



Dipartimento di Scienze Politiche

Dottorato di Ricerca in Scienze politiche – XXX ciclo

Curriculum “Governano e istituzioni”

***In varietate concordia. A cooperative model to
gently improve freight goods distribution in
European cities. The case of Rome***

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Abstract

This work, entitled ‘*In varietate concordia. A cooperative model to gently improve freight goods distribution in European cities. The case of Rome*’, deals with urban freight transport, from two guiding principles: i) cooperation and ii) voluntary behaviour change.

The thesis develops a new conceptual structure, called *Choice Architecture Chain (CAC)*. CAC identifies multi-level governance cooperation mechanisms, to establish a dialogue and undertake joint actions, both vertically (with different levels of governance, from the EU to local communities) and horizontally (peer-to-peer, at all levels). To reach such an ambitious degree of cooperation, the active involvement and engagement of policy makers, planners and citizens is needed. The voluntary element of behaviour change towards more sustainable, innovative and fair practices for the distribution of goods in urban areas is based on the hypothesis that, when wisely guided by well-conceived policies, actors can make conscious and smart choices.

The action of the public authority, considering the multi-level governance structure of the urban mobility sector, is analysed in the framework of the *choice architecture* concept, derived from the *libertarian paternalism*: assuming that the PA cannot avoid influencing individual choices, since it has to intervene in the regulation of various spheres of public life, this approach identifies the PA as the *choice architect*, aiming to create a favourable decision-making context. The application of this approach in the field of public policy results in soft policy measures (SPMs), different but complementary to hard policy measures (HPMs), acting in the wider transport demand management (TDM) and introducing incentives or increasing awareness to guide the behaviour of business and citizens, without enforcement actions.

The research project deepens the knowledge of SPMs and their application to specific cases, and develops a conceptual general framework for their categorisation, to evaluate the interaction of soft and hard measures, and their potential influence on the UFT in terms reduction in congestion (number of circulating vehicles) and pollution (emissions), while maintaining a high level of efficiency of delivery services.

On the basis of the results on the effectiveness of SPMs, recommendations are proposed for the development of a strategy to involve PAs and local stakeholders and promote replication of (successful and adaptable) SPMs in their local context. An assessment of the most suitable UFT SPMs for Rome is performed, and a strategy for Rome, *Improving UFT via SPMs - supporting the new SUMP*, is proposed.

Keywords: SUMP, Urban mobility, Urban freight transport, Soft Policy Measures, European Union, Multi-level governance, Behavioural Economics, Choice architecture

Acknowledgements

Questa tesi non avrebbe mai visto la luce se non fosse stato per il costante supporto e incoraggiamento del mio tutor prof. Edoardo Marcucci, che in questi tre anni e mezzo ha sempre creduto nel mio lavoro, spesso più di quanto non facessi io. Grazie per avermi accompagnato in questo percorso.

Grazie al prof. Valerio Gatta, sempre prodigo di buoni consigli e piacevole compagno di missioni in giro per l'Europa.

Sono inoltre grato al prof. Gian Cesare Romagnoli, eccellente coordinatore del curriculum di Dottorato Governo e Istituzioni del dottorato di Scienze Politiche, per il costante supporto nel reindirizzare il lavoro di ricerca nei binari che gli competono, e al prof. Leopoldo Nuti, direttore della Scuola di Dottorato, per la fiducia riposta in questo lavoro. Grazie ai miei colleghi del dottorato, per condividere i momenti comuni, belli e brutti.

A very special gratitude goes out to all who participated in this research, especially researchers and experts who have had the patience and the time to answer my questions and questionnaires, for contributing to the significant improvement of the findings of this work: Andrea Campagna, Michela Le Pira, Stanisław Iwan, Maria Rodrigues, Karin Fossheim, Tharsis Teoh, Elena Maggi, Stefano Dondi, Sara Verlinde, Giuseppe Luppino, Jens Klauenberg, Jardar Andersen, Jacques Leonardi, Nina Nesterova, Ioannis Karakikes, Tim Ward, Julian Allen, Richard van der Wulp and Hans Quak, and all the others that have contributed with their views and knowledge. *Grazie, takk, obrigado, dzięki, bedankt, danke, merci, cnacu6o, thank you, σας ευχαριστώ!*

With a special mention to my Polis colleagues, who are exquisite and serious people to work with, and have always encouraged me and understood my needs during my research.

Inutile dire che senza la mia famiglia e i miei amici sarebbe stato un percorso molto più faticoso e noioso. I loro consigli, il loro affetto e il loro sostegno sono tutto ciò di cui ho bisogno, e fanno di me la persona (e il ricercatore) che sono.

En Kirsten: dank je wel, voor altijd zo lief te zijn.

Acronyms

BE	Behavioural Economics
CLFQP	Central London Freight Quality Partnership
CC	City Council
CL	City Logistics
CLLL	City Logistics Living Laboratory
CLOCS	Construction Logistics and Cyclist Safety scheme
CLPs	Construction Logistics Plans
CBA	Cost-Benefit Analysis
DSS	Decision Support System
DSPs	Delivery and Servicing Plans
DG MOVE	Directorate-General for Mobility and Transport
EVs	Electric Vehicles
EC	European Commission
EU	European Union
FORS	Fleet Operator Recognition Scheme
FQP	Freight Quality Partnership
FVs	Freight Vehicles
FUA	Functional Urban Area
PGTU	General Urban Traffic Plan
GD010ZES	Green Deal 010 Zero Emission City Logistics
HPM	Hard Policy Measure
H2020	Horizon 2020
IEE	Intelligent Energy for Europe
LTZ	Limited Traffic Zone

LL	Living Laboratories
L/U	Loading and Unloading
LA	Local authority
LEZ	Low Emission Zone
MS	Member States
MM	Mobility Management
MCA	Multi-Criteria Analysis
MSP	Multi-Stakeholder Platforms
NO _x	Nitrogen Oxide
PM	Particulate Matters
PA	Public Authority
PT	Public Transport
PPPs	Public-Private Partnerships
SPM	Soft Policy Measure
PSMS	Sustainable Strategic Mobility Plan
SULP	Sustainable Urban Logistic Plan
SUMP	Sustainable Urban Mobility Plan
TDM	Transport Demand Management
TfL	Transport for London
UFP	Urban Freight Plan
UFT	Urban Freight Transport
UL	Urban Logistics
UMP	Urban Mobility Package

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Introduction

The incipit of the title of the thesis, ‘*In varietate concordia*’¹, the Latin and official version of the European Union (EU) motto ‘*United in diversity*’, wants to convey the spirit of a work exploring the potential of local policies empowered by a sense of responsibility and ownership of local actors and citizens, and supported by a European context of cooperation and dialogue that, when exploited at its full potential, multiplies the benefits of virtuous public policies.

This thesis deals with a specific topic of urban development, namely urban freight transport (UFT), from two guiding principles: i) *cooperation* and ii) *voluntary behaviour change*.

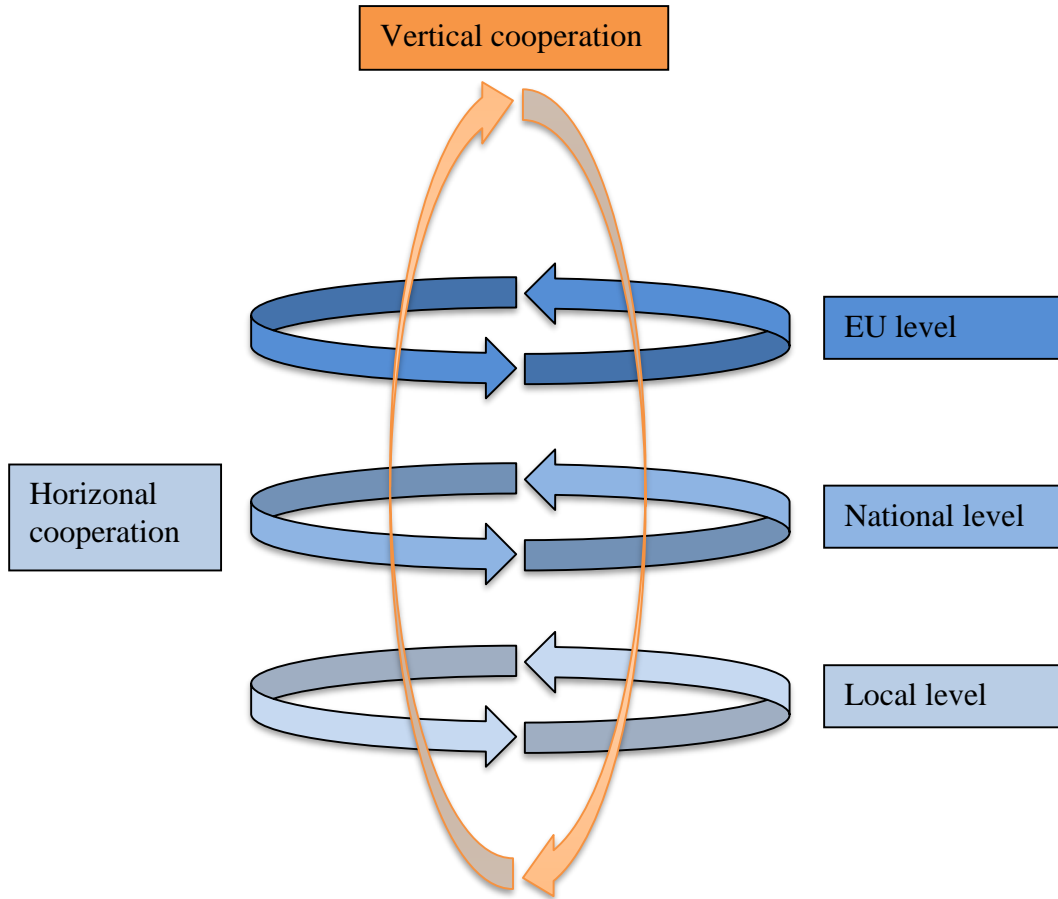
The thesis develops a new conceptual structure, called *Choice Architecture Chain (CAC)*. CAC identifies multi-level governance cooperation mechanisms, to establish a dialogue and undertake joint actions, both vertically (with different levels of governance, from the EU to local communities) and horizontally (peer-to-peer, at all levels). The structure is simplified in

¹ Full title: “*In varietate concordia. A cooperative model to gently improve freight goods distribution in European cities. The case of Rome*”

Figure 1.

