%	9.6%	6.2%	1.45	67.0%	15.8%
E - Emergency vehicle warning	29.4%	40.8%	19.9%	6.9%	3.0%	2.13	70.2%	9.9%
C - On-vehicle road signs provision	19.9%	37.0%	25.7%	12.0%	5.4%	1.7	56.9%	17.4%

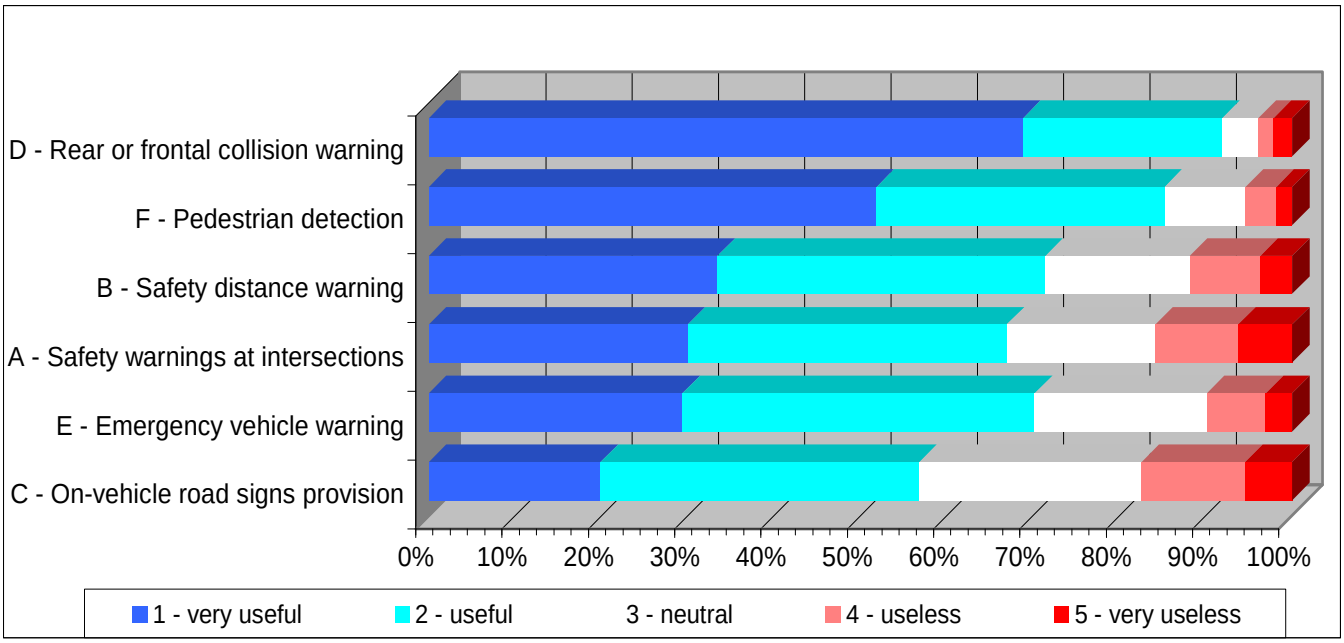
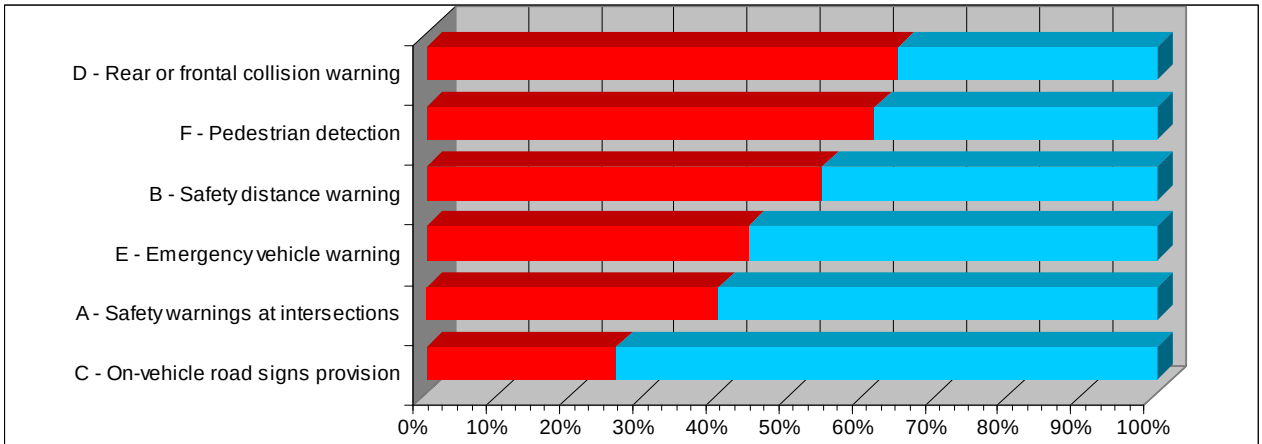


Figure 41: .top 6 most popular SAFESPOT functions in EU countries

More than 60% of users consider that the installation of Rear of frontal collision warning and Pedestrian detection functions should become mandatory(figure 41), that is coherent with the preferences stated for their usefulness (see Figure. 40). The Safety distance warning is indicated as mandatory by the half of the respondents.



	C - On-vehicle road signs provision	A - Safety warnings at intersections	E - Emergency vehicle warning	B - Safety distance warning	F - Pedestrian detection	D - Rear or frontal collision warning
non mandatory	74.0%	60.1%	55.9%	45.9%	38.6%	35.5%
mandatory	26.0%	39.9%	44.1%	54.1%	61.4%	64.5%

Figure 42: Mandatory SAFESPOT functions

4.4. Willingness to pay

About the willingness to pay, the percentages are quite high for the two most evaluated SAFESPOT functions and are related to their usefulness.

The functions Rear of frontal collision warning and Pedestrian detection, that have been best evaluated and are proposed to become mandatory, have also been considered “worth Paying for” Figure 42.

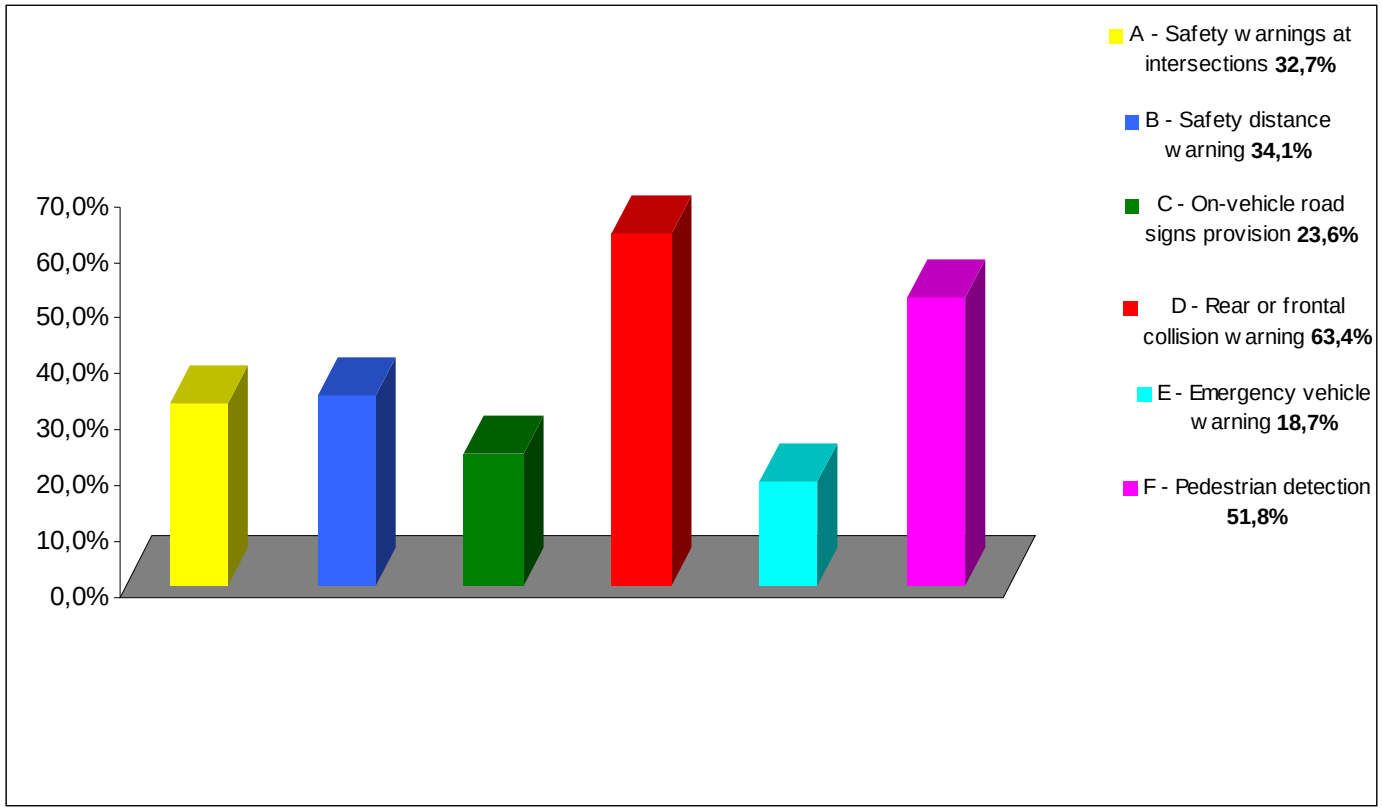


Figure 43: Willingness to pay for each SAFESPOT functions

4.4.1. Ways of payment

About SAFESPOT typologies of payment, four main typologies have been defined: for each of them three possible options have been listed (enclosed in parenthesis). The user could pay:

- when buying a car (Less than 150€, Between 150 and 350€, More than 350€)
- according to the use of SAFESPOT functions (Less than 50 €/10,000km, Between 50 and100 € / 10,000km, More than 100.€/10,000km
- monthly fees (Less than 5€/month, Between 5 and 10 €/month, More than 10 €/month)
- annual fees (Less than 50€/year, Between 50 and100 €/year, More than 100€/year)

As regards to the ways of payment, the respondents (79%) would prefer to get SAFESPOT when they buy a car, not as an extra (optional) with the price included in the overall vehicle's car price (62,4%). If they had to pay to buy the system, most of them (68,1%) would be disposed to pay more then 150 Euro.

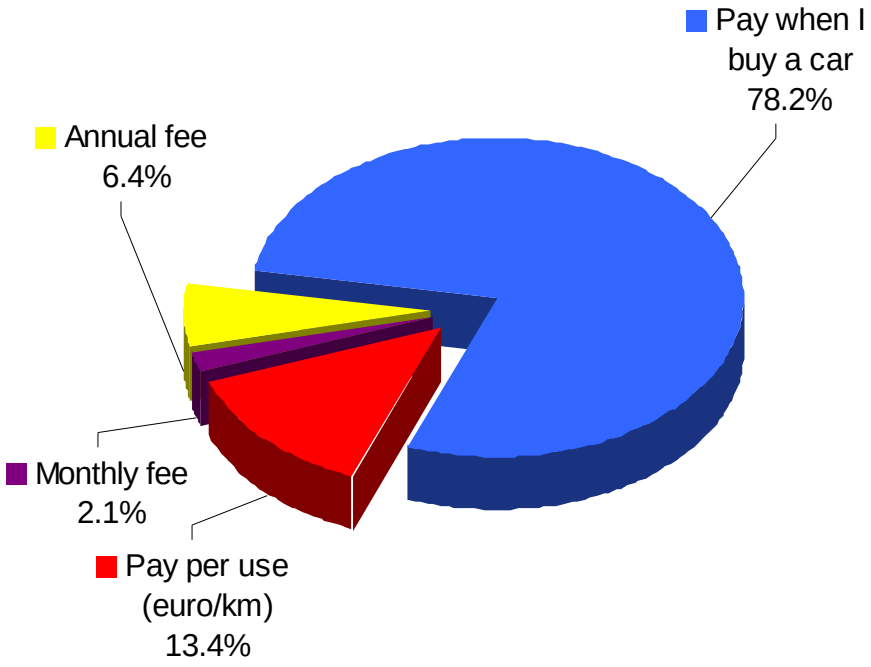


Figure 44 : SAFESPOT ways of payment

Among the ones who selected “Pay when I buy a car”, the majority would pay 150-350 €:

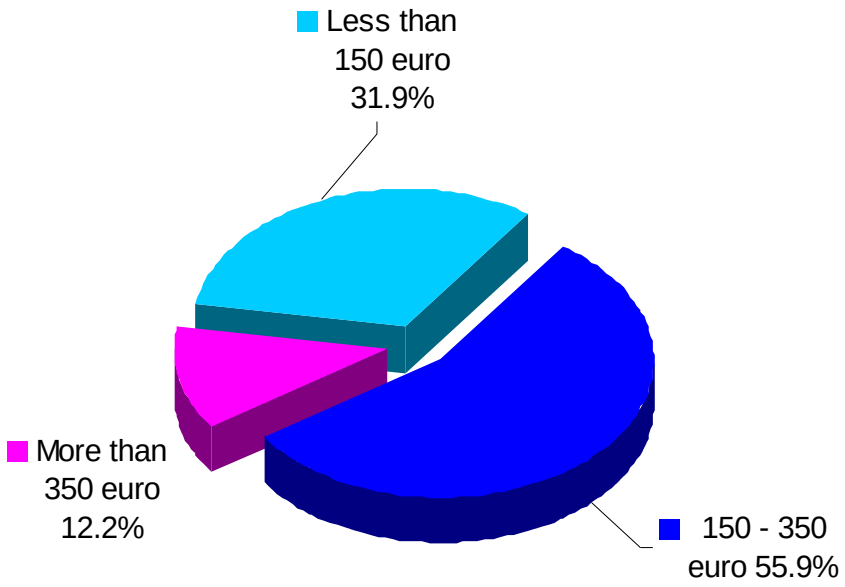


Figure 45: Amount of payment (pay when I buy a car)

As regards to the Pay-per-use modality, the 87% of the respondents[34] who chose this option is willing to spend less than 100 euro/10.000 km (56% is willing to spend 50-100 euro/10.000 km). See Figure 45.