To reach such an ambitious degree of cooperation, the active involvement and engagement of policy makers, planners and citizens are needed. The voluntary element of behaviour change towards more sustainable, innovative and fair practices for the distribution of goods in urban areas is based on the hypothesis that, when wisely guided by well-conceived policies, local actors can make conscious and smart choices. In addition, cultural change in the transport authorities is also desirable: motivated and competent staff enables transport planning departments to become agents of change. This also contributes to strengthening a sense of ownership of the decision-making process, creating a sense of responsibility not only among politicians and planners, but also among citizens and stakeholders, and fostering the feeling of actively contributing to the well-being of the community: when people are informed and emancipated, they are more likely to act consciously and in the collective interest.

Figure 1 - Conceptual structure of the "Choice Architecture Chain"



1 Scope of the research

1.1 Purpose of the thesis and research questions

Behavioral Economics (BE)² questions the perfect rationality of the economic actor as assumed by neoclassical economic theory, emphasizing his cognitive limits. On this basis, the derived concept of *libertarian paternalism*, a new approach to policy-making (Thaler and Sunstein, 2009), believes that the institutions should lead, through *nudges*, people make optimal choices in the collective interest, although in accordance with their preferences.

The action of the public authority (PA), considering the multi-level governance structure of the urban mobility sector, is analysed in the framework of the *choice architecture* concept, derived from *libertarian paternalism*: assuming that the PA cannot avoid influencing individual choices, since it has to intervene in the regulation of various spheres of public life, this approach identifies the PA as the *choice architect*, aiming to create a favourable decision-making context. The application of this approach in the field of public policy results in soft policy measures (SPMs), different but complementary to hard policy measures (HPMs), acting in the wider transport demand management (TDM) and introducing incentives or increasing awareness to guide the behaviour of citizens, avoiding enforcement actions. In this regard, this work elaborates the concept of *Choice Architecture Chain* (CAC) in the (urban mobility) public policy sector, from the European to the local level: each upper level of the chain has the power to *nudge* the lower, significantly influencing the final choices of citizens and companies, at the bottom of the chain. The action of the chain is not only *top-down*: a preliminary *bottom-up* approach, via the participation of stakeholders and citizens, is essential for the PA to understand which are the problems and the needs to be addressed. This cooperation with the end users enables the elaboration of a shared, and consequently more effective, set of SPMs.

The research project deepens the knowledge of SPMs and their application to specific cases, and develops a conceptual general framework for their categorisation, to evaluate the interaction of soft and hard measures, and their potential influence on UFT in terms reduction

² Behavioral economics is a branch of political economy which has developed in recent decades. This theory is based on the assumption that the human being is fallible, and that he often makes the wrong choices and adopt irrational behaviour (Ariely, 2009).

in congestion (number of circulating vehicles) and pollution (emissions), while maintaining a high level of efficiency of delivery services.

On the basis of the results on the effectiveness of SPMs, recommendations are suggested for the development of a strategy to involve PAs and local stakeholders and promote replication of (successful and adaptable) SPMs in their local context, linked to the proposed cooperation model. The research also analyses the UFT context in Rome and envisages a case study application of the strategy to the city of Rome.

Key research questions:

1. BE's *choice architecture* fits with UFT planning?
2. Central role of PA: Can public authorities be considered reliable and effective choice architect in the field of urban mobility? Is the *CAC* concept an effective conceptual framework to represent the multi-governance structure characterising the sector?
3. Does a linkage between BE and UFT soft policy measures exist?
4. Do SPMs, such as incentives, rewarding and recognition schemes, information campaigns and gamification, have a direct, significant impact on UFT actors' behaviour (like for the passenger sector), or do they necessarily represent a marginal part of a wider policy package mainly based on HPMs?

1.2 Outline

The thesis is organised as follows:

Chapter 2 provides a strong theoretical background supporting the choice of the topic and the motivation for this research. Moreover, it provides a solid conceptual framework for framing and validating the findings of chapters 5 and 6.

Chapter 3 illustrates the methodology of the research, which improves the knowledge of urban mobility and urban freight planning process i) at the EU level, ii) in the 28 European member states and iii) in selected cities, and identifies, assesses and validates a set of SPMs for UFT. In this regard, the chapter is divided into two main sections. In the first section, it lists the different methods for data collection adopted, providing a general overview for each of them and explaining why and how they have been used for each activity. The second section focuses on the evaluation criteria elaborated in the research, necessary to obtain and validate rigorous and

scientifically valid findings. Firstly, it illustrates the concept of each evaluation criterion, from which policy strategies are derived, clarifying the distinction between positive and normative criteria. Secondly, it defines the key standardised criteria for policies comparison and assessment, and how they are utilised in the framework of the overall study, as developed in the following chapters.

Chapter 4 revisits the evolution of urban transport planning processes and policies, focusing on the approach of the European Commission (EC) on urban mobility. It highlights the fact that the approach of public authorities with respect to mobility planning significantly changed over the years, passing from a mere technical analysis (rational planning model) to the promotion of sustainability through integrated transport policies. In addition, over the last 20 years, the EC undertook a bottom-up approach, learning from the best practices on planning at local and national level.

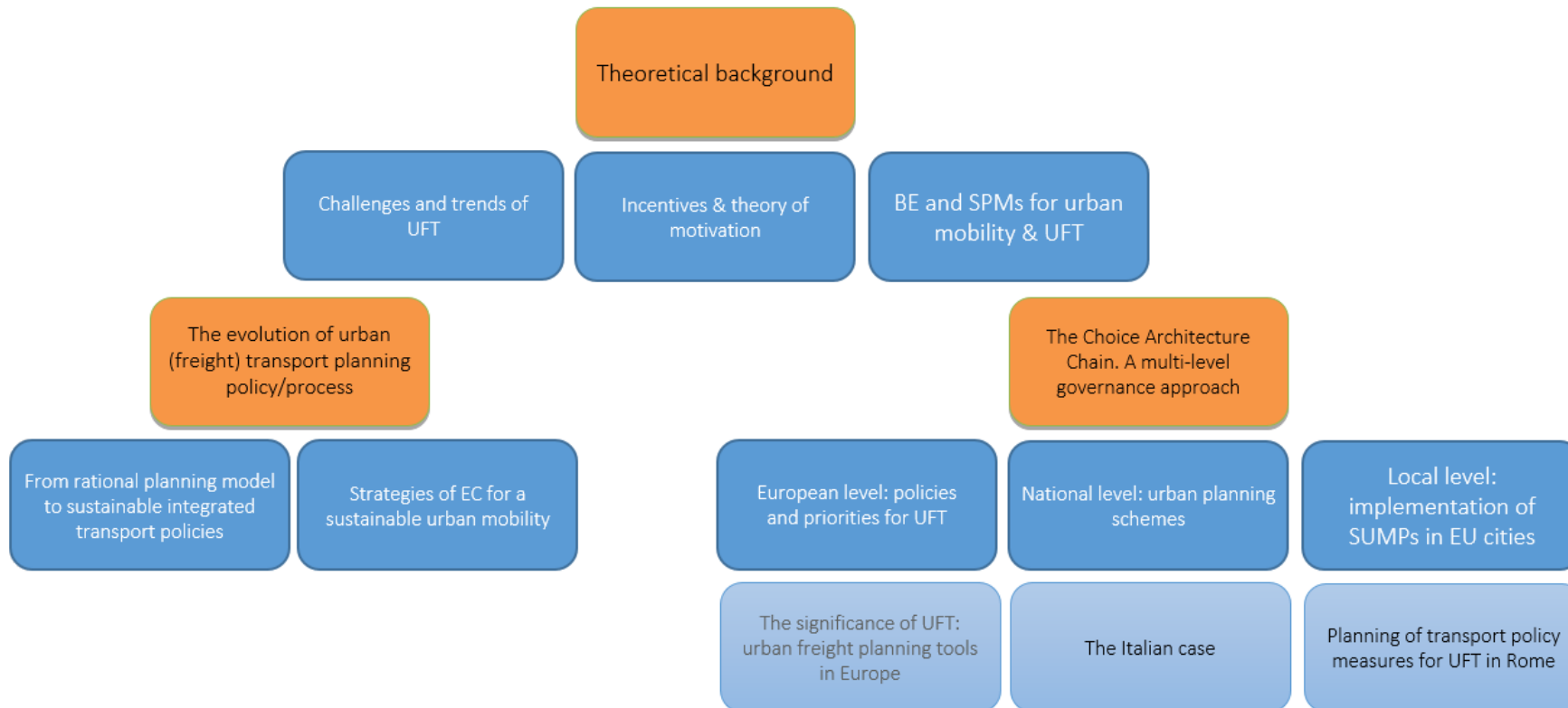
In chapter 5, a new conceptual structure is proposed, called *Choice Architecture Chain* (CAC), identifying multi-level governance cooperation mechanisms to establish a dialogue and undertake joint actions, both vertically (with different levels of governance, from the EU to local communities) and horizontally (peer-to-peer, at all levels). This section reports the results of the analysis of the European, national and local decision-making dimension and trends with regards to urban mobility policy and planning. Each governance level is supposed to carry out different and complementary actions, satisfying the principles of subsidiarity and proportionality, to create the best conditions to spread and implement the EU common sustainable mobility planning principles.