[34] They represent the 22,9% of the respondents

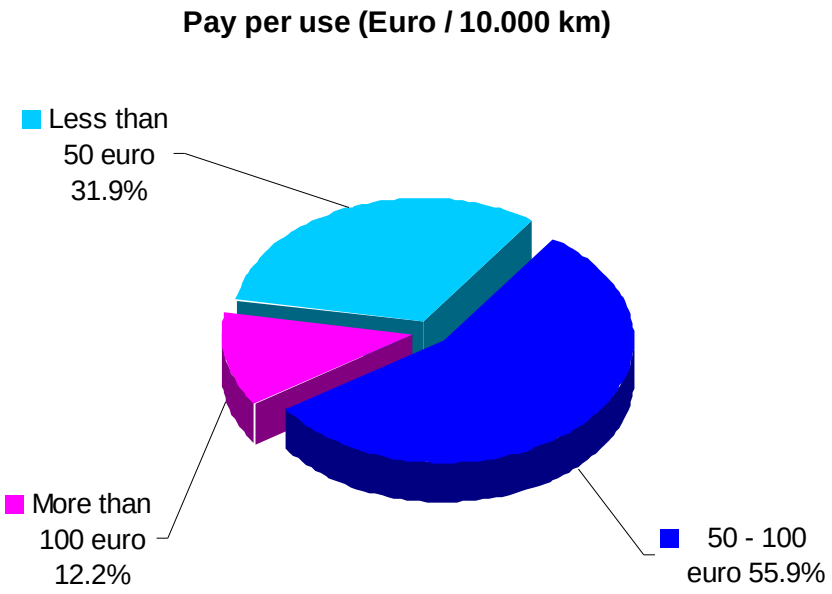


Figure 46: Amount of payment (pay per use)

Among the few people who selected the monthly fee option (37 answers, only the 2.1% of the respondents), the majority would like to pay less then 5 euro/month (56.8%), while the 40.5% would like to spend 5-10 euro/month. See Figure 46.

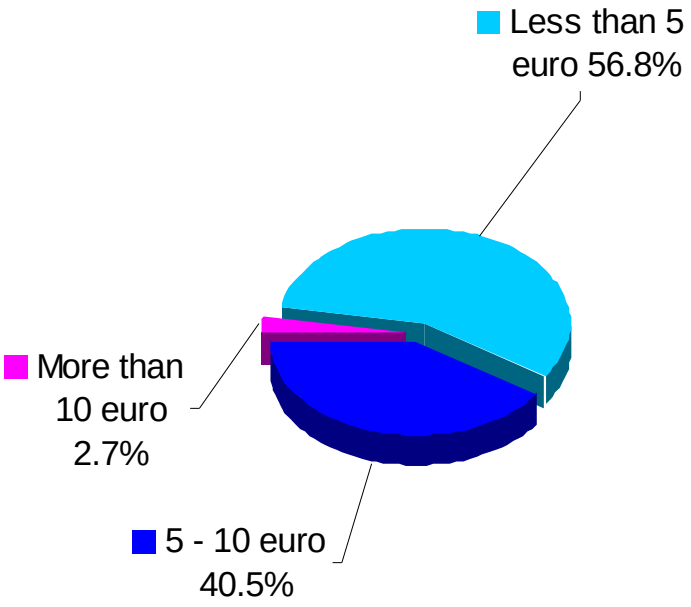


Figure 47: Amount of payment (monthly fee)

About the annual fee (113 answers, the 4.6% of the respondents), the most part would prefer to spend less than 50 euro/year (60.2%), while the 36.3% would like to spend 50-100 euro/year (Figure 47).

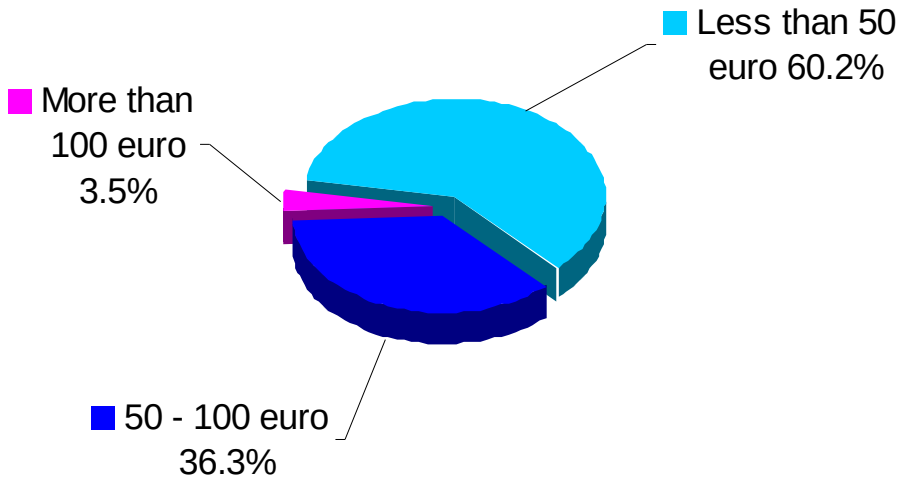


Figure 48: Amount of payment (annual fee)

4.5. ROAD SAFETY

Perceived utility and knowledge of safety functions in Europe

The perceived usefulness (very useful + useful) and awareness about safety functions is very high (Figure 63). The most useful are: Electronic Stability Control (85% of the respondents), Obstacle& Collision Warning (81 %) and Blind Spot Monitoring (79%).

	6 - unknown	1 - very useful	2 - useful	3 - neutral	4 - useless	5 - very useless	useful (1 + 2)	useless (4+5)	**average**
Electronic Stability Control (ESC)	2.7%	53.7%	35.5%	8.1%	1.9%	0.8%	89.2%	2.6%	1.60
Obstacle& Collision Warning	7.3%	44.9%	43.7%	8.8%	2.0%	0.6%	88.6%	2.6%	1.70
Blind spot monitoring	8.1%	38.6%	48.9%	10.4%	1.5%	0.5%	87.6%	2.0%	1.76
Vision enhancement	9.9%	44.8%	42.2%	9.8%	2.5%	0.6%	87.1%	3.2%	1.72
Adaptive Head Lights	8.5%	24.4%	55.8%	16.8%	2.6%	0.3%	80.2%	3.0%	1.99
eCall	8.3%	33.2%	42.5%	17.2%	5.3%	1.8%	75.7%	7.0%	2.00
RTTI	3.8%	27.4%	45.3%	20.2%	5.3%	1.8%	72.7%	7.1%	2.09
Alcohol lock	8.5%	35.4%	27.6%	19.7%	8.2%	9.1%	63.0%	17.2%	2.28
Lane Departure Warning	8.3%	14.0%	45.8%	28.0%	9.3%	2.8%	59.9%	12.1%	2.41
Active Body Control (ABC)	15.2%	16.4%	41.4%	33.8%	6.2%	2.1%	57.8%	8.4%	2.36
Lane Keeping Assistant	12.4%	10.7%	35.2%	36.1%	13.5%	4.5%	45.9%	18.0%	2.66
									2.05

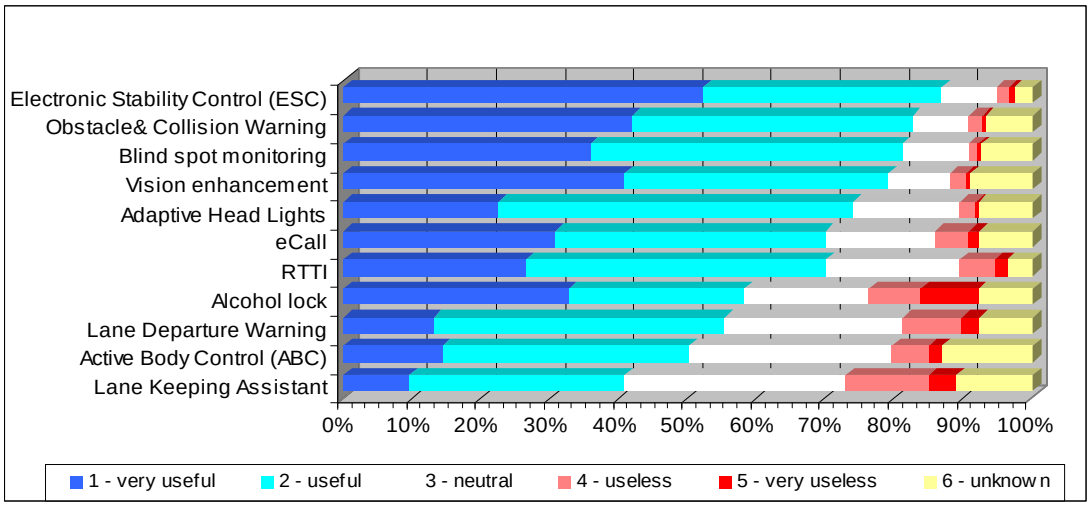


Figure 49: Knowledge and perceived usefulness of safety functions

4.5.1. Additional functions

Beyond the safety applications, the most cited additional functions (68.1%) that the user would like to have onboard is Traffic Information (Figure 49).

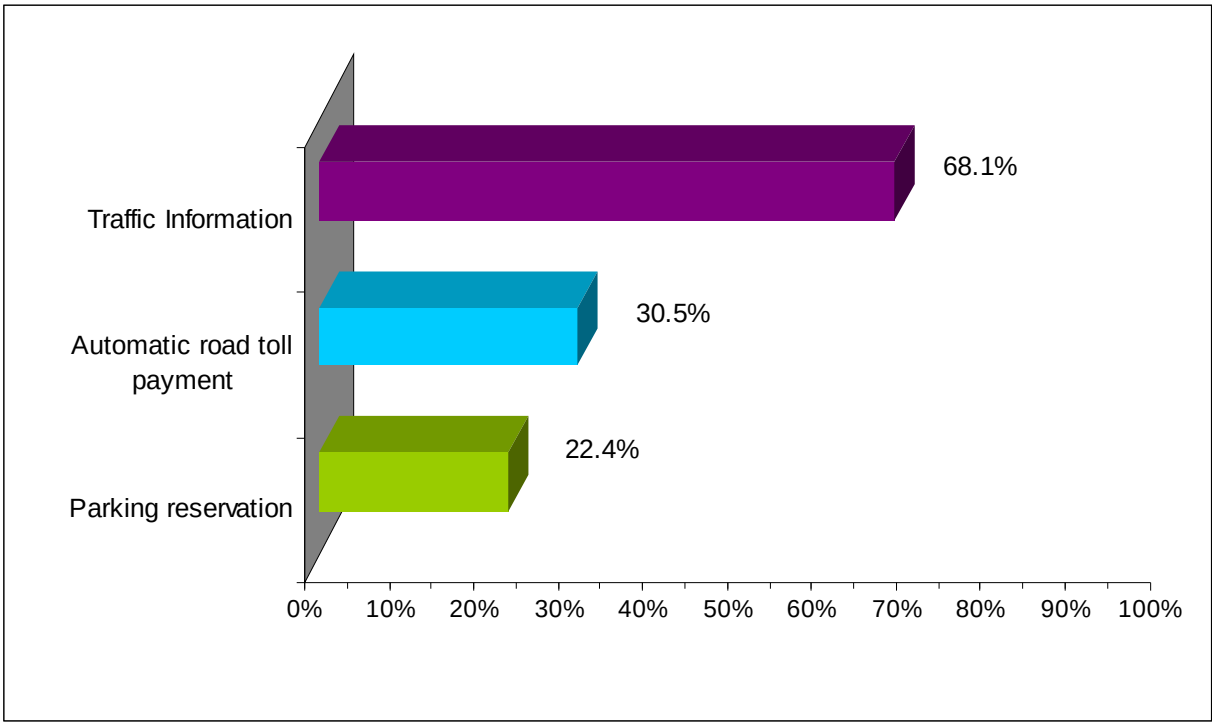


Figure 50: Additional functions

4.5.2. Possible ways of improving road safety

We asked the respondents which is the best way to improve road safety. The respondents show a quite similar distribution for the three options: improving the driver's education (55,5% of the respondents) and road infrastructure (47%) together with to introduce on-vehicle functions to help the driver to prevent accidents (46,8%) (Figure 50). The adoption of enforcement measures was the less preferred option.

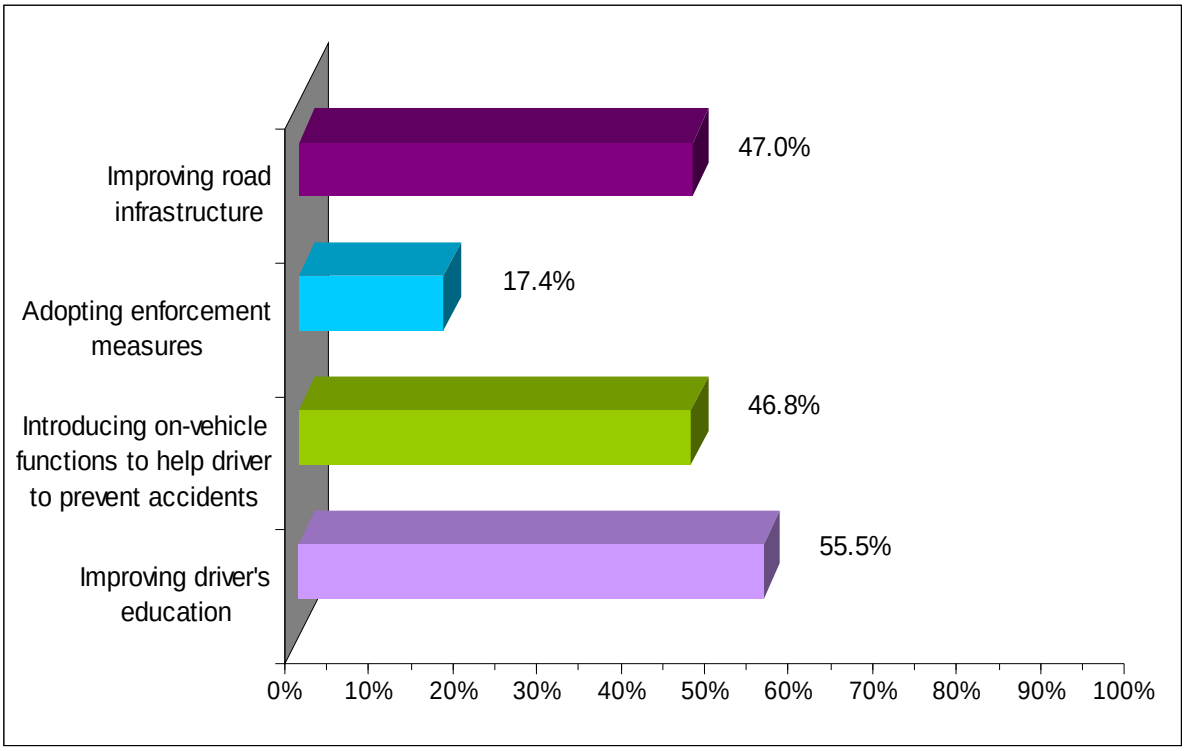


Figure 51: The best way of improving road safety (European Level)

The respondents were also asked how they would prefer to be informed about new on-vehicle safety functions and by whom. The charts represent, per each category, the distribution of the answers on the different degree of preferences. The preferences about the way to be informed are listed below (Figure 51)

1. TV
2. Internet
3. Newspaper
4. Campaign
5. Magazines
6. Radio

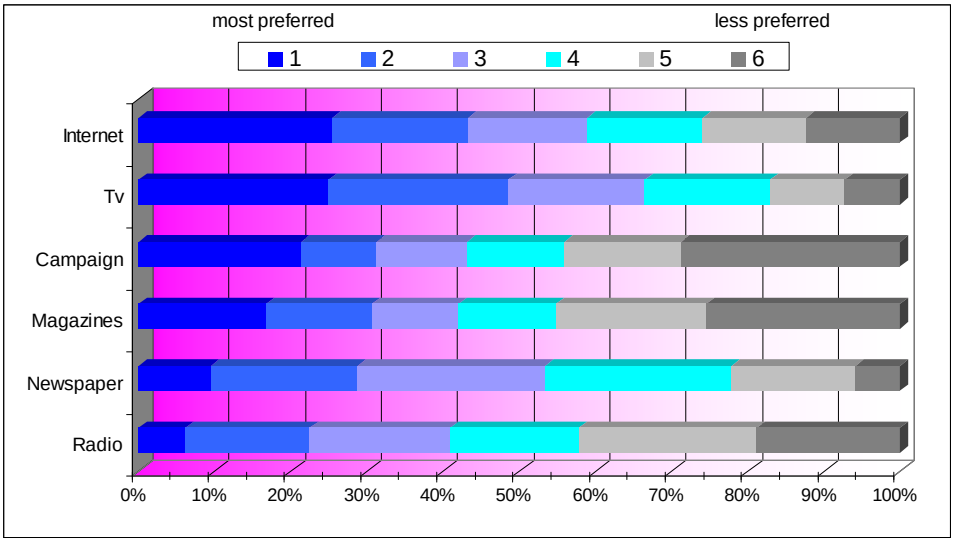


Figure 52: Favourite Channels to inform about new on-vehicle safety functions

As regards who should provide these information, like above, the most cited are (Figure 52):

1. Government
2. Car Dealer
3. Automobile Clubs
4. Garages
5. Technical Vehicles Inspection Workshop

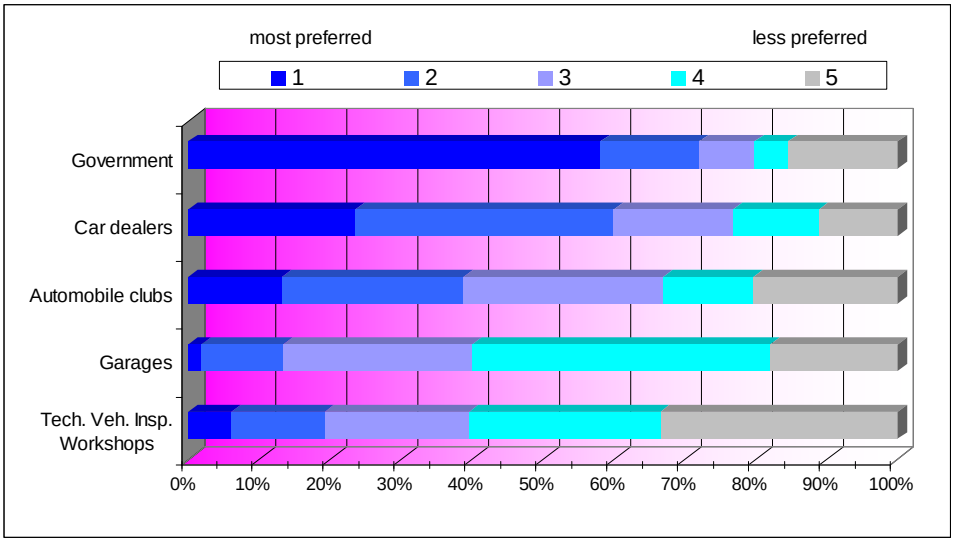


Figure 53: .Who should inform about new on-vehicle safety functions

4.5.3. Perceived utility of safety functions per type of road

The respondents were asked how they perceived the usefulness of a number of safety functions in relation with the different road typologies.

- The “Imminent crash” and the “Reduced visibility” are the functions that users consider very important independently from the type of road.
- For some other functions there is a clear distinction between motorways and urban roads.
- The first 6 functions are considered very important (from 60 to 70% about) on motorways.
- The last three are considered very important on urban roads, as well as the “Imminent crash”.

	Motorway	Inter-urban roads	Roads with bends	Urban roads
Imminent crash	68.8%	58.8%	47.1%	47.6%
Lane Keeping	64.3%	31.6%	17.6%	13.9%
Regulating speed	63.7%	31.3%	14.7%	25.7%
Lane changing	63.1%	26.3%	7.2%	25.2%
Car following	58.7%	27.8%	9.1%	19.8%
Reduced visibility	57.6%	58.6%	56.2%	27.3%
Congestion driving	30.1%	20.7%	5.3%	60.5%
Negotiating non-signalled Intersect.	3.5%	47.1%	23.7%	52.5%
Negotiating signalled Intersect.	3.2%	32.6%	15.2%	57.4%

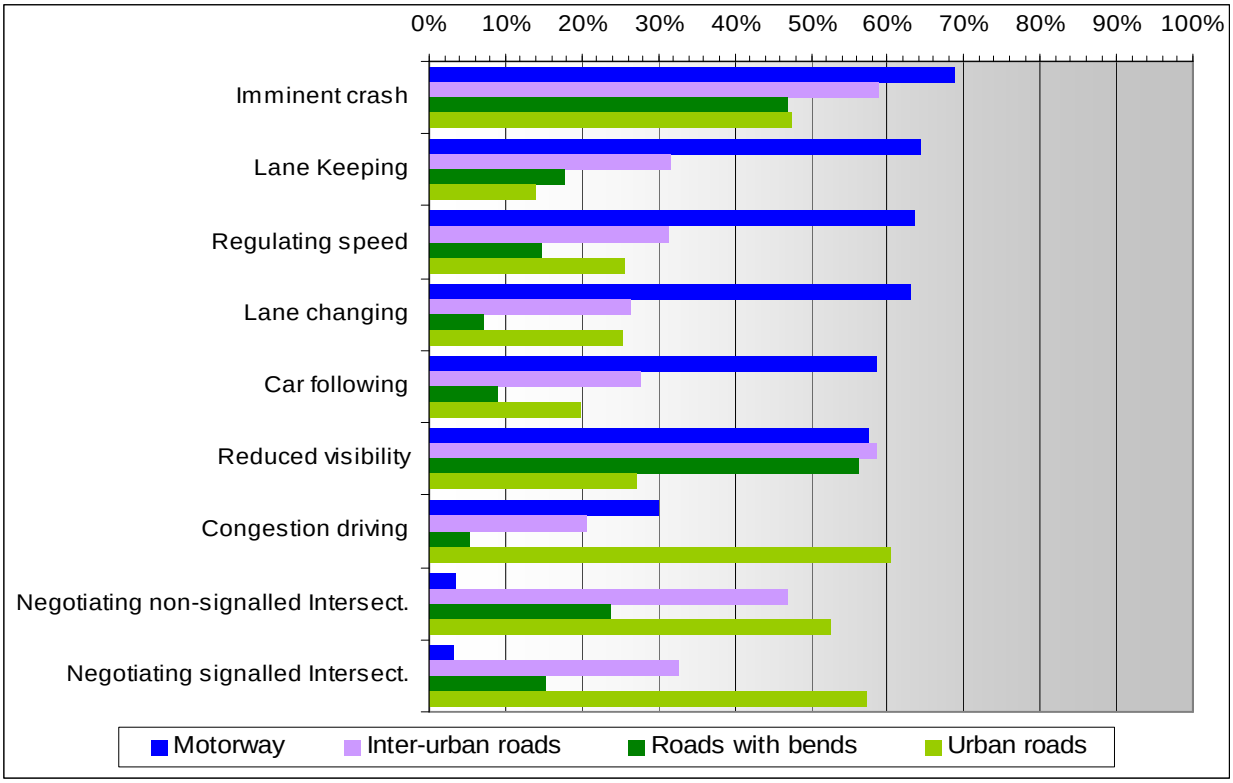


Figure 54: perceived utility of safety functions per type of road

4.6. Conclusions of the User Acceptance

In this section the conclusions of the user acceptance survey are presented and the relevance of the user acceptance for the ranking of the business and service models.

The European target sample used for this ranking exercise was composed by 1825 respondents from different European countries. From the beginning the sample was addressed to make estimation on the average of population without specific classification of the repliers. For this reason the sample was kept undifferentiated in order to collect information that should represent a preliminary indication of “how the average population would be oriented towards the novelty brought by the SAFESPOT applications”. Several analyses in order to verify the significance of the sample have been made. As a conclusion, it is confirmed that the hypothesis of undifferentiated sample is correct, also in respect to the professional categories.

4.6.1. Conclusion of the user acceptance survey

The evaluation made by potential European users regarding SAFESPOT applications is quite positive.

- The most popular SAFESPOT functions are Rear of frontal collision warning (92%)[35] and Pedestrian detection. On-vehicle road signs provision is the less preferred function. However, for all the functions the score is in the usefulness area.
- The majority of them think that the installation of Rear of frontal collision warning and Pedestrian detection should be mandatory, that is coherent with the preferences stated for their usefulness.
- The Rear or frontal collision is considered as the most “worth to pay” function all over Europe. Pedestrian detection is the second “worth to pay” function indicated overall the EU countries.
- As regards to the ways of payment, the majority of respondents expressed a clear preference to get SAFESPOT when they buy a car, with the price included in the overall vehicle’s price. If they had to pay to buy the system, most of them would be disposed to pay more than 150 Euro. Among the ones who selected “Pay when I buy a car”, the majority would pay 150 - 350 €.
  As regards to the Pay-per-use modality, the respondents are willing to spend less than 100 euro/10.000 km. About the annual fee, the majority would prefer to spend less than 50 euro/year, while the 36.3% would like to spend 50-100 euro/year. Among the few people who selected the monthly fee option the majority would like to spend less then 5 euro/month.
- Beyond the safety applications, the most cited additional functions that the users would like to have on board is Traffic Information.

[35] (very useful + useful)

- About the best way to improve road safety there is a quite similar distribution for the three options: improving driver's education and road infrastructure together with the introduction of on-vehicle functions to help the driver to prevent accidents. The adoption of enforcement measures was the less preferred option.
- The respondents said they would prefer to be informed about new on-vehicle safety functions thought TV, internet and newspapers channels by Government, Car dealers and automobile clubs.
- Generally there is a relation among the Km driven in the last year and the driving experience and the level of utility attribute to the SAFESPOT functions.

4.6.2. Relevance of the User Acceptance Survey for next steps, the Multi Criteria Analysis (MCA)

Different aspects are relevant for the evaluation of the different B&SM solutions. These aspects will be used in the ranking of the different B&SM solutions.

The main aspects analysed in the survey are: the most attractive types of cooperative functions, the preferred added (i.e. extra_SAFESPOT) services, the preferred mode of payment.

Regarding the **preferred functions** (among the following categories: Rear or frontal collision warning, Pedestrian detection, Safety distance warning, Safety warnings at intersections, Emergency vehicle warning, On-vehicle road signs provision): the most popular SAFESPOT functions are Rear or frontal collision warning and Pedestrian detection; on-vehicle road signs provision is the less preferred function, however, for all the functions the score is in the usefulness area.

Regarding the **preferred extra-SAFESPOT services**, beyond the safety applications, the most cited additional function that the users would like to have on board is Traffic Information.