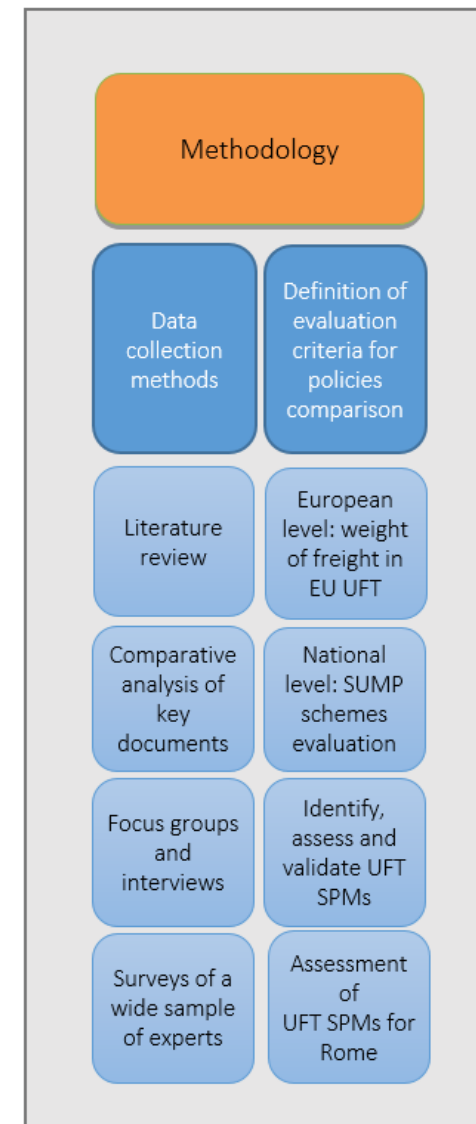
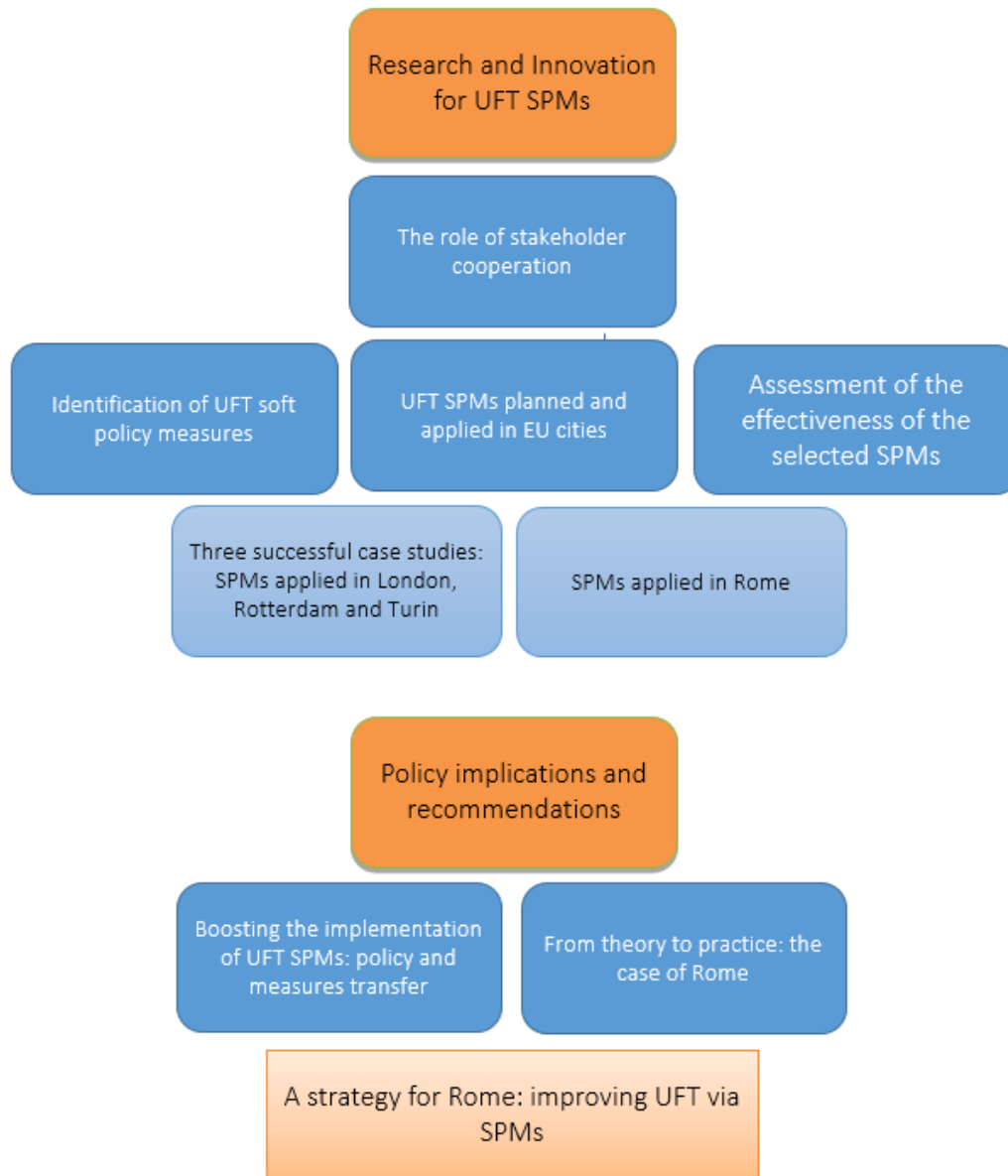
Chapter 6 focuses on research and innovation for UFT soft policy measures. After having analysed in detail the multi-level governance structure of the urban mobility planning sector and its implications, based on the CAC approach, it narrows the scope of the research specifically on the object of the analysis of the libertarian paternalism, i.e. the *nudges* - UFT SPMs in the case of this work. It identifies, evaluates and validates existing and new SPMs measures and schemes applied to the UFT sector.

Chapter 7 investigates how the implementation and standardisation of UFT SPMs can be boosted: horizontal influences have been acknowledged to be effective in transferring good

urban mobility practices. The study investigates how city-to-city networks and joint research are important in motivating cities to adopt SPMs and improving their transport performances.

Figure 2 - Visualisation of the structure of the research





2 Theoretical background

This section provides a strong theoretical background supporting the choice of the topic and the motivation for this research. Moreover, it provides a solid conceptual framework for framing and validating the findings that are presented in chapters 5 and 6.

2.1 Challenges and trends of urban mobility and urban freight transport (UFT)

This section provides for a general view of urban mobility trends and of the urban freight transport (UFT)³ sector, highlighting relevant economic theory, its main characteristics and related measures.

European cities host 72% of the European Union (EU) population (80% in 2020) and generate over 80% of EU GDP. In urban areas, about 25% of CO₂ emissions produced are attributable to the transport sector, as well as 30-50% of other transport-related pollutants, like particulate matters (PM) and Nitrogen Oxide (NO_x - ALICE/ERTRAC, 2014). Congestion causes inefficiencies producing losses of around 80 billion euro per year (European Commission, 2011). European cities are facing daunting problems in meeting air quality legal standards⁴ (EEA, 2016).

The 2011 White Paper on Transport identifies the need to take additional steps to ensure that cities contribute to reducing Europe's dependence on imported oil and cutting carbon emissions in transport by 60% by 2050, and achieving essentially CO₂-free city logistics in major urban centres by 2030 (European Commission, 2011). In the light of the challenges mentioned, strengthening voluntary cooperation at European level has been identified as an effective driver to improve the overall performance of the sector in terms of environmental sustainability (Eberlein, 2004). In fact, the EU has no binding power on urban mobility regulation, according

³ The EC defines UFT as “the movement of freight vehicles whose primary purpose is to carry goods into, out of and within urban areas” (MDS, 2012). But the EC also provides a very similar definition of 'urban logistics' (UL): “[...] the movement of goods, equipment and waste into, out, from, within or through an urban area” (European Commission, 2013a). For this reason, the choice here is to consider the two expressions as synonyms and to use only “UFT”, systematically replacing “UL” with “UFT” every time the research incurred in the former expression.