Regarding the **preferred mode of payment:** the majority of respondents expressed a clear preference to get SAFESPOT when they buy a car, with the price included in the overall vehicle's price. If they had to pay to buy the system, most of them would be disposed to pay 150 - 350 €. As regards to the Pay-per-use modality, the respondents are willing to spend less than 100 €/10.000 km or 5€/month. In the option of an annual fee, the majority would be willing to spend less than 50 €/year, while more than one third of respondents would spend 50-100 euro/year.

These three aspects form the major input for the criteria to differentiate the various B&SM solutions needed for the ranking, to be performed in task 6.6.3.

5. Main International Cooperative Systems

In this chapter the most interesting aspects of related activities in US and in Japan have been summarised, after a research and analysis of several documents[36] of the principal international meetings and forums in this field. The Japanese “SmartWay Project” and the American “MVII (Mobility Applications for Vehicle-Infrastructure Integration)” have been identified as the most relevant initiatives that are related to SAFESPOT activites.

The following two extra-European projects have been chosen, as they work in a similar technological area as SAFESPOT, even if in different geographic and socio-economic scenarios.

The information that has been found are about:

- Which other cooperative systems exist?
- How is SAFESPOT different from these systems?
- Which are the strenghts and the weakness of the SAFESPOT system?
- What kind of appeal will have SAFESPOT?

All the information that has been found, will be analyzed inside BLADE Wp6.5 in order to answer the questions highlighted above.

As explained in Chapter 1.3, about the description of the work organization between BLADE Wp6.5 (Assessment & Evaluation) and Wp6.6 (Business Models), this first outcomes of Wp6.6.1. will be the input data of Wp6.5, for further analysis.

USA and Japan started to study and experiment cooperative systems before 2000 and they are now close to large scale experimentations of some specific applications .

In Europe preventive safety based on autonomous vehicles was assessed by several research project and in particular the large IP PReVENT, which also started to analyze V2I and V2V in some specific Subproject as Willwarn and InterSafe.

SAFESPOT then started in 2006 as a major initiative with the objective to analyze a wider spread of applications and into the 7th Framework Program many other initiatives started or are foreseen.

The i2010 Intelligent Car Initiative is a framework of actions finalized to support the future exploitations of preventive and cooperative SAFETY.

[36] They have been listed in Chapter 7.6

5.1. JAPAN: THE SMARTWAY PROJECT

Smartway in Japan is being promoted as part of the effort to realize the world's safest road traffic society. Following VICS and ETC, which are already operational, a large-scaled experiment using public roads was launched from May 2007, aiming to put ITS emerging services into action.

The Smartway Project is designed to provide an opportunity to experience the leading edge technology of Japan in vehicle components and infrastructure systems. The main goals of the project, that is developed by both private and public organizations, are: reversing the negative legacy of motorization, ensuring mobility for the elderly, developing affluent communities and lifestyles, improving the business climate.

The Japanese Strategy is the Realization of a society with the world's safest road traffic environment. The target is to reduce the number of traffic fatalities (under 5,000 by 2012) and serious injuries by deploying Cooperative Driving Safety Support Systems.
The main milestones will be the following:

- A joint committee from the public and private sectors has been defined in early 2006 to work towards the realization of Cooperative Driving Safety Support Systems.
- To Conduct a large-scale verification test on the selected regional public roads by 2008.
- To deploy Cooperative Driving Safety Support Systems and to promote the widespread use of on board equipment by 2010.
- To develop the technologies necessary for interactive communications systems for pedestrians, roads, and vehicles by 2010 that will contribute to reductions the number of fatalities.
- The ITS services previewed are: information provision along roadways, information connection at the rest area, public parking lot settlement.

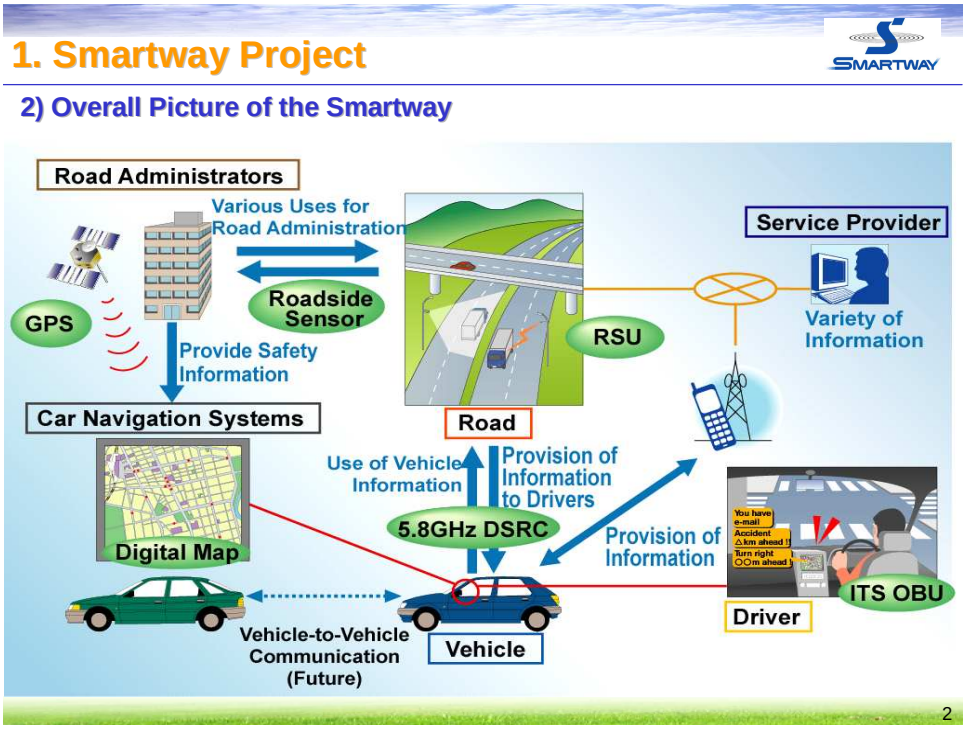


Figure 55: Smartway cooperative project

Source: Hiroshi Makino' Presentation, National Institute for Land and Infrastructure Management, Japan, al 12th ITS World Congress , San Francsco (U.s.a.), 30th November 2005

5.2. USA: MVII (Mobility Applications for Vehicle-Infrastructure Integration)

The VII Initiative[37] (a 6 year project, from 2003 to 2008). It is a cooperative effort between Federal and State departments of transportation (DOTs) and vehicle manufacturers to evaluate the technical, economic and social/political feasibility of deploying a communication system to be used primarily for improving the safety and efficiency of the nation's road transportation system.

This communication system may also be used for other applications up to the extent to which they do not interfere with the primary purpose of enhancing transportation safety and mobility.

The primary benefit of VII deployment would be roadway safety. There are also expected to be significant benefits to operations and maintenance of the transportation network due to the real-time performance feedback that the VII deployment is expected to provide. In addition, other commercial and business applications may be enabled by a high bandwidth data connection between vehicles and the infrastructure. At this time the U.S. DOT, the American Association of State Highway and Transportation Officials (AASHTO) and several state DOTs, along with most major automobile manufacturers, are involved in discussions on the VII Initiative. This group comprises the VII Coalition.

Others important “ongoing” activities in the USA are the following:

1. CAMP

A 3 year project (from December 2006 to November 2009).The main objectives are the following:

- to assess how previously identified critical safety scenarios in autonomous systems could be addressed and improved by DSRC+Positioning systems.
- to define set of DSRC+Positioning based vehicle safety applications and application specifications including minimum system performance requirements.
- to develop a selected set of communication-based vehicle safety systems.
- to develop scalable, common vehicle safety communication architecture, protocols and messaging framework (interfaces) necessary to achieve interoperability and cohesiveness among different vehicle manufacturers. Standardize this messaging framework and the communication protocols (including message sets) to facilitate future deployment.
- to develop accurate and affordable vehicle positioning technology needed, in conjunction with the 5.9 GHz DSRC, to support most of the safety applications with high potential benefits.

[37] The National VII Initiative was established in 2004 to determine if the investment necessary to equip new vehicles and the roadway infrastructure with communications is warranted and can be synchronized

CICAS-V

A 4 year project (from May 2006 to May 2010). The main objective is to develop Cooperative Intersection Collision Avoidance Systems that:

- Prevent crashes between vehicles due to violations of traffic signals
- Prevent crashes between vehicles due to violations of stop signs

The application of this project is quite close to the so-called IRIS SAFESPOT application.

5.3. Conclusions of Main International Cooperative Systems

These two projects have been presented to understand their visions, their deployment scenarios and their main application areas.

As an important note is that it should be underlined that both SAFESPOT and the above described systems need a dedicated spectrum band allocation in the 5.8-5.9 GHz. Range.

For different reasons (pre-existing allocations) USA, JAPAN and Europe are obliged to use different bands.

Moreover, currently USA and Europe rely on the 802.11p standard (under finalization) which is a flexible solution for V2V and V2I. Japan Relies on existing DSRC usable only for V2I communications. Also Japan is going to switch in a second step to 802.11p.

This is a crucial point from the economical viewpoint as the technological solutions and components cannot be the same in Europe, US and Japan. Although a direct compatibility between USA, Japan and Europe will not be possible, the underlying communication technology will be the same and the cumulative volumes will provide a large semiconductor market for 802,11p and a consequent dramatic cost reduction. For the MVII project the following scenarios have been foreseen:

- MVII will be first deployed in production vehicles and on the roadside in 2011.
- By 2015, Road Side Units (RSUs) will be placed at key intersections for collision avoidance and on selected major freeways for safety and traffic management applications.
- The VII deployment supports safety-related collision avoidance at intersections; additionally, an array of early-winner mobility applications such as improved traveller information will be deployed.
- At this point, starting from an initial deployment in 2011, between 10% and 30% of all vehicles on the roadway will be VII-equipped and much of the freeway and arterial network will have RSUs at key points. By key points, it is meant that interstate ramps and many arterial intersections will be equipped.

We noticed that MVII will be deployed:

- First for safety (2011)
- Secondly to improve mobility (2015).

The main MVII applications are:

- Signal Violation Warning
- Stop Sign Violation Warning
- Curve Speed Warning
- Electronic Brake Lights
- Advance Warning Information to Vehicles
- In Vehicle Signing
- Probe Based Mapping
- Ramp Metering
- Signal Timing & Adjust
- Corridor Management
- Traveler Information
- Electronic Payment
- Localized Weather/Road Condition Warning
- Winter Maintenance

The MLIT[38] approach relies on 5.8 GHz DSRC.
This DSRC system has a high level of security to support safety and payment services, and will be high-speed and reliable. Because DSRC is already used for electronic toll collection, in-vehicle deployment will be quite rapid.

Its main applications area are:

Information provision services along roadways

- Information by static image
- Collection of probe data
- Providing traffic information on greater numbers of routes

Information connection services at rest areas

- Road traffic information
- Road surface conditions
- Local news

Public parking lot payment settlement services

[38] The Japanese Ministry of Land, Infrastructure, and Transport

6. Conclusions

This deliverable indicates the most suitable Business and Service Models that should be taken into account for the SAFESPOT system deployment.

In particular, for each of them, the following issues have been defined:

- The main actors and stakeholders involved and their relationships
- The relevant Business and Service Model aspects in both the “End User” and the “Stakeholder” point of view.

Ten products–clients-service scenarios have been defined, based on different technical configurations (V2V and V2I), ways of payment (direct and indirect) and commercial/marketing (“base /final system ready to use” and “plus/final system with the integration of further applications”) configurations.

In particular, this study has shown that:

- As regards how to finance SAFESPOT system introduction, the use of tax money/ governmental subsides together with own profit/loss responsibility seems to be the preferable solution.
- For the system diffusion, it would preferable to follow a double approach, which sums the intervention of the government to a market driven solution.
- The Insurance premium reduction would be a good incentive for SAFESPOT potential users.
- Combining vehicle to vehicle and vehicle to infrastructure configuration and introducing additional functions like traffic information, automatic road toll payment and parking reservation, could help the SAFESPOT system diffusion.
- Concerning the target market, the best solution would be to start equipping not only luxury vehicles but also intermediate vehicles. From the road infrastructure point of view the optimal solution would be to start equipping the most dangerous road segments. All this because cooperative systems for road safety can really enter into the market when their benefits is perceived by the community of users. Particularly, it will be important to select the applications that will firstly enter the market: as indicated by the results of the user questionnaire, there are some preferred applications the users would like to have on their cars. The most popular SAFESPOT functions are Rear Of Frontal Collision Warning and Pedestrian Detection.
- SAFESPOT implementation on road infrastructures should enable to equip different road typologies. In an earlier phase, motorways and interurban roads are the typologies on which the system installation could be more urgent. Also the urban roads are indicated as relevant for this purpose, due to the massive presence of vulnerable road users.
- About the ways of payment, the majority of respondents would prefer to get SAFESPOT when they buy a car, with the price included in the overall vehicle’s car price. If they have to pay for the system, most of them would be disposed to pay more than 150 Euro.

- People would prefer to be informed about SAFESPOT through TV, internet and newspapers channels by Government, Car dealers and Automobile Clubs.

The results obtained are going to be the starting point for the following BLADE Wps.

The next two steps are:

1. For each Business and Service Model, a first[39] preliminary ranking will be defined.
In addition, the following activities will be done:
- Analysis of the user position, based on user acceptance analysis (BLADE Wp 6.1) and market assessment (BLADE Wp6.5).
- Analysis of the potential business drivers of each Business and Service Model, taking into account the role of all actors and stakeholders, both private and public ones.
- Alternative government intervention strategies together with their expected impact on the possible Business and Service Models.