⁴ See in particular Directive 2008/50/EC of the European Parliament and of the Council of 21 May 2008 on ambient air quality and cleaner air for Europe, OJ L 152, 11/6/2008, p.1.

to the subsidiarity principle⁵. This potentially hinders the elaboration of common solutions, which might conveniently be tailored to different urban contexts, and produces a single market fragmentation risk when it comes to ITS systems, access regulations and discriminatory practices. For this reason, European guidance, research, innovation, good practice exchange and capacity building activities represent effective means in the hands of the EC and member states (MSs) to support the success and coordination of local policies and measures.

It is important to identify a clear relationship between citizens, stakeholders, environment, local governments, on the one hand, and different types of measures, on the other, to determine the optimal combination of the best policies with respect to the peculiarities of each specific context (Nesterova and Quak, 2016). To facilitate the adoption of a more shared approach, the EC encourages cities to develop a long-term vision and objectives for urban mobility. In 2013 it released the Urban Mobility Package *Together towards competitive and resource-efficient urban mobility*, providing an overview of possible actions, including guidelines on Sustainable Urban Mobility Plans (SUMP), released for the first time in 2011⁶, and working documents on access regulations, urban logistics (UL), urban road safety and urban ITS. SUMP represent a innovative approach for city planning, fostering effective, coordinated and consistent MSs' initiatives in line with the general guidelines provided by the EC.

2.1.1 Characteristics and trends of UFT

It has been estimated that UFT determines up to 15-20% of vehicular traffic in cities (Dablanç, 2011), generates up to 30% of road occupancy and 50% of greenhouse gas emissions in cities (Austrian Mobility Research, 2013). Concentration of economic activities and population in European cities are both high and rising (Eurostat, 2016). The two phenomena produce new challenges for urban freight distribution: cities are changing and so are freight customer

⁵ Its legal basis is Article 5(3) of the Treaty on European Union (TEU): "Under the principle of subsidiarity, in areas which do not fall within its exclusive competence, the Union shall act only if and in so far as the objectives of the proposed action cannot be sufficiently achieved by the Member States, either at central level or at regional and local level, but can rather, by reason of the scale or effects of the proposed action, be better achieved at Union level".

⁶ 23 September 2011 saw the release of the "Guidelines on Developing and Implementing a Sustainable Urban Mobility Plan" as a working document. These Guidelines have been used as a reference document for a series of awareness raising and training events held throughout Europe. Views obtained at those European Commission funded events were incorporated into a revised set of Guidelines, released on 17 December 2013 in conjunction with the official announcement of the European Commission's Urban Mobility Package. The now final version of the SUMP Guidelines replaces the 2011 working document.

demands. Consequently, the freight industry is changing (Wainwright, 2015), featuring new trends:

- Customer demand: e-commerce, instant deliveries
- Technology supporting the industry: clean fuel (including electric vehicles - EVs), telematics, use of real-time data
- Business models and operations: internet ordering, 'omni-channel', near-sourcing, port-centric logistics
- Fragmentation of supply chains: growth of number of vans
- Higher political profile for freight, also because of safety issues (fatal accidents).

In particular, over the last years, the distribution system of goods in European cities has suffered a strong fragmentation: there are many professional operators that offer third party shipping services and many who, on the other hand, operate on their own. There is a large number of polluting and oversized vehicles compared to the actual demand. The strong presence of own account small operators makes it more complex to coordinate and reorganize the industry. Another issue comes from the organisational policies adopted by retailers. Because of the rising prices of real estate in city centres, they want to maximize the area dedicated to sales and minimise storage needs: as a consequence, they pursue *just-in-time* (frequent deliveries of products) and *zero stock* (small quantities to minimize warehouse costs in the city centre) strategies, which can result in low vehicle load factors and a consequent increase of negative externalities caused by the sector. The fragmentation in loads and trips is accentuated by the recent expansion of *e-commerce* and instant deliveries, contributing to increase the number of deliveries and environmental impacts, and adding new types of 'light' (cargo-bikes, scooters) traffic for freight. Empty returns represent a significant cost too, for both transport companies and the community. In addition, the out-dated freight vehicle fleet causes a high level of air and noise pollution.

PAs have recently developed a growing, yet probably insufficient, awareness of the crucial role UFT policies play within the overall urban mobility system. European MSs need to further integrate UFT in the general city mobility management system (Dablanc, 2007). These challenges are addressed by city logistics (CL), a discipline that aims at balancing two seemingly conflicting elements: a freight distribution system effectively and efficiently responding to market demand, and a satisfactory environmental sustainability level (Taniguchi

and Thompson, 2014). Indeed, it is not feasible to abandon the logistics sector market to its own rules, without taking into account the social costs produced; on the other hand, excessive restrictions on goods distribution in cities or a heavy taxation system would lead to a reallocation of resources elsewhere (Delle Site et al., 2013), and consequently to the deterioration of the city economy (MDS, 2012). It is therefore necessary to identify measures that could solve this trade-off, by maximizing the efficiency of the distribution services and minimise the number of trips and the derived environmental impact.

2.1.2 The economic theory: external costs

Transportation costs are subject to a distorted perception: the prices of freight deliveries, especially for road transport, do not reflect the real costs and benefits they cause, as they relate to the individual, 'private' cost of transport only, without taking into consideration the shared, social and environmental costs. This distortion means that there is no optimal allocation of resources, since the equilibrium between supply and demand is distorted by the fact that part of the cost of transport is not considered. The cost caused by side effects of a certain activity upon society is defined *external cost*. This cost is not borne by transport users and hence not taken into account when they make a transport decision (European Commission, 2014). Types of side effects include air pollution, greenhouse gases, noise, accidents, congestion.

In the case of UFT, carriers and logistics operators make their economic assessments without taking into account the external cost of their activity, that is, the cost they do not pay but it is covered by the entire community: this means that the price they pay is lower than the real price, and consequently they will tend to carry out their operation until they reach the equilibrium between the marginal costs and benefits, which nevertheless does not correspond to the optimum quantity. The level of externality differs according to cost categories and transport modes. Environmental costs are considered as fully external. Congestion is an external cost for every driver, including the UFT operator causing the externality (Danielis, 2001).

If, from a theoretical point of view, it seems efficient to apply taxation equal to the marginal external cost produced, in practice, according to Danielis (2001), this can cause undesired effects:

- If one considers a general economic equilibrium, regulate the specific market considered is not enough, because any distortions in the competing and connected markets should be taken into account.
- Not always, due to data shortage or inaccuracy, it is possible to know the actual slope and position of the curve of marginal private costs, marginal private benefits, and marginal external costs. This can lead to a wrong assessment of the corrective fiscal measure, which must be equal or proportional to the (negative) impact produced, and must be known to the users in advance, so that they can make their own assessments considering the real weight of external costs.
- From a practical point of view, applying these measures can be complicated and costly, and large structural interventions are needed. Moreover, from a political-social point of view, the application of a fee is not always perceived as fair or popular.

According to these considerations, it is essential to explore as many alternatives as possible policy-makers have to reduce the impact of externalities caused by the UFT sector, by improving sustainable policies and measures. Policy makers tend to internalize externalities, i.e. making such effects part of the decision-making process of transport users, through market-based, pricing policies (Mostert et al., 2016), but also through regulation, i.e. command and control measures (European Commission, 2014). This work explores the opportunity to influence behaviour of all types of UFT actors through SPMs, i.e. avoiding coercion and enhancing voluntary cooperation mechanisms. As a first step, a literature review of categorisation of UFT policy measures is provided in the next paragraph.

2.1.3 Categorisation of UFT policy measures: a literature review

In this section, a comparative analysis of the literature is carried out to assess the different approaches used by scholars and experts to categorise UFT policy measures. Over the years, various categorisation systems have been elaborated, presenting different approaches in terms of public/private initiatives, types of actors involved, single or combined measures, etc.

Ogden (1992) is the first researcher to have compiled a catalogue of UFT policy measures. He indicates that the complexity and heterogeneity of the UFT system is driven by the key features of the goods movement with respect to the passenger sector. One of these is the range of participants involved in UFT and the range of perceptions they hold of the system.

Visser (1999) resumes and extends Ogden's work, by introducing a number of technological measures based on ITS systems and *voluntary cooperation schemes*. He also argues that, since private actors (transport operators and retailers) directly deal with the distribution of goods, while the PA merely regulates and facilitates these operations, it is necessary to distinguish between public and private measures and strategies. In his work, *voluntary cooperation schemes* are demanded to the private sector only, whereas the most recent trends put the PA at the core of the organisation of stakeholder cooperation schemes (Lindholm et al. 2013, Marcucci et al. 2015b, Quak et al. 2015). In addition, Visser introduces an important distinction as to how these measures can be implemented, which can be achieved either through incentive regulation, which makes the adoption of *virtuous behaviour* more attractive by (financial and non) incentives or permits, or by discouraging other behaviours through restrictive regulation, such as pricing and restrictions.