These phases are planned from M27 to M34, as the final market assessments, necessary to define them, have been scheduled for M34 (figure 12).

2. For each Business and Service Model a final ranking[40] will be defined based on market, socio-economic, cost and financial assessments.

[39] from MM27 to MM34)
[40] from MM35 to MM37

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8. ANNEXES

8.1. Annex 1: The Preliminary Business and Service Models

8.1.1. The Expert Questionnaire

Introduction

SAFESPOT \ BLADE\ Business Models (WP 6)

The SAFESPOT Project results allow cars communicate with each other and with the nearby roadside infrastructure, building a network that will increase road safety.

The business for traffic safety is a complex issue, many parties are involved and there are still a lot of questions to be answered. The BLADE team focuses on a deployment plan addressing risks, mitigation strategies and organisational, business and legal aspects,

The main objectives of WP 6 are:

- Define possible service and business models for SAFESPOT architecture;
- Provide indications about alternative business models to be addressed in the deployment programme and action plan

Questionnaire

This document contains a questionnaire that will be used as a starting point for the analysis of the SAFESPOT business case. Now we have reached a certain level of understanding of the functionality of the SAFESPOT concept your expert vision is needed to extract useful elements for the Blade work on business models. Your vision will help us to validate the initial Blade WP6 hypothesis.

All SP leaders are kindly requested to e-mail their response to Blade WP6 team:
Han.Zwijnenberg@tno.nl
Michele.francano@crf.it
Cristina.Levizzani@tirocinanti.crf.it

Also in case of questions, please don't hesitate to contact us.

Applications of the SAFESPOT concept

The Safety Margin Assistant (SMA) coordinates the functional tasks of SP4 / SP5 applications. The following list contains the applications that are taken into account in the scope of this survey.
For further details you can see the deliverables concerning Wp3 and Wp4, contained in Sp4 and Sp5.

SP4 (V2V based) applications

10 applications are planned, divided in 4 clusters:

1. Lateral collision
    - Road intersection safety
    - Lane change manoeuvre
    - Safe overtaking
2. Longitudinal collision
    - Head on collision warning
    - Rear end collision
    - Speed limitation and safety distance
    - Frontal collision warning
3. Road departure
    - Road condition status ; slippery roads
    - Curve warning
4. Vulnerable road users
    - Vulnerable road users detection and accident avoidance

SP5 (V2I based) applications

5 application are planned:

1. Speed Alert
    - Critical speed warning (legal) (pollution, weather, traffic)
    - Critical speed warning (dynamic)
    - Dynamic speed alert to all vehicles
2. Road Departure Prevention
    - Road departure warning
3. Safety Margin for Assistance and Emergency Vehicles
    - Safety margin for assistance vehicle signalling a critical event.
    - Safety margin for emergency vehicle crossing an intersection
4. Co-operative Intersection Collision Prevention System
    - Basic Application (Driver awareness)
    - Support of Emergency Vehicles
    - Surveillance of Uncontrolled Close-by Intersection
5. Hazard and Incident Warning
    - Static obstacles
    - Reduced friction, visibility or traffic conditions
    - Moving obstacle
    - Wrong way driving.

Survey

BUSINESS AND SERVICE MODELS
1.Which are the most feasible Business/Service Model hypothesis for a Cooperative System like SAFESPOT, among the ones indicated below?

Please select your preference for the following hypothesis[41]. *(The distinction between Business and Service Model is based on the way of payment: indirect payment in a Business Model, direct payment in a Service Model)*
BUSINESS MODELS *(the user pays a shadow-toll[42])* 1.1 Selling of final system ready to use 1.2 Selling of final system with integration of further applications 1.3 Are there any others? Please list them
SERVICE MODELS *(the user pays a direct toll[43], through several possible modalities: bank charge, smart card, etc.)* 1.4 Selling of final system ready to use 1.5 Selling of final system with integration of further applications 1.6 Are there any others? Please list them

[41] All the hypothesis refer both to V2V and V2I scenarios
[42] The term "shadow tolling" is used as there are no visible toll booths and the users do not actually pay charges to the operators.
[43] The price schemes will be based on different criteria/ parameters:
- distance covered (km)
- time slot
- annual fee
- type of vehicle
- …

BUSINESS CASE ELEMENTS
2.1 Please describe the potential charging model:
2.2 Who is going to pay for the service? (user, car owner, government, infra operator, car manufacturer, car seller, service provider, insurance company, car lease company/fleetowner, other). Please list here: 2.3 How? • Membership fees • Tax Money/Governmental subsidies • Fund raising • Sponsorships • Own Profit/Loss responsibility • Others

INTEGRATION OF FUNCTIONALITIES
3.In the Business Models hypothesis n.**1.2** and Service Model n.**1.5** SAFESPOT could be integrated with other functions/services (safety, infomobility, localization, tracking, etc.). Which functions, in your opinion, could be integrated/added? Please list them

BENCHMARKING
4. Which are SAFESPOT real competitors? 4.1 Cooperative systems developed in Japan and USA? 4.2 Alternative scenarios: ADAS (Advanced driver assistance Systems), other devices. Are there alternative ways to satisfy the same need/ reach the same objectives? 4.3 Other? Please list them 4.4 There isn't any real competitor.

USER ACCEPTANCE
5. As SAFESPOT is a radical innovation, can we consider reliable data coming from an end-user-survey concerning the appeal of the functions proposed (SMA)?

MAIN BUSINESS/SERVICE MODELS RELATED RISKS
6. What are the most relevant Business/Service Models related threats/opportunities?
HIGH COST OF THE SYSTEM 6.1. The system is too expensive to install/maintain 6.2. Public authorities don't want high investment in the infrastructure 6.3. Other (please list them)
FINANCIAL COMMITMENT 6.4. High complexity of the Business Model 6.5. The lack of financial commitment from stakeholders 6.6. Other (please list them)
COST AND BENEFITS BALANCE 6.7. Unclear allocation of costs and benefits 6.8. Costs higher than benefits 6.9. Problems of benefits perception 6.10.Other (please list them)
ACCEPTANCE 6.11. Lack of user acceptance 6.12. Lack of OEM acceptance 6.13. Lack of public acceptance/commitment 6.14. Other (please list them)
MARKET 6.15. Uncertainty in the demand forecast 6.16. Sales lower than expected 6.17. No or weak marketing campaign and promotion 6.18. Other (please list them)
OTHER CATEGORIES (please list them)
WHAT ARE OPPORTUNITIES? (please list them) e.g. safety, comfort, political, environment, efficiency, other

BUSINESS/SERVICE MODELS VALIDATION
7. What is your opinion on the validation of the Business/service Models?
WHO should we ask? 7.1 Stakeholders (SAFESPOT and WATCH-OVER User- forum Workshop in Stuttgart on November 2007)? 7.2 the participants to the Test Sites 7.3 the SP leaders 7.4 all SF partners 7.5 Others (please list them)
HOW should we organise this validation? 7.6 Using a Questionnaire 7.7 Using a Workshop 7.8 Using Other (please list them).

ADDITIONAL COMMENTS
8.

8.1.2. The Results

Table 9: Summary of Questionnaire results

Question	Response
1.Which are the most feasible Business/Service Model hypothesis for a Cooperative System like SAFESPOT, among the ones indicated below? Please select your preference for the following hypothesis: 1. **BUSINESS MODELS** *(the user pays a shadow-toll)* • Selling of final system ready to use • Selling of final system with integration of further applications • Are there any others? Please list them 2. **SERVICE MODELS** *(the user pays a direct toll, through several possible modalities: bank charge, smart card, etc.)* • Selling of final system ready to use • Selling of final system with integration of further applications • Are there any others? Please list them ***(The distinction between Business and Service Model is based on the way of payment: indirect payment in a Business Model, direct payment in a Service Model.*** ***Please notice the following:*** • ***All the hypothesis refer both to V2V and V2I scenarios*** ***The term "shadow tolling" is used as there are no visible toll booths and the users do not actually pay charges to the operators.***	**Business Models** • 1 x Selling of final system ready to use • 3 x Selling of final system with integration of further applications • 1 x payment by the end user to the service provider, with dynamic navigation, traffic information, etc. **Service Models** • 1 x ..”I do not understand these options, I would expect options in term of services. For safety related information I do not think there should be any charge per message” • 2 x Selling of final system with integration of further applications • 1 x Selling of final system with integration of further applications in addition “…the name of highways with SAFESPOT service should be: “safe high ways” • 1 x Selling of final system with integration of further applications in addition “….the toll collected on toll motorways or infrastructures will serve to finance the road side equipment and central systems (same currently for FM traffic radios, VMS, Internet services, etc.)
2. Please describe the potential charging model.	• 1 x…” of course there are different possibilities and this is exactly what BLADE has to study. I do not think there

	should be a charge for safety information to the end user per message, this should be one time fee…. “

Question	Response
3. Who is going to pay for the service? (user, car owner, government, infra operator, car manufacturer, car seller, service provider, insurance company, car lease company/fleet owner, other). Please list here:	• 1 x User, car manufacturer, insurance company, service provider, car lease company / fleet-owner • 1 x In case of infrastructure platform, government, insurance companies and infrastructure operator • 1x Final user: driver • At the end, the user will pay for the service, through a fee to a service provider and a toll to the infrastructure operator. It is possible (like for traffic information today) that the service provider business model is a BtoB[44] model, the BtoC[45] being carried out by car manufacturers or equipment suppliers (for after market) • 1 x the user is going to pay for the in-car equipment • 1 x the user can receive a discount from the car insurance company • 1 x the road infra provider or government should pay for road-side equipment and operation • 1 x this is based on the fact that information is communicated through ad-hoc networks and DRSC, and for this there are no communication costs. if additional communication infrastructure is needed, e.g. cellular to support a reliable communication, then the costs need to be covered by the road-operator and/or the users
4. How? • Membership fees	• 3 x membership fees • 1 x membership fees…. only a one time payment if the car

[44] Business to Business
[45] Business to Consumer

• Tax Money/Governmental subsidies • Fund raising • Sponsorships • Own Profit/Loss responsibility Others	is purchased • 1 x taxMoney/Governmental subsidies • 1 x taxMoney/Governmental subsidies for local road authorities to finance road side equipment • 1 x taxMoney/Governmental subsidies through road operators; regarding info regarding road works and events could be transmitted • 1 x Fund raising , possibly, through insurance companies, but maybe insurance companies prefer to provide discount to the users • 1 x Sponsorships: • 1 x Sponsorships, as alternative solution for financing road side equipment on rural roads • 1 x Own Profit/Loss responsibility • 1 x Others, gate tolling •
Question	**Response**
5. In the Business Models hypothesis and Service Model SAFESPOT could be integrated with other functions/services (safety, infomobility, localization, tracking, etc.). Which functions, in your opinion, could be integrated/added? Please list them	• 1 x Localization Tracking Tolling Audio/Video comfort functions • 1 x Infomobility, availability of internet (Wi-fi) connection • 1 x CVIS for traffic efficiency and remote management of the applications, including map upgrade • 1 x Dynamic navigation; real time traffic navigation; info mobility, multi modal information; car sharing, park and drive service; localization and tracking; freight and fleet management; dangerous goods monitoring • 1 x Traffic information (congestion, road works, events, detours) • 1 x Parking information and guidance • 1 x Remote diagnostics

Question	Response
6. Which are SAFESPOT real competitors? • Cooperative systems developed in Japan and USA? • Alternative scenarios: ADAS (Advanced driver assistance Systems), other devices. Are there alternative ways to satisfy the same need/ reach the same objectives? • Other? Please list them • There isn't any real competitor.	• 3 x Cooperative systems developed in Japan and USA • 1 x ADAS • 2 x ADAS aren't competitors of a cooperative system • 1 x "I would say the real danger is that there will be different suppliers with incompatible systems or maybe a dominant party with its own solution (e.g. a TomTom safety module). • 1 x A competitor to SAFESPOT are possibly also other traffic safety measures taken, such as special driving license for young people, strict enforcement of drunk driving or road infrastructure improvements • 1 x There isn't any real competitor. for some of the (innovative) services offered, there isn't any real competitor
7. 7. As SAFESPOT is a radical innovation, can we consider reliable data coming from an end-user-survey concerning the appeal of the functions proposed (SMA)?	• 1 x The results of end user surveys should be handled with caution. The end user decides on a limited view. He/she doesn't have a full overview on the scope of the safety impact of such systems. Therefore expert judgements should be included. • 1 x For end users the responses are not likely to be reliable without the possibility of trying the systems first, as they will be based on pre-conceptions • 1 x This point should be deeply analyzed. I would in general tend to say "NO", but it really depends on the way questions are made and the specific information that should be recovered from much survey. • 1 x It is essential that the information is reliable: otherwise, drivers will not use SAFESPOT systems. Although, some information delivered may be confidential (i.e. not validated

	by staff on site) like today with traffic information. • 1 x Yes, but this depends on how the survey is done. It will be difficult for people to understand the systems, unless they are able to use it. But you can ask people in a reliable way what kind of problems they experience.
Question	**Response**
8. What are the most relevant Business/Service Models related threats/opportunities? • **HIGH COST OF THE SYSTEM** 6.1. The system is too expensive to install/maintain 6.2. Public authorities don't want high investment in the infrastructure 6.3. Other (please list them) • **FINANCIAL COMMITMENT** 6.4. High complexity of the Business Model 6.5. The lack of financial commitment from stakeholders 6.6. Other (please list them) • **COST AND BENEFITS BALANCE** 6.7. Unclear allocation of costs and benefits 6.8. Costs higher than benefits 6.9. Problems of benefits perception 6.10.Other (please list them) • **ACCEPTANCE** 6.11. Lack of user acceptance 6.12. Lack of OEM acceptance 6.13. Lack of public acceptance/commitment 6.14. Other (please list them)	**The most cited risks are:** • 6.1., The system is too expensive to install/maintain • 6.5., The lack of financial commitment from stakeholders • 6.9., Problems of benefits perception • 6.11., Lack of user acceptance • 6.12**.,** Lack of OEM acceptance **The most cited opportunities are**: • Safety

• **MARKET** 6.15. Uncertainty in the demand forecast 6.16. Sales lower than expected 6.17. No or weak marketing campaign and promotion 6.18. Other (please list them) **OTHER CATEGORIES** (please list them) **WHAT ARE OPPORTUNITIES?** (please list them) e.g. safety, comfort, political, environment, efficiency, other	
Question	**Response**
9. What is your opinion on the validation of the Business/service Models? **WHO should we ask?** 7.1 Stakeholders (SAFESPOT and WATCH-OVER User- forum Workshop in Stuttgart on November 2007)? 7.2 the participants to the Test Sites 7.3 the SP leaders 7.4 all SF partners 7.5 Others (please list them) **HOW should we organize this validation?** 7.6 Using a Questionnaire 7.7 Using a Workshop 7.8 Using Other (please list them).	**WHO should we ask?** • 5 x Stakeholders • 3 x Participants to the Test Sites • 1x the SP leaders • 1x Sp6 people **HOW should we organize this validation?** • 4 x Using a Questionnaire • 4 x Using a Workshop

8.2. Annex2: The User Acceptance Analysis

The User Questionnaire

INTRODUCTION

The growing mobility of people and goods has a very high societal cost in terms of traffic congestion, fatalities and injured people every year.