Muñuzuri et al. (2005) distinguishes two levels of measures for urban freight distribution: *specific measures* targeted at specific problems and addressed to one or a few groups of stakeholders and *combined measures*, generated by the combination of different specific measures and which represent a comprehensive strategy. Focusing on specific solutions, Muñuzuri also makes a preliminary distinction based on the group of stakeholders responsible for their adoption: not all actors are involved, but only those who have decision-making power: therefore, citizens are excluded. In this case, however, the groups are three: transport and logistics operators, receivers and local authorities (LAs). The measures investigated in this case are only those applied by the PA. The measures identified, broken down according to their scope, concern:

1. Public services (transfer points, local shifts)
2. Land management (parking, building regulations)
3. Access conditions (spatial and temporal restrictions)
4. *Traffic management* (scope of regulations, information, cooperation)
5. Enforcement and *promotion of measures*.

The criterion adopted by Russo and Comi (2010) aims to identify homogeneous characteristics between different measures, which make it possible to distinguish between those who have to make decisions (public bodies, private companies or public-private partnerships, PPPs) and those who are subject to them (final consumers, receivers or shippers). This classification also

implicitly reflects the different ways in which goods move from the producer to the final consumer. In this sense, different business patterns and functional relationships have been identified: i) direct, ii) indirect with the mediation of the point of sale and iii) indirect with the logistics mediation and point of sale).

Benjelloun (2009) considers the UFT projects undertaken over the past twenty years to develop a taxonomy of the implemented measures. Starting from the assumption that too often a too general categorisation has been adopted, he disaggregates each single type of intervention, and proposes a new three-tier classification, with a growing degree of specification: "five components, each structured on the second level through a series of criteria, for which more precise details are given by objects at a third-level of specification". The five components are: i) description (provides context explanation), ii) business model (addresses the criticalities of project financing and ensure its feasibility), iii) functionality (principles of project functioning), iv) area of application and v) technology.

On the contrary, Lindholm (2013), in the context of an impressive literature review on the role of LAs in the urban freight distribution, asserts that the more a text has an academic connotation, the more it increases the complexity of the measures, particularly with regard to stakeholders involved. Her classification, therefore, consists of only three items: i) infrastructure, ii) restrictions and iii) consolidation. In particular, on infrastructure, she focuses on measures that make existing infrastructure more efficient. Restrictions mainly include congestion charging measures and road pricing. Concerning the consolidation interventions, attention is drawn to the actors responsible for the implementation of distribution platforms: sometimes the initiative is public, sometimes private, often shared.

The EC has also given its contribution to the effort for the UFT measures categorisation, with two studies published in 2012 and 2015 respectively (MDS 2012, CIVITAS WIKI 2015). A comparison of the two categorisation systems has been carried out. As can be seen from Table 1, the categories proposed are consistent and overlap in most cases. However, the CIVITAS WIKI Policy Note proposes two new categories that, although partially considered by the MDS study in the generic *Management and other measures* category, are now being given more attention: *Stakeholders' Engagement* and *Eco-logistics awareness raising*.

Table 1 - Comparison between CIVITAS WIKI (2015) & MDS (2012) studies on UFT measures categorisation

CIVITAS POLICY NOTE (2015)	EC STUDY ON UFT (2012)
Regulatory measures	Regulatory measures
Market-based measures	Market-based measures
Land use planning & infrastructure	Land use planning measures
	Infrastructure measures
New technologies	New technologies
Eco-logistics awareness raising	Management and other measures
Stakeholders' engagement	

Source: comparison of CIVITAS WIKI (2015) & MDS (2012)

Looking in detail at the types of measures belonging to these categories (Table 1), it can be noticed that many of these are strongly linked to the UFT SPMs concept as it is defined in this work (highlighted in light green): the development of EC policies seems evolving taking into account principles such as participation, exchange of good practices, information and awareness raising and positive incentives.

Table 2 - CIVITAS WIKI - UFT categorisation

CATEGORY	MEASURES	NATURE OF THE PROBLEM					INVEST	IMPL. TIME
		Cong,	Inadeq. Infrastr.	Pollution	Noise	Safety		
Stakeholders' engagement	Freight Quality Partnerships	x	x				low	medium
	Freight advisory boards & fora	x	x				low	medium
	Designation of a City Logistics Manager	x	x				low	medium
Regulatory measures	Time access restrictions	x			x	x	low	short
	Parking regulation	x				x	low	short
	Environmental restrictions			x	x		low	short
	Size/Load access restrictions				x	x	low	short
	Freight- -traffic flow management	x			x	x	low	short
Market-based measures	Pricing (road pricing, congestion charging/ park pricing)	x			x		high/moderate	medium/short
	Taxation and tax allowances	x		x	x		high	medium
	Tradable permits and mobility credits			x	x		moderate	medium
	Incentives and subsidies			x	x		high	medium
Land use planning & Infrastructure	Adapting on- -street loading zones	x	x			x	low	short
	Using building code regulations for off-street delivery areas		x				low	medium
	Nearby delivery areas	x	x			x	high	medium
	Upgrading central off-street loading areas		x			x	high	short
	Integrating logistics plan into land use planning	x	x	x	x	x	moderate	long
	Collect points	x	x				low	short
	Urban Consolidation Centers	x	x			x	high	medium
New technologies	Dynamic routing	x				x	high	medium
	Real- -time information systems	x					high	medium
	Traffic control	x				x	high	medium
Eco-logistics awareness raising	Anti-idling			x			moderate	short
	Eco-driving			x	x		moderate	medium
	Modal-shift	x		x	x		low	medium
	Staggered work hours	x					low	medium
	Recognition and certification programmes			x	x		low	medium

Source: CIVITAS WIKI (2015) Incentives and theory of motivation

2.2 Incentives and theory of motivation

After having briefly analysed the characteristics and trends of the UFT, and the categorisation of the related policy measures, this paragraph introduces a theoretical overview of economic and psychological approaches to incentives and motivation. This is necessary for elaborating considerations as regards rationality of agents and psychological mechanisms affecting their decision-making processes: here we set the ground for the following introduction of *prospect theory* (Kahneman and Tversky, 1971), BE and its impact on urban transport through incentives provided by SPMs.

2.2.1 Principal-agent problem and incentives with information asymmetry

Incentive systems study collective action by analysing contractual and non-contractual mechanisms to coordinate the efforts of all actors in the system with the aim to achieve a predominant goal (Gibbons, 1998). Such mechanisms act by limiting the motivation of the individual interest in case it diverts the individual behaviour from achieving the common goal, and by re-directing individual motivation to attain this objective.

Linked to the object of this research, the *principal-agent* model envisages a situation where the so-called *principal*, or company, delegates a task to a single *agent* through a contract (*contract theory*). In particular, the *principal-agent* model in the presence of *information asymmetry*⁷ (Laffont and Tirole, 1993, Laffont and Martimort, 2001, Sappington and Stiglitz, 1987) seems particularly important to explore more about type and nature of incentives, although its application is mainly limited to contract theory (Prendergast and Canice, 1999). According to this model, the delegation of complex activity from one actor to another - when the goals of the individual actors do not coincide and the exchange of information is expensive for them - requires a control mechanism that ensures efficiency of the delegated activity and limits the occurrence of opportunistic behaviours. If such control cannot be direct (for reasons of cost or nature of the activity) it must be regulated by ad hoc contractual mechanisms. These mechanisms are based on the use of incentives, that in this theory are defined as the “stimulus that provides motivation to act in a certain direction” (Skinner, 1938). This direction may not correspond to the one that would have been spontaneously undertaken in the absence of such a

⁷ In contract theory and economics, information asymmetry deals with the study of decisions in transactions where one party has more or better information than the other. Information asymmetry is in contrast to perfect information, which is a key assumption in neo-classical economics.

mechanism and even be contrary to it. In the the *principal-agent* model, there are two types of incentives:

- *Ex-ante incentive* schemes aim to steer strategic choices in terms of objectives or priorities
- *Ex-post incentive* schemes are result-oriented systems for controlling efficiency. In this case, incentives can be directed to incentivise a greater involvement by the players, as well as to take on a greater risk. Rewards belong to this second category: the motivation to engage of the agent is determined by the reward for achieving a certain result. Rewarding is a strong incentive system and represents an evolution compared to the more traditional ex-ante incentive systems, since it promotes autonomy and responsibility, in line with principles of performance and result-based public management theory (OECD 2004).

Incentives can be of a different nature: monetary, reputational, moral, psychological. These aspects are often interconnected and present at the same time. The award of a monetary reward follows a reputational recognition, and so on. One can often think that monetary incentives are decisive and that they are linked to secondary incentives that only strengthen it, but that is not always the case (Gneezy, 2000). The nature of the incentive must be consistent with the type of actor it is devoted to: in order to have the strength to influence the behaviour of an actor, it must have some value for the actor himself. This is also the reason why *segmentation* of target groups is an essential aspect for the creation of effective incentives and policies (Egmond, 2006).