SAFESPOT is a research project co-funded by the European Commission, developing functions to be installed on vehicles and also on the road infrastructure. Such functions called "cooperative functions" or "cooperative systems", will help to prevent road accidents using sensors and radio communication to detect potentially dangerous situations and to inform drivers as early as possible.

We should like to ask *drivers like you, who will one day be offered the possibility of having SAFESPOT cooperative functions installed on your car,* to kindly respond to the questions. Please note that there are no right or wrong answers, it is your opinion that counts. This questionnaire is anonymous; all information you provide is absolutely confidential. It will be used for statistical purposes only, and not be traceable to a single person.
We wish to thank you in advance for taking the time to fill in this questionnaire.

A. EVALUATION OF SAFESPOT SAFETY FUNCTIONS

SAFESPOT functions are based on radio communication between neighbouring vehicles, and also between vehicles and the infrastructure. Safety-relevant information is provided to the driver in different ways: as icons or text messages visualized on an on-board display, acoustics warning or spoken messages, as well as signals given by roadside devices.

A.1 Please indicate your assessment of the safety functions described above:

(For each function put a cross in the column corresponding to your assessment of its usefulness – from 1 to 6 (1 indicates extremely useful, 6 the least useful).

Function	1	2	3	4	5	6
A Safety warnings at intersections When you approach an intersection, this function will warn you of approaching vehicles whose trajectories intersect with yours.						
B Safety distance warning This function will warn you if you are driving too close to the vehicle in front to be able to stop safely if it should suddenly brake hard.						
C On-vehicle road signs provision This function is able to provide safety information normally contained in road sign. The function could include Speed Alert, Hazard (potentially also accident warnings) that could be hidden from your view due to poor visibility conditions (rain, fog, behind a bend, etc.)						
D Rear or frontal collision warning This function warns you about the presence of an obstacle on the road ahead which is hidden from your view (for example behind a bend, or invisible due to foggy conditions).						
E Emergency vehicle warning This function provides on an onboard display a visual warning of the presence of an emergency vehicle, and also the direction in which it is travelling.						
F Pedestrian detection This function uses sensors which are able to detect cyclists or pedestrians. So even when a vulnerable road user is hidden from your view by another vehicle or is hard to see because of low visibility, you will receive a warning.						

A.2 In your opinion should the installation of these functions be mandatory?

(For each function please mark the selected option with a cross)

Function A	Function B	Function C	Function D	Function E	Function F
❏ Yes	❏ Yes	❏ Yes	❏ Yes	❏ Yes	❏ Yes
❏ No	❏ No	❏ No	❏ No	❏ No	❏ No

B. WILLINGNESS TO PAY

B.1 If these functions were available on the market, would you be willing to pay for them? (*For each function put a cross against the selected option)*

	Worth paying for	Not worth paying for
Safety warnings at intersections (link to extended description)		
Safety distance warning		
On-vehicle road signs provision		
Rear or frontal collision warning		
Emergency vehicle warning		
Pedestrian detection		

B.2 How would you prefer to pay for them?

(Put a cross against the selected option)

Pay when I buy a car	Pay per use (€/km)	Monthly fee	Annual fee

B.3 If you bought all these functions when purchasing a new car, how much would you be prepared to pay? *(Put a cross against the selected option)*

Less than 150€	Between 150 and 350€	More than 350€

B.4 If you selected "pay when I buy a car" would you prefer the price to be… *(Put a cross against the selected option)*

❏ an extra, as optional equipment

❏ included in the vehicle's base price

B.5 If you selected "pay per use", how much would you pay for all these functions? *(Put a cross in the selected option)*

Less than 50 €/ 10,000km	Between 50 and100 € / 10,000km	More than 100.€/ 10,000km

B.6 If you selected "monthly fee", how much would be a reasonable amount? *(Put a cross in the selected option)*

Less than 5€/month	Between 5 and 10 €/month	More than 10 €/month

B.7 If you selected "annual fee", how much would you pay for all these functions? *(Put a cross in the selected option)*

Less than 50€/year	Between 50 and100 €/year	More than 100€/year

C. DRIVING HABITS

C.1 Please indicate the brand (e.g. Alfa Romeo) of the car you usually drive *(Specify in the blank below)*

_____

C.2 Please indicate the engine size of the car you usually drive
(Insert a cross against the selected option)

❏ < 1.200 cc
❏ 1.200-1.800 cc
❏ > 1.800 cc

C.3 How many kilometres have you driven in the last year? *(Mark with a cross)*

❏ <15,000 Km

❏ >15,000 Km

C.4 How frequently do you use your car……?
(Per each type of road insert a cross in the selected option)

Type of road	Almost every day	At least once-twice a week	At least once a month	At least once a year	Never
Motorway					
Urban roads					
Inter-urban roads					
Roads with bends (eg. mountain, hill, country road)					

C.5 Are you a professional driver (e.g. a taxi driver, sales agent, etc) **?**
(Put a cross against the selected option)

❏ Yes
❏ No

C.6 How long have you had a driving licence?
(Put a cross against the selected option)

❏ 1- 5 years
❏ 6-15 years
❏ 16-25 years

❑ > 26 years

C.7 Which of the following functions is installed in your own car?

(Insert crosses against the selection options. You can choose more than one option)

Applications	Standard	Optional
Stability control function		
Lateral airbags		
Parking sensors		
Automatic speed control		
Lane Departure Warning		
Built-in phone		
Navigation		
Internet connection		
Automatic rescue call in case of emergency		

D. ROAD SAFETY

D.1 Please indicate the extent to which you agree with the following statement *(Put a single cross in the selected option)*

	Completely agree 1	2	3	4	Completely disagree 5
When buying a new car I am in favour of spending more money to have new on board technologies to prevent accidents					

D.2 Have you heard of any of the following safety functions for cars?
(Insert crosses against the selection options. You can choose more than one option)

	Yes	No
Adaptive Head Lights Ensure optimum illumination of the lane in bends.		
Alcohol lock Prevents the vehicle from starting if the driver is intoxicated by alcohol.		
Blind spot monitoring Prevents lateral collisions		
Electronic Stability Control (ESC) Stabilises the vehicle under all driving conditions.		
Active Body Control (ABC)		

Active damping and suspension system.

Lane Departure Warning
Prevents the vehicle from leaving the lane

Lane Keeping Assistant
Active lane-keeping support

Obstacle& Collision Warning
Prevents frontal collisions

Vision enhancement
Helps at night or in otherwise bad visibility conditions.

eCall
Rescue call sent automatically by the car in the case of an emergency

RTTI
Real Time Travel and Traffic Information

D.3 Only if you answered yes, in your opinion, how useful are the following functions for improving car safety?

(Per each function insert a cross in the selected option)

	No Use 1	Of little use 2	Neutral 3	Quite Useful 4	Very Useful 5
Adaptive Head Lights Ensure optimum illumination in bends.					
Alcohol lock Prevents the vehicle from starting if the driver is intoxicated by alcohol.					
Blind spot monitoring Prevents lateral collisions					
Electronic Stability Control (ESC) Stabilises the vehicle under all driving conditions.					
Active Body Control (ABC) Active damping and suspension system.					
Lane Departure Warning Prevents the vehicle from leaving the lane					
Lane Keeping Assistant Active lane-keeping support					
Obstacle& Collision Warning Prevents frontal collisions					
Vision enhancement Helps at night or in otherwise bad visibility conditions.					
eCall Rescue call sent automatically by the car in the case of an emergency					
RTTI Real Time Travel and Traffic Information					

D.4 In your opinion, in which situations and type of road is the support of safety functions most important?

(Per each situation insert a cross in the selected option)

Situations / type of roads	Motorways	Urban roads	Inter-urban roads	Road with bends (hills, (mountains)
Regulating speed				
Lane keeping				
Car following				
Lane changing				
Congestion driving				
Negotiating non-signalled intersections				
Negotiating signalled intersections				
Reduced visibility				
Imminent crash				

D.5 Imagine that your car is equipped with all SAFESPOT safety functions. Which of the following additional functions would you like to have on your car?

(Mark the selected options with a cross. You can choose more than one option)

❏ Traffic Information

❏ Automatic road toll payment

❏ Parking reservation

D.6 In your opinion, which is the best way of improving road safety?

(Insert a cross against the selected option)

❏ Improving the road infrastructure

❏ Adopting enforcement measures

Introducing on-vehicle functions to help the driver to prevent accidents

Improving drivers' education

D.7 How do you prefer to be informed about new on-vehicle safety functions?

(Per each option insert you rating from 1 to 7: 1:most preferred; 6 :less preferred)

	Rating
Magazines	
Internet	
Newspapers	
Tv	
Radio	
Campaigns	

D.8 Who should provide this information? *(Per each option insert you rating from 1 to 7: 1:most preferred; 5 :less preferred)*

	Rating
Government	
Car dealers	
Automobile clubs	
Garages	
Technical vehicle inspection workshops	

E. USER TYPOLOGY

(We remind you that this information is and will always remain totally anonymous)

E.1 Age

(Mark with a cross)

❏ 18-25
❏ 26-40
❏ 41-55
❏ 56-65
❏ > 65

E.2 Gender

(Mark with a cross)

❏ male
❏ female

E.3 In which country are you living?

(Mark with a cross)

❏Austria
❏Belgium
❏Bulgaria
❏Cyprus
❏Czech Republic
❏Denmark
❏Estonia
❏Finland
❏France
❏Germany
❏Greece
❏Hungary
❏Ireland
❏Italy
❏Latvia
❏Lithuania
❏Luxembourg
❏Malta
❏Netherlands
❏Poland
❏Portugal
❏Romania
❏Slovakia
❏Slovenia
❏Spain
❏Sweden
❏United Kingdom
❏Other

E.4 What are your educational qualifications?
(Mark with a cross)

❏ Primary education
❏ High School Certificate
❏ University Degree (or equivalent)

E.5 Please indicate your professional category:
(Mark with a cross)

❏ Freelancer (lawyer, doctor, etc.)
❏ Salesman, commercial agent
❏ Businessman (industrial, commercial, agricultural)
❏ Dealer, shopkeeper
❏ Craftsman, self-employed
❏ Farm manager (not employee)
Manager
    ❏ in a private company
    ❏ in a public company
Employee
    ❏ in a private company
    ❏ in a public company
❏ Workman (specialized/not specialized)

❏ Farm worker (employee)
❏ Housewife
❏ Student
❏ Retired
❏ Unemployed
❏ Other

8.3. Annex 3: The Stakeholders Questionnaire

Introduction

SAFESPOT / BLADE/ Business Models/Stakeholders Consultation (WP 6)

The growing mobility of people and goods has a very high societal cost in terms of traffic congestion, fatalities and injured people every year.
SAFESPOT is a research project co-funded by the European Commission, developing functions to be installed on vehicles and also on the road infrastructure. Such functions called "cooperative functions" or "cooperative systems", will help to prevent road accidents using sensors and radio communication to detect potentially dangerous situations and to inform drivers as early as possible.
The SAFESPOT Project objective is to allow cars **communicate** with each other and with the nearby roadside infrastructure, building a network that will increase **road safety**.
The business for traffic safety is a complex issue, many parties are involved and there are still a lot of questions to be answered. The Blade team focuses on a deployment plan addressing risks, mitigation strategies and organisational, business and legal aspects.
The main objectives of WP 6 are:

- **Define possible Service and Business models for SAFESPOT architecture;**
- **Provide indications about alternative Business Models to be addressed in the deployment programme and action plan**

Description of Business and Service Models

The SAFESPOT Project objective is to allow cars communicate with each other and with the nearby roadside infrastructure, building a network that will increase road safety.
The business for traffic safety is a complex issue, many parties are involved and there are still a lot of questions to be answered.

For this reason we defined a Business and a Service Model for each of the technological configurations: V2V (Vehicle to Vehicle communication) and V2I (Vehicle to Infrastructure Communication).
The distinction between Business and Service Model is based on the different Public/Private reliance.

- In the BUSINESS MODEL hypothesis (indirect payment) there is a public reliance: the SAFESPOT functions are paid from the general taxation, fully (no contribution of the final user) or partially (with a contribution of the final users).