For UFT, it is particularly important to consider the behaviour and incentives issues from the perspective of the *principal-agent* model: indeed, unlike other urban mobility areas, UFT stakeholders are mainly commercial players, i.e. economic agents (Tezuka, 2011). Gruler (2016) states that, in the context of city logistics, behaviour plays an important role, since integration and cooperation among different stakeholders (public and private) and system planning does not only depend on technical and physical components, but also on human and behavioural factors. Research in supply chain management mostly neglects this fact and forgets about the crucial importance of the behavioural and people dimension (Storey, 2006), arising from risk-aversion of decision takers or the lack of trust and incentive misalignment between companies and their managers.

Conventional *principal-agent* models assume players are rational, so they know, and they understand, their own and other player's utilities and probabilities. In reality, players constantly make decisions without such knowledge and understanding. In this case, decisions based on standard *principal-agent* theory may not be efficient when knowledge assumptions are relaxed (Rose, D. and T. Willemain, 1996). Therefore, it is important to enlarge the scope of the analysis to situations where the actors present not only asymmetric and incomplete information, but also cognitive limits.

2.2.2 Intrinsic vs extrinsic motivation and incentive theory of motivation

Incentives can be used by policy makers to influence behaviour of users of the city transport network (Dolan et al., 2011). An incentive is “everything that motivates or stimulates people to act” (Giger, 1996), or a signal to motivate action (Sargent et al., 1994).

Incentive theory investigates the factors capable of influencing human behaviour. Incentives are a form of motivation driving people to better perform an activity, or to do something they would not do without the incentive (Brewer et al., 1995). The incentive theory is therefore a theory of motivation that emphasizes the importance of influencing factors, which attract actors through a desire for reward (Cherry, 2013). This element of reward, which determines the satisfaction of the interested actor, is called 'motivator' (Herzberg, 1959). The types of incentives depend on the type of activity to be performed, and on the preferences system of each actor. Depending on the nature of the motivator, two types of incentives are distinguished: *intrinsic* and *extrinsic*.

Citizens and businesses can be driven by extrinsic motivators, characterized by rewards from third parties, such as benefits in terms of awards, cash prizes, free products. Extrinsic motivation has been defined as “engaging in an activity to obtain an outcome that is separable from the activity itself” (deCharms, 1968; Lepper et al., 1978), which means that the actors perform certain actions and activities because they are induced from the outside, and not because they derive direct satisfaction or believe in the action itself. Brewer et al. (1995) argue that extrinsic incentives are very effective because rewards are always positive and are likely to encourage citizens to continuously participate. The resulting advantage is often economic, which in turn can be financial (money transfer, tax relief, tax reduction, subsidies) or non-financial (in the

case of companies: competitive advantages towards other companies, advertising, increased reputation).

Consequently, external motivators are used to *nudge* someone who does not have an intrinsic interest in performing a certain action, but that the decision-maker considers useful in the interest of the community. This seems to be in line with the mobility sector we investigate in this work: the *choice architect*, as we see in the following sections, needs to identify the areas to be improved, and where the awareness and motivation of the actors are poor, and design an incentive system to encourage them to undertake the desired action.

Intrinsic incentives are based on the satisfaction a person feels after accomplishing an activity or task because it is enjoyable, or because the person simply believes in it (Massung et al. 2013). In literature there is debate about the actual impacts of the so-called *overjustification effect*, that is the theory arguing that the systematic application of extrinsic rewards decreases the intrinsic motivation of performing an activity that has the potential to be intrinsically driven (Wiersma, 1992), and even that motivation that was once intrinsic has a tendency to shift to being extrinsic (Darner, 2009), creating a dependence on the rewards in order to continue the action (Carlson, 2007). Intrinsic incentives are often related to motivators like enjoyment, interest, verbal recognition, feedback, curiosity and satisfaction. UFT is a particular sector compared to other urban mobility areas, where choices are often taken by individuals maximising their own well-being, including strong social elements, as the motivators just listed. UFT actors' interaction and choices are rather bounded to economic constraints, with the ultimate goal of profitability. In this area, intrinsic motivation seems to have a lower impact, therefore the risk of creating a dependence on extrinsic rewards for continued performance appears negligible. However, money has shown to be an expensive way to motivate people (Gneezy, 2000). It is important to clarify that this study aims to investigate the effectiveness and impact of SPMs on UFT, intended as measures 'gently' encouraging the adoption of virtuous behaviour and voluntary cooperation mechanisms to instil a sense of social responsibility to the actors. Therefore, whereas direct financial incentives do not always satisfy this vision, external rewards and non-financial recognition schemes that can make UFT actors perceive any sort of benefits, strictly linked to sustainable behaviour (see the Turin case in 6.3.1.3) are in line with the conceptual framework proposed in this work.

2.3 Behavioural economics and soft transport policy measures

This paragraph is pivotal for the overall research: first, it covers the evolution of studies about the behaviour of the economic agents, from the classical theory of rational choice to the latest developments suggested by *prospect theory* and BE; second, it undertakes a wide literature review of the application of BE in the field of urban mobility, and the preliminary findings available so far. Finally, it discusses how they could be adapted to UFT, considering its peculiarities.

2.3.1 Perfect rationality vs bounded rationality and prospect theory

The classical theory of rational choice states that economic agents are rational and markets are or should be efficient and behave also rationally. According to classical economic theory, the sub-optimal choices made by the rational agent (*homo oeconomicus*) are caused by incomplete or asymmetric information. BE questions the perfect rationality of the economic actor as assumed by neoclassical economic theory, emphasizing his cognitive limits (Dawney). BE does not contradict classic theory, it rather adds another layer of complexity to try to understand when and why people behave differently than macro, traditional economic models suggest. This approach is particularly useful when research implies the analysis of everyday transportation choices and preferences of individuals and businesses in the urban environment: it is essential to understand people behaviour, in order to ‘gently’ influence it by a well-conceived choice architecture.

The rational choice theory proposes a model portraying economy as a collection of profit-maximizing firms and utility-maximizing households interacting through perfectly competitive markets (Weintraub, 2007). Simon (1955) proposes a shift from global rationality of the economic actor to rational behaviour compatible with the access to information and computational capacities, that’s to say decision-making as a fully rational process of finding an optimal choice *given the information available*. He introduces the concept of *bounded rationality* to denote the whole range of limitations on human knowledge and human computation that “prevent economic actors in the real world from behaving in ways that approximate the predictions of classical and neoclassical theory” (Simon 1987a). “Theories of bounded rationality is more ambitious, in trying to capture the actual process of decision as well

as the substance of the final decision itself” (Simon 1987b), whereas neoclassical choice theory remains at a pure theoretically explanatory level, creating an “apparatus for predicting choice”.

Citizens and businesses aim to maximize their preferences. However, they cannot know for sure what will be the result of their choices. *Expected theory*⁸ considers how to choose rationally when the outcome of choices is uncertain. It assumes that what actors maximise is not expected value, but expected utility, i.e. the sum of the products of probability and utility over all possible outcomes (Mongin, 1997). This approach represents decision making under uncertainty, and includes the variable of measurable risk aversion of the actors (Arrow, 1965). Over time, researchers have become aware of the limitations of expected utility theory (Schervish et al. 2003, Wu 1996). Thus, numerous alternative theories have been developed to overcome its limitations without losing its explanatory power. *Prospect theory*, developed by Daniel Kahneman⁹ and Amos Tversky, is perhaps the most well-known of these alternative theories. Their findings question the rationality and cognitive capacities of individuals when they are called to express their preferences and make choices. In particular, Kahneman has identified some distortions depending on the timing and the way of acquiring information. According to the concept of *availability heuristic*, the most recent or most easily available and comprehensible information tends to weigh more in the process of forming a person's opinion. Also, the way in which choice options are presented influences the propensity of the actor towards one or the other: this phenomenon is known as *framing effect* (Tversky and Kahneman, 1981). The ability to discern the relevance of an information in maturing a decision should not be taken for granted: when the decision maker considers an irrelevant one, we speak of *anchoring effect* (Kahneman et al., 1982).

2.3.2 Behavioural economics: local authorities as *choice architect*

Building on prospect theory and Kahneman and Tversky's work, Robert Thaler¹⁰ published *Toward a Positive Theory of Consumer Choice* in 1980, a paper which Kahneman considers

⁸ *The expected utility theory deals with the analysis of situations where individuals must make a decision without knowing which outcomes may result from that decision, this is, decision making under uncertainty. These individuals will choose the act that will result in the highest expected utility, being this the sum of the products of probability and utility over all possible outcomes. The decision made will also depend on the agent's risk aversion and the utility of other agents.*

⁹ *Psychologist, winner of the Nobel Prize for Economics in 2002*

¹⁰ *Professor of Economics and Behaviour Science at University of Chicago*

“the founding text in BE” (Kahneman, 2003). BE theory is a branch of political economy that has spread over the last few decades, mainly under the impulse of some scholars, including Thaler, Cass Sunstein¹¹, and Kahneman. This theory is based on the consideration that the human being is fallible, and that s/he often makes the wrong choices and adopt irrational behaviour (Ariely, 2009). As found above, according to classical economic theory, the sub-optimal choices adopted by the rational agent (*homo oeconomicus*) are caused by incomplete or asymmetric information. BE, on the other hand, attribute it mainly to cognitive limits and insufficient willpower (Simon, 1987a). Because human beings are subject to behavioural biases (Kahneman and Tversky, 1979, 1981, 1982), there is the need for a *choice architect*, which intervenes to organise the context in which individuals make decisions. The organisation of such a context can take place in different ways. However, since the human being is not always able to select the solution that maximises her/his actual wellbeing, it is essential that the *choice architect* ‘gently’ pushes her/him towards the good direction. This ‘gentle’ push is defined *nudge*, and it is any aspect of the presentation of a set of options that condition the behaviour of the individual, however without excluding any possible choice (Thaler and Sunstein, 2009). The intervention, in fact, should be easily avoided without causing significant costs to the individual. This approach thus significantly deviates from measures including obligations and prohibitions. The case of organ donation is a classic example used by BE supporters to clarify what a *nudge* is. In some countries, legislation requires citizens to give explicit consent for their organs to be donated after death (*opt-in*). In others, often with similar socio-economic-cultural characteristics, citizens simply have to provide explicit dissent (*opt-out*). Statistics show that, in the first case, donors do not exceed 15%, while in the second case they almost never fall below 90% of the population (Johnson and Goldstein, 2003). This demonstrates that a simple variation in the choice architecture results in a substantial change in the choices made (reinforcing the findings of Tversky and Kahnemann, 1981, about the *framing* effect) Khan. In particular, several studies indicate that the choice often coincides with the *default* option (Johnson and Goldstein, 2003). When, on the contrary, there is an obligation to choose, the results are often different, and not necessarily more positive. This is because individuals, when the topics are complex and feedback is not immediate, have difficulty in adopting the most rational choice.

¹¹ Professor and former consultant to the Supreme Court and Federal Department of Justice of the USA

The essential condition for BE is that the *nudge* orients the individual towards the choice that meets *his/her own preferences*, otherwise it would represent a case of simple manipulation. On the basis of this fundamental premise, Thaler and Sunstein introduced the concept of *libertarian paternalism*, a new approach to policy-making, for strategies and public policies, based on the findings of BE research. The paternalistic side is based on the belief that regulation in public policy is desirable and necessary, and must be directed towards improving the well-being of citizens. The libertarian qualification of this approach is concerned with ensuring and maintaining the substantial freedom of choice of individuals. Starting from the assumption that PA cannot avoid influencing individual choices, since it has to intervene in regulating the various areas of public life, *libertarian paternalism* identifies the PA as the *choice architect*, which has to create a decision-making context.

According to this theory, marketing actions can successfully affect the experienced appeal of an option, by manipulating its *non-intrinsic* attributes: preferences are often dependent on *how* the options are presented (*framing* effect), and *when* (*timing* effect). Accordingly, in the (soft) policy-making processes, policy-makers can work on the non-intrinsic attributes of the most suitable solutions, to make them more attractive for the users.

Psychology, being the science of human behaviour, is highly relevant for environmental policy formation at any level, but particularly with regard to the more complex environmental problems. People generally cannot handle long-term complexity. *Eco-technology* and economic price mechanisms alone cannot resolve major environmental problems: any serious policy measure will affect human behaviour patterns. Environmental policy making is most effective in the context of *multidisciplinary collaboration* (Vlek, 2000). In the environmental sector, many national governments are making progress in managing local and regional environmental problems. However, as we discuss in chapter 5, at the national level environmental problems are more difficult to control, due to the diversified nature and composition of actors and local environment, especially for what concerns transport. However, at each level, one's own environmental problems can only be resolved if most others agree to cooperate. Thus, there is a need for effective coordinating authorities who design, implement, and enforce optimal environmental policies at higher governance levels.

In order for LAs to play a key role as *choice architect*, a different approach concerning their organisational capabilities and skills needs to be adopted as well. Lower-tiered authorities

report difficulties in acting in a more comprehensive or rapid manner than upper tiers of government (Marsden et al., 2014). Simply providing training, resources and tools is not enough: cities need to look at the state of readiness to change the way they work, in the light of an organisational and cultural change. It is necessary to create learning organisations (Argyris, C., Schön, D., 1978), i.e. places where people continually expand their capacity to create the results they truly desire (Senge, 1990), that are resilient and responsive with capable, motivated and adaptable staff, so that transport planning departments become change agents, therefore more aware players in the CAC. The EU-funded project SUITS¹², started in 2017, is supporting this view, aiming to help LAs find new ways of implementing their particular measures, by identifying individual, organisational and institutional capacity gaps, and increase interdepartmental working and knowledge exchange.

2.3.3 Behavioural economics and soft policy measures in the transport sector

This paragraph performs a literature review of the main contributions on the theoretical implication of the BE in the urban transport sector. In particular, the concept of SPMs is investigated. The review deepens the knowledge of SPMs and their application to concrete real-field testing environments.

2.3.3.1 Definitions of soft policy measures in the transport sector

According to Bamberg et al., 2011: “soft measures are policy interventions aimed at interfering directly in individual decision-making processes *to promote voluntary behavioural changes*”. Hard measures intervene on infrastructures, on regulation and aim to change user behaviour through actions of a coercive nature, or which imply a direct economic impact, as taxes and fees (Bamberg, 2011). Soft measures place the user at the centre of the decision-making process, providing more options but sponsoring those with the most positive impact for the community. Hard and soft measures are not mutually exclusive, on the contrary, they are complementary and the SPMs are often designed to support and strengthen the effectiveness of HPM: for example, to increase the number of users using public transport or the cycle network, it is fundamental to improve the infrastructural network, however it is equally important to promote and publicize the changes made, and to inform the population of the advantages that result from its use (Sanjust et al., 2015).

¹² <http://www.suits-project.eu/>

SPMs in transport are also referred to as *voluntary change measures* (Loukopoulos, 2007), *psychological and behavioural strategies* (Fujii and Taniguchi, 2006), or *mobility management tools* (Cairns et al., 2008). As for the latter, EPOMM, the EU platform of mobility management (MM), provides the following definition, developed by the MAX project¹³:

“MM is a concept to promote sustainable transport and manage the demand for car use by changing travellers’ attitudes and behaviour. At the core of Mobility Management are ‘soft’ measures like information and communication, organising services and coordinating activities of different partners. ‘Soft’ measures most often enhance the effectiveness of “hard” measures within urban transport”

According to the EU-funded initiative CIVITAS the aim of MM is to “change attitudes and travel behaviour with the ultimate goal to create a new mobility culture”¹⁴.

. The MIDAS project¹⁵ was part of the Intelligent Energy for Europe (IEE) STEER Programme. The prime objective of the project, which ran from January 2006 to December 2008, was to encourage transfer to less energy intense modes of transport by optimising the use of SPMs aimed at reducing demand for private motorised transport. Categories of SPMs are i) education and awareness, ii) participation and consultation, iii) information, advice and marketing, iv) planning and coordination campaigns. They aim to encourage greater use of public transport, cycling and walking, car clubs and carpooling, and MM initiatives. The evaluation of the project showed that SPMs, integrated with other transport improvements, could reduce private car traffic by 20% (Cain and Blackledge, 2009). However, it is important to note that UFT is not included among the sectors analysed.

2.3.3.2 Transport actors ‘predictably irrational’

In recent years, SPMs are gaining increasing attention in the field of sustainable mobility for different reasons: the impossibility of disposing of large budgets, public dissent against coercive measures (Gärling and Schuitema, 2007), the failure of many top-down interventions, the increasing awareness of environmental externalities. Moreover, from an economic perspective, it should be considered that there is a market failure in the urban transport sector (Metcalf et al., 2013): i) carbon-based fuels’ externalities are not accounted in their price, and ii) there are

¹³ The MAX-project ran from 2006 to 2009 and was the largest research project on Mobility Management within the EU’s sixth framework programme.

¹⁴ <http://civitas.eu/measures/mobility-management>

¹⁵ *Measures to Influence transport Demand to Achieve Sustainability*

transaction costs and information barriers hindering the adoption of more rational behaviour in making (non-)transportation choices. While HPMs can provide compensation for the former issue, SPMs can especially address the latter: SPMs are designed to motivate people to adopt sustainable behaviour regarding urban mobility. SPMs aim to achieve important goals in the urban transport sector (e.g. modal shift, higher safety, CO2 reduction), influencing individual mobility choices, and therefore altering the demand for mobility (Jones et al., 2011, Holguín-Veras et al., 2016a).

Behavioural change campaigns appeal to the will of individuals, who take the decision they deem to be the best without being forced, but only oriented (*nudging*). According to Metcalfe et al. (2013), several elements of BE could be used as a cost-effective tool in climate-change policies, and TDM, considered as synonym of MM (Litman, 2003) has been discovered as a way to influence travel behaviour (Juhász 2013, Mokhtarian 2001, Ben-Elia 2015, Watkins 2011, Dziekan 2007, Brög 2004, Garcia-Sierra, 2015).