- In the SERVICE MODEL hypothesis (direct payment) there is a private reliance: the cost of the service is completely in charge of the user.

The Price Politics will be based on different criteria/ parameters.

We have reached a certain level of understanding of the functionalities of SAFESPOT concept, but the expert vision is needed to extract useful elements for our work on Business Models and to validate the hypothesis we made.

For further information about SAFESPOT, please visit: www.safespot-eu.org

If you have any remarks or questions, please don't hesitate to contact:

Cristina Levizzani
Tel. +39 011 90 83064; Fax +39 011 9083.083
e-mail: cristinaalessia.levizzani@crf.it

Please notice that there are no right or wrong answers, it is your opinion that counts

Stakeholder Typology

4.1. To which of the following groups can your organisation be counted among? *(Mark with a cross the selected option. If not listed below, please check the one closest to your group.)*

Public Authority	
Road Manager/Operator	
Service Provider	
Content Provider	
Car Manufacturer	
Supplier Automotive Industry	
Infrastructure System Supplier	
Insurance	
Telecommunication Industry	
Automotive Club	
Academia/University	
Research Centre	

4.2. What is your country of residence?
(Please write your country in the blank below)

_____

5. System Configuration

5.1. How do you rate the importance/usefulness of the following functions in a *Safety* Cooperative System?

- **First, for each function please say if you consider it a "Must Have" or a "Less Important" one.**

The Main functions could be divided into two main groups:

- *"**Must have**"/Necessary or "First level" Functions/Features, i.e. Key attributes which have to be met unconditionally in order to assure the basic required performances for a Safety Cooperative System*
- *"**Less Important**"/ Nice to have or "Second level" Functions/Features, i.e. less important attributes than the above mentioned First level group.*

2. Then, please rate from 1 (= very low) to 9 (= very high) the importance of each function.

Main Functions	**Level**		**Rating**
	Must have/ First Level	Less Important/ Second Level	
SAFETY WARNINGS AT INTERSECTIONS When you approach an intersection, this function will warn you of approaching vehicles whose trajectories intersect with			
SAFETY DISTANCE WARNING This function will warn you if you are driving too close to the vehicle in front, to be able to stop safely if it should suddenly brake hard.			
ON-VEHICLE ROAD SIGNS PROVISION. This function is able to provide safety information normally contained in road sign. The function could include Speed Alert, Hazard (potentially also accident warnings) that could be hidden from your view due to poor visibility conditions (rain, fog, behind a bend, etc.)			
REAR OR FRONTAL COLLISION WARNING. This function warns you about the presence of an obstacle on the road ahead which is hidden from your view (for example behind a bend, or invisible due to foggy conditions).			
EMERGENCY VEHICLE WARNING. This function provides on an onboard display a visual warning of the presence of an emergency vehicle, and also the direction in which it is			
PEDESTRIAN DETECTION. This function uses sensors which are able to detect cyclists or pedestrians. So even when a vulnerable road user is hidden from your view by another vehicle or is hard to see because of low visibility, you			
INFORMATION BY STATIC IMAGE: this function allows you to see on a display the image of an obstacle/object hidden from your view (i.e. behind a bend)			
INTERSECTION MAP : this function allows you to see on the dashboard display the intersection structure (as a navigation system)			
COOPERATIVE ADAPTIVE CRUISE CONTROL: this is a speed regulating function basing on a cooperative and interventive approach, i.e. communication with other vehicles.			
AUTOMATED LATERAL CONTROL / LANE GUIDANCE: this function controls the lateral lane basing on a cooperative approach			
GAP CREATION FOR MERGING / MERGE ASSIST: this function is a sort of intelligent "traffic light" which manages and controls the vehicles' affluence from more lanes.			
INTELLIGENT SPEED ADVISORY AND CONTROL: this function regulates speed both through a warning and the intervention of the vehicle			
INTERSECTION RESERVATION / GRIDLOCK CONTROL: this function performs the dynamic control of the right of way at intersections, also in case of traffic jam.			

5.2. In your opinion, how could these issues influence SAFESPOT implementation? Are they strengths or weaknesses, in relation to the different Business/Service models configurations?

The following issues are elements that, due to their complexity, might be considered as STRENGHTS (factors that favour the project implementation) or as WEAKNESSES (elements that obstruct the project implementation).

*(Mark with a "+" the strenghts, with "–" the weaknesses, with a "=" the neutral issues)***.**

Example:

- **Investment costs could be a "***Weakness***" in the V2I configurations , in both the Business Models and Service Models, as this one is more expensive than the V2V configuration. While could be a "***Strenght***" in the V2V configuration as this one is less expensive than the V2I.**
- **HMI aspects could be a "***Strenght***" in the V2V, in both the Business Models and Service Models, as this configuration (information displayed inside the car, in the dashboard/instrument panel)is more immediate then the V2I (outside the car: on boards along the road).**
- **Price of the System, could be a "***Strenght***" in the Business Models (in both the technical configurations, V2V and V2I) as the toll will be paid from the general taxation and not by the final user. On the contrary could be a "***Weakness***", in the Service Model (in both the V2I and V2V ones) as the cost of the service is completely in charge of the user.**

	BUSINESS MODEL (public reliance)	**BUSINESS MODEL (public reliance) -**	**SERVICE MODEL (private reliance)**	**SERVICE MODEL (private reliance) -**	**BUSINESS MODEL (public+ private reliance)**	**BUSINESS MODEL (public+ private reliance)**
	V2V	**V2I**	**V2V**	**V2I**	**V2V**	**V2I**
Investment costs						
Operating costs						
Attractiveness/Acceptability for user						
Attractiveness/ acceptability for the system installer/financer						
Market penetration						
Ease of implementation						
Reliability						
Possibility of customization						
Organization						
Technological feasibility						
Liability/responsibility in case of malfunctioning						
Return on investment of the configuration (ROI)						
Performances in energy, efficiency, emissions reduction						
Universality (possibility of use in every road and weather situation, etc.)						
Time to market (availability of the solution on a short or long term)						
Distinctiveness of the solution at an international level						

HMI aspects						
Possibility of integration with other existing safety devices						
Possibility of updating						
Possibility of retrofitting						
Legal aspects (harmonization of legislative frames across Europe)						
Price of the system						
Liability problems when an accident happens or for violations of a breakdown						
Time for renewal of the vehicle fleet						
Need for an extra driving education						
Other, please specify						

6. Market Penetration

We are investigating the possible Business and Service models for SAFESPOT deployment. The distinction between Business and Service Model is based on two main criteria:
1.PUBLIC/PRIVATERELIANCE.
In the Business Model hypothesis (indirect payment) there is a public reliance: the SAFESPOT functions are fully (no contribution by the final user) or partially (with a contribution of the users) paid from the general taxation.
In the Service Model hypothesis (direct payment) there is a private reliance: the cost of the service is completely in charge of the user.

2. TECHNICAL CONFIGURATION (V2V/V2I)
The hypothesis have been made considering two possible options: V2V (the intelligence basically resides in the Vehicle) and V2I (the intelligence basically resides in the Infrastructure).

6.1In your opinion, what percentage of the new vehicles in Europe could be equipped with SAFESPOT devices with a PUBLIC RELIANCE? (From 0% to 100%)

*the System is fully paid from the general taxation (with no contributions of the final user)

	V2V	V2I
In 2015		
In 2020		
In 2030		

6.2. In your opinion, what percentage of the new vehicles in Europe could be equipped with SAFESPOT devices with a PUBLIC RELIANCE in a V2I configuration? (From 0% to 100%)

***the System is fully paid from the general taxation (with no contributions of the final user)**

	V2V	V2I

In 2015		
In 2020		
In 2030		

6.3 In your opinion, what percentage of the new vehicles in Europe could be equipped with SAFESPOT devices with a PUBLIC+PRIVATE RELIANCE? (From 0% to 100%)

***the system is partially paid from the general taxation with a contribution of the final users.**

	V2V	V2I
In 2015		
In 2020		
In 2030		

6.4 How likely do you consider a "mixed scenario", combining Vehicle to Vehicle and Vehicle to Infrastructure Configurations together? *(From 0% to 100%)*

	V2V+V2I
In 2015	
In 2020	
In 2030	

6.5. In your opinion, the introduction of the following additional functions:

- **Traffic Information,**
- **Automatic Road toll payment,**
- **Parking Reservation,**

could increase the percentages that you indicated in the previous questions (6.1 and 6.2) ?

If yes, could you please indicate us the possible increasing? ***(From 0% to 100%)***

_____

7. Deployment

We are investigating the issues that could influence SAFESPOT deployment

7.1. In your opinion, SAFESPOT system's introduction should be:
(Please mark with a cross)

- o Market Driven
- o Regulated by Government
- o A combination of both

7.2. In your opinion, which of the following instruments could be useful to promote the diffusion of SAFESPOT-able vehicles? *(Please mark with a cross. You can chose more than one option)*

- o Awareness campaigns
- o Advertising Media
- o Driver education – driver training
- o Dealer training
- o Cooperative research
- o Awards (e.g. Euro NCAP)
- o Field Operational Tests
- o System as standard equipment instead of optional
- o Discounts
- o Direct Subsidies
- o Tax reductions /Financial Incentives
- o Insurance premium reduction
- o Voluntary agreement at European/national/company level
- o Legislative mandatory equipment
- o Other _____

7.3. The initial deployment will require significant investments. In your opinion, who is most likely to finance the installation of the infrastructure necessary for the realisation of SAFESPOT Applications? *(Please mark with a cross, You can select more then one option for each possible configuration)*

	V2V	V2I
Public Authority		
Road Manager/Operator		
Service Provider		
Content Provider		
Car Manufacturer		
Automotive Industry Supplier		
Infrastructure System Supplier		
Insurance		

Telecommunication Industry		
Automotive Club		
Academia/University		
Research Centre		

7.4.How? *(Please mark with a cross)*

Membership fees	
Tax Money/Governmental subsidies	
Fund raising	
Sponsorships	
Own Profit/Loss responsibility	
Others	

7.5. Who should be the target group/s for SAFESPOT? *(Please mark with a cross the target group)*

Everybody	All drivers without distinction	
Specific target groups	Professional drivers: for example bus drivers, taxi drivers, truck drivers	
	Repeated traffic violators: for example people who have committed a number of severe speed offences	
	Novice drivers: for example people who possess a driving license for less than five years	
	Elderly drivers: people who could need an assistance while driving	
	Other (fill in)	

7.6. In what type/s of vehicle should SAFESPOT be implemented? *(Please mark with a cross the vehicle type)*

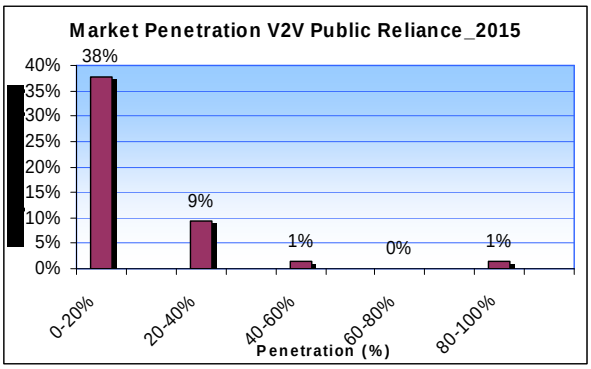
	All vehicles	
Specific vehicles	Private cars	
	Freight transport: vans, light and heavy duty vehicles	
	Buses	
	Motorcycles	

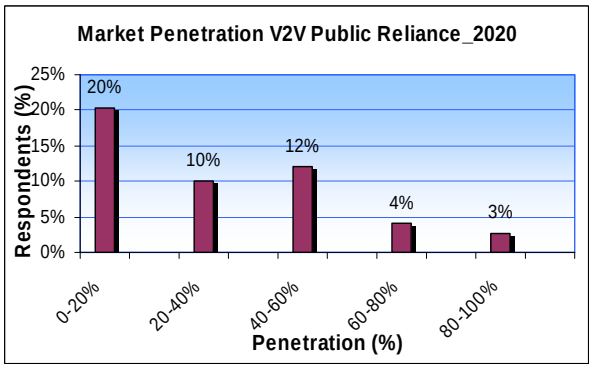
7.7. On which roads should SAFESPOT be used? *(Please mark with a cross the road type/s)*

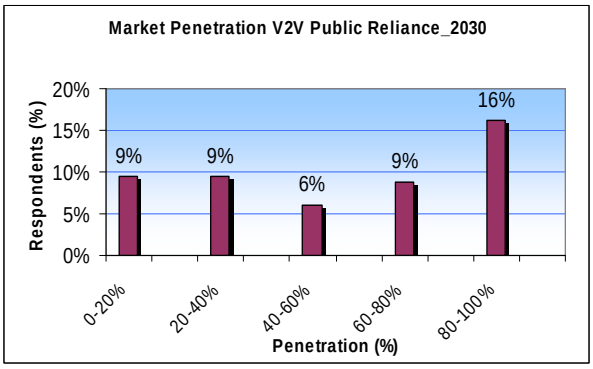
Everywhere	All road types	
Specific roads	Motorways	
	Urban roads	
	Inter-urban roads	
	Roads with bends (e.g. mountain, hill, country road)	

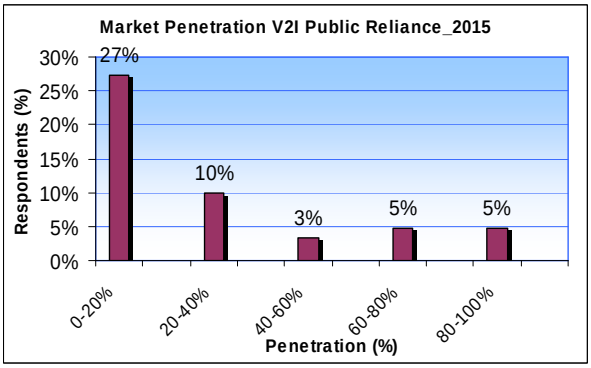
Market penetration (from the survey results)

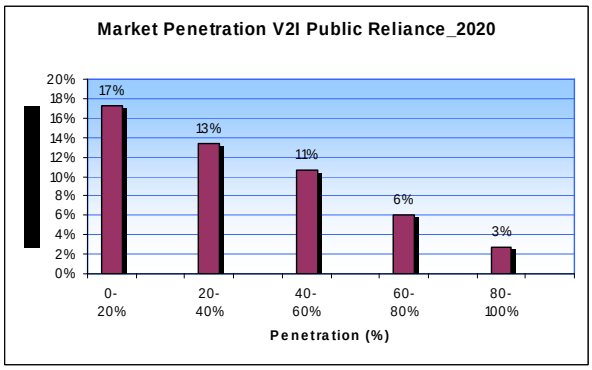
Question from 6.1. to 6.5 are related to the possible SAFESPOT market penetration in the timeframe 2015-2030, depending on the configuration. This questions helped defining the business models and building the optimistic-intermediate-pessimistic scenarios. Here there are the results of these answers. Taking the suggestion of the statistical colleagues, we decided to classify the answers from 20 to 20 (0-20%, 20-40%, 40-60%, 60-80%, 80-100%).
The outcomes of this clusterization show a coherent and consistent trend, as we can see in the figures below.

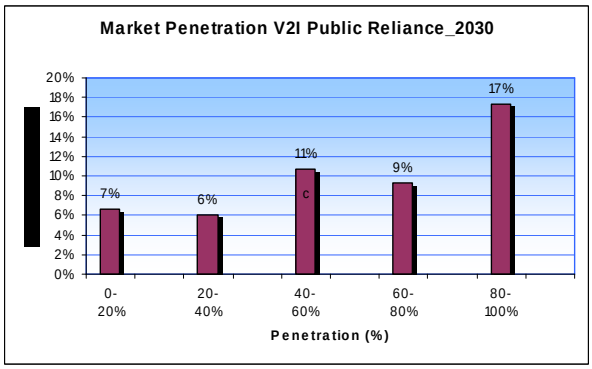


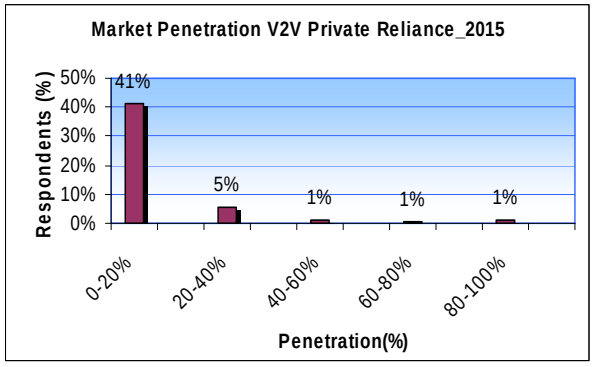


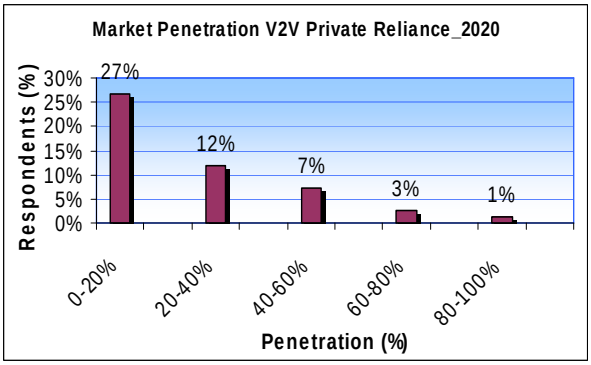


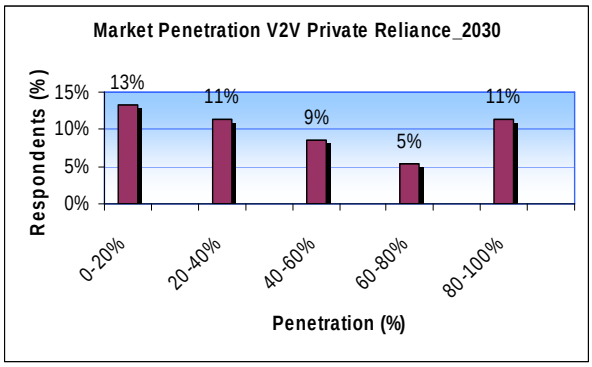

Market Penetration V2I Public Reliance_2015
Respondents (%)
30%
25%
20%
15%
10%
5%
0%
27%
10%
3%
5%
5%
0-20%
20-40%
40-60%
60-80%
80-100%
Penetration (%)

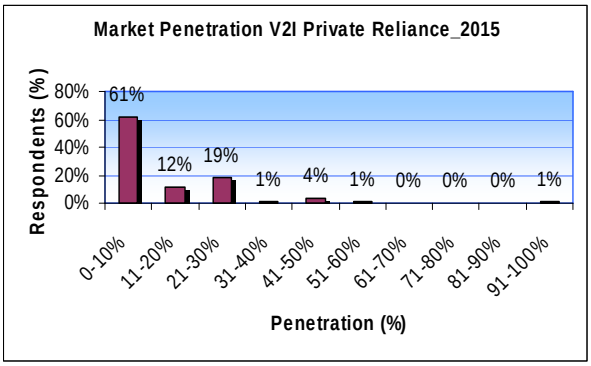

Market Penetration V2I Public Reliance_2020
20%
18%
16%
14%
12%
10%
8%
6%
4%
2%
0%
17%
13%
11%
6%
3%
0-20%
20-40%
40-60%
60-80%
80-100%
Penetration (%)

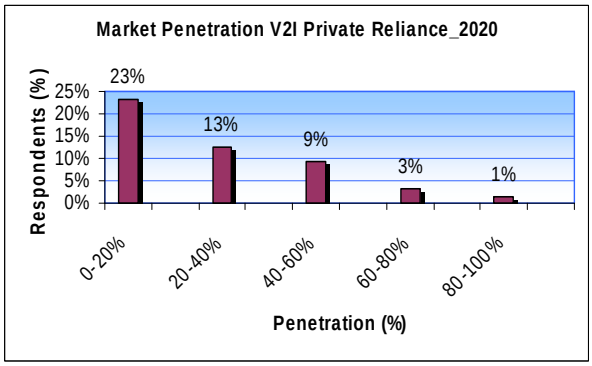

Market Penetration V2I Public Reliance_2030
20%
18%
16%
14%
12%
10%
8%
6%
4%
2%
0%
7%
6%
11%
9%
17%
0-20%
20-40%
40-60%
60-80%
80-100%
Penetration (%)

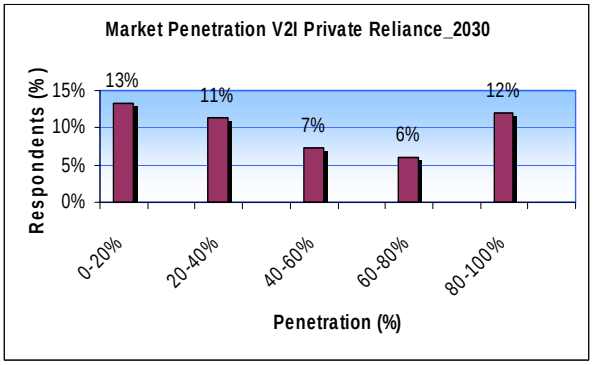

Market Penetration V2V Private Reliance_2015
Respondents (%)
50%
40%
30%
20%
10%
0%
41%
5%
1%
1%
1%
0-20%
20-40%
40-60%
60-80%
80-100%
Penetration(%)

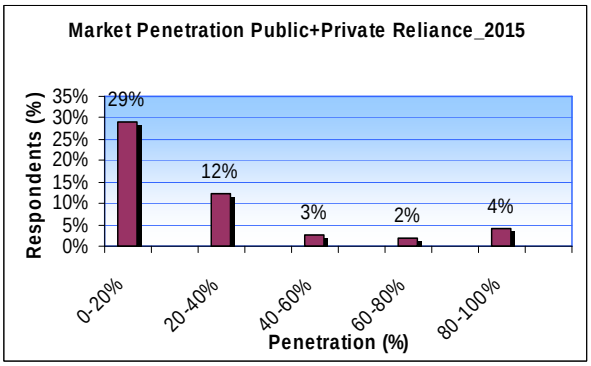

Market Penetration V2V Private Reliance_2020
Respondents (%)
30%
25%
20%
15%
10%
5%
0%
27%
12%
7%
3%
1%
0-20%
20-40%
40-60%
60-80%
80-100%
Penetration (%)

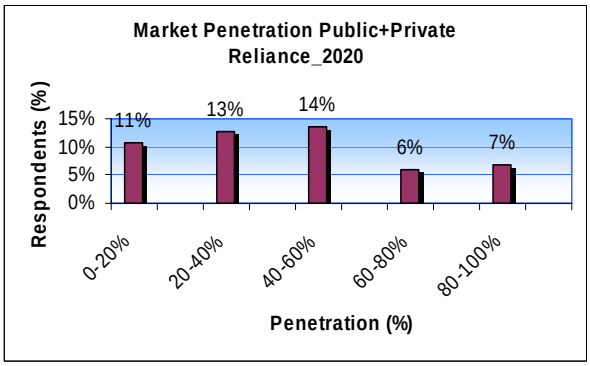

Market Penetration V2V Private Reliance_2030
Respondents (%)
15%
10%
5%
0%
13%
11%
9%
5%
11%
0-20%
20-40%
40-60%
60-80%
80-100%
Penetration (%)

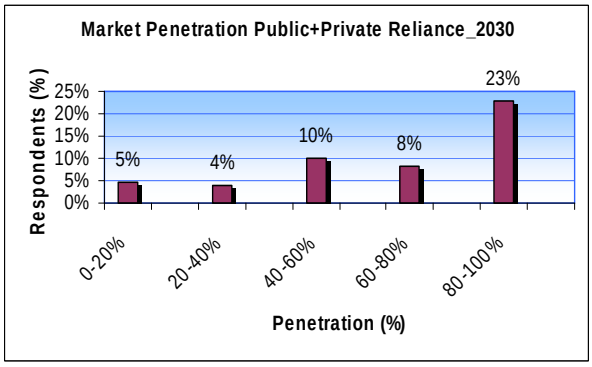

Market Penetration V2I Private Reliance_2015
Respondents (%)
80%
60%
40%
20%
0%
61%
12%
19%
1%
4%
1%
0%
0%
0%
1%
0-10%
11-20%
21-30%
31-40%
41-50%
51-60%
61-70%
71-80%
81-90%
91-100%
Penetration (%)

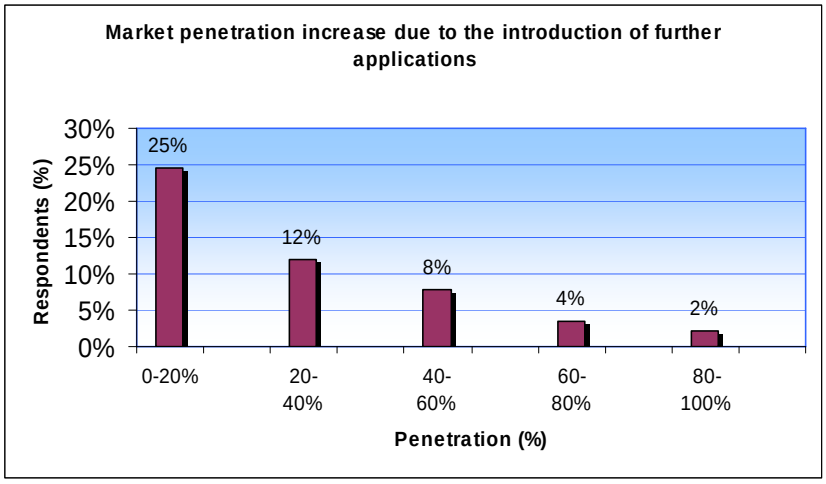

Market Penetration V2I Private Reliance_2020
Respondents (%)
25%
20%
15%
10%
5%
0%
23%
13%
9%
3%
1%
0-20%
20-40%
40-60%
60-80%
80-100%
Penetration (%)


Market Penetration V2I Private Reliance_2030
Respondents (%)
15%
10%
5%
0%
13%
11%
7%
6%
12%
0-20%
20-40%
40-60%
60-80%
80-100%
Penetration (%)


Market Penetration Public+Private Reliance_2015
Respondents (%)
35%
30%
25%
20%
15%
10%
5%
0%
29%
12%
3%
2%
4%
0-20%
20-40%
40-60%
60-80%
80-100%
Penetration (%)


Market Penetration Public+Private Reliance_2020
Respondents (%)
15%
10%
5%
0%
11%
13%
14%
6%
7%
0-20%
20-40%
40-60%
60-80%
80-100%
Penetration (%)


Market Penetration Public+Private Reliance_2030
Respondents (%)
25%
20%
15%
10%
5%
0%
5%
4%
10%
8%
23%
0-20%
20-40%
40-60%
60-80%
80-100%
Penetration (%)


Market penetration increase due to the introduction of further applications
Respondents (%)
30%
25%
20%
15%
10%
5%
0%
25%
12%
8%
4%
2%
0-20%
20-40%
40-60%
60-80%
80-100%
Penetration (%)