SPMs can take the shape of rewarding and recognition schemes, (motivational) incentives, information campaigns and gamification. They encourage individuals to voluntarily align to a virtuous behaviour, also leveraging motivational forces based on social, environmental and (indirect) economic mechanisms. Nowadays, financial resources are scarce in most of the European cities, and financial incentives are expensive (Ariely, 2009). More importantly, financial incentives can have a negative impact on the choice of individuals, transforming a social norm into a market norm (Gneezy et al., 2000). For these reasons, the analysis here focuses on non-financial incentives (Silverman, 2004).

So far, many projects have been directed to limit speeding for safety (Elliot et al. 2010, Peer 2011, Pelsmaker et al. 2007) and voluntarily reduce car use by citizens (Abou-Zeid et al. 2012, Buningh et al. 2014, Ettema et al. 2012), which have led to several positive results (Richter et al., 2009a). In *Review of Evaluations of Soft Transport Policy Measures* (2010), Richter et al. elaborate an extensive literature review of SPMs adopted in different countries around the world, with the aim of evaluating their effectiveness. The research considers SPMs something different from hard measures, which often meet public disapproval, and are politically infeasible. Although SPMs are found effective, it is difficult to infer the motivations and drivers of their effectiveness so far, so that they can be systematized and successfully transferred to other contexts. So far, the spectrum of measures introduced on a large scale is limited to the

ones mainly attempting to reducing car use as well as improving more sustainable modes, by providing customised information and feedback, workplace and school travel plans; personalised travel planning, travel awareness campaigns, sharing schemes, public transport promotion (Cairns et al., 2008; Taniguchi et al., 2007; Thøgersen, 2007, Richter, 2011, Bamberg, 2011, Sanjust et al., 2015, Avineri, 2012, Moser and Bamberg 2008). Different EU research projects (BYPAD, MOBI, PASTA, PRESTO, TRACE) have investigated the opportunity to introduce measures to effectively promote modal shift towards more sustainable means of transport, and the identification of the proper mix of hard (infrastructure) and soft (promotion) measures (Lozzi et al., 2016). However, there is an increasing need for large-scale, field studies, to prove that the effectiveness of these interventions are ascribable to clear cause-effect relationships, clarifying the different impact of both intrinsic and extrinsic motivation-based measures.

An important result of this preliminary literature review is that only few studies, which are described in chapter 6, address the freight dimension when identifying SPMs in the field of urban mobility. Following on from these implications, two issues linked to our research questions arise and are addressed in the following sections:

- How can these key elements of BE be utilised by LAs in choice architecture for the urban mobility?
- In the UFT sector, does the same concept apply, since private business actors (companies) are implied, and not individuals?

2.3.4 Urban freight transport: need for an *agent-specific* approach

The need to tie the research in the field of BE, and therefore of the SPMs, to the UFT arises from the fact that the latter, in contrast to other fields of the transport sector, such as the passengers one, presents marked elements of fragmentation and heterogeneity (Marcucci et al., 2013a). This potentially hinders the elaboration of common solutions, which might conveniently be tailored to different urban contexts. Therefore, it is important to identify a clear relationship between citizens, stakeholders, environment, local governments, on the one hand, and different types of measures, on the other, to determine the optimal combination of the best policies with respect to the peculiarities of each specific context (Nesterova and Quak, 2016). The policy interventions implemented so far in this area have often produced unsatisfactory

results, as little attention has been paid to the behavioral aspects of the actors involved, and *agent-specific* approaches have not been adopted (Marcucci et al., 2013a). For this reason, this work aims to explore the applicability and effectiveness of SPMs to the UFT, and systematize a conceptual approach to frame them in a broader multi-level governance planning process.

3 Methodology

This chapter illustrates the methodology of the research, aiming to improve the knowledge of urban mobility and urban freight planning policies and interconnections i) at the EU level, ii) in the 28 European MSs and iii) in selected cities. Moreover, it aims to identify, assess and validate a set of SPMs for UFT (from now on, called *UFT SPMs*). In this regard, the chapter is divided into two main sections. In the first section, it introduces the different data collection methods adopted, providing a general overview for each of them and explaining why and how they are used, and for which activity. The second section focuses on the evaluation criteria elaborated in the research, necessary to obtain and validate rigorous and scientifically valid findings. Firstly, it illustrates the concept of each evaluation criterion, essential to derive policy strategies, clarifying the distinction between positive and normative criteria. Secondly, it defines the key standardised criteria for policies comparison and assessment, and how they are utilised in the framework of the overall study, as developed in the following chapters.

3.1 Data collection methods

Four data collection methods are used in this research: i) literature review, ii) comparative analysis of key documents about different countries and cities, iii) surveys of a wide sample of key stakeholders and experts, and iv) interviews and surveys of policy makers in European Member States and cities.

3.1.1 Literature review

The literature review, reported in chapter 2 and 5, explored four main areas:

- Literature review of UFT, to identify the main features of the sector.
- Literature review of BE, with particular attention to the contributions providing new elements for the elaboration of public policies, such as *libertarian paternalism* and *nudging*.
- Literature review of the application of SPM to the transport sector, with particular attention to planning tools related to stakeholder cooperation, awareness raising campaigns, motivational incentives, rewards and gamification.
- Literature review of SPMs in the field of UFT.

3.1.2 Comparative analysis of key documents and databases

First, the research identifies key policy documents produced by the EC, which explicitly deal with (urban) freight transport. Once the relevant policy documents have been identified, a qualitative analysis of these documents is carried out to detect the most important UFT policy solutions, and extrapolate and redefine them in a comparable format (section 5.1).

Second, the research assesses the effective adoption of the most innovative SUMP principles (see section 5.2) in different MSs national planning frameworks, through a systematic comparative analysis of all the relevant national urban mobility planning legislation and guidelines introduced by the MSs.

Finally, in 5.3 the research carries out a survey on the actual implementation of SUMP in European cities. Data extrapolated from the ELTIS City Database¹⁶ have been elaborated to infer a quantitative estimation of the relationship between SUMP national frameworks and the actual plans locally adopted in the 28 MSs.

3.1.3 Surveys of a wide sample of experts

In order to validate the five criteria identified to define UFT SPMs (see 6.2), a Delphi Analysis with UFT experts is carried out. The Delphi method is a technique for collecting information that allows obtaining the opinion of a panel of experts. This technique, qualitative in nature, is advisable when there is not enough information available for decision-making or it is necessary, for the research, to collect consensus and representative opinions from a group of individuals. In this context, this technique has been used to gather expert opinions on the open questions on urban freight planning and soft policy measures in EU cities, as illustrated in 6.2.1

3.1.4 Focus groups and interviews with policy makers

The research presented in section 5.2, on the MSs national planning frameworks, collects information from various official sources and carries out all the necessary checks and follow ups, thanks to a direct contact with the members of the European MS Expert Group on Urban Mobility¹⁷, who provided valuable feedback. All the members of this group have provided

¹⁶ <http://www.eltis.org/mobility-plans/city-database>

¹⁷ The MS Expert Group on Urban Mobility was established by the EC in October 2014. This phase took place in the framework of a research activity at the EC (www.eltis.org/mobility-plans/member-state-profiles), started in October 2014.

information on the status of the adoption of innovative urban mobility transport solutions in their own countries.

At a second stage, in 6.4.1, the research involves, through interviews, European LAs officers and researchers planning in the field of urban freight distribution, which have considered and introduced UFT SPMs, as identified in this research, to check whether their evaluation and feedback correspond to the theoretical ones.

Finally, for the identification of the most suitable UFT SPMs for Rome, to be framed in an overall strategy for Rome: *Improving UFT via SPMs*, a Focus Group with Rome's local stakeholders (LA, industry stakeholders, researchers) is envisaged.

3.2 Definition of evaluation criteria

The criteria to derive policy statements can be of two types, positive and normative. The first define the rules under which some empirical data can validate or not a theoretical hypothesis: they should be derived by economists. The latter identify the norm that underpins the assessment of the different lines of action or conduct: they should be defined by politicians, or by who have received the mandate to do so. It is appropriate to distinguish the division of tasks between economists and politicians for the development of positive and normative criteria.

Economists cannot isolate a specific theory and indicate it to the policy-maker as a reference for the behaviour it aims to promote. The economist should instead propose to the politician a range of alternative models built according to the main theories, based on the purpose of the latter. It is the duty and responsibility of the politician to choose, from time to time, the model to which constrain the maximization of his preference function (Romagnoli, 2017). This concept reinforces the proposed approach, derived from BE, which attributes to the PA the role of *choice architect*, in charge of defining a set of preferences for the actors. Chapter 5 takes account of this separation of tasks, considering how data can validate theoretical assumptions.

3.2.1 Definition and utilisation of key standardised criteria for policies comparison & assessment

3.2.1.1 European level: weight of freight in EU UFT policy

As for the identification of the most important UFT policy solutions proposed at the EU level (see section 4.2), their linkage with the Horizon 2020 (H2020) Research Programme's topics

(see section 5.1) implies the identification of a criterion for easily assessing the consistency between the two. The research also identifies the amount of budget (potentially) allocated to UFT projects, and consequently ranks the UFT policy solutions according to their importance, on the basis of the weight in monetary terms resulting from the research funds allocated to each of them.

The methodology adopted consists of three main steps: i) selecting policy documents; ii) identifying the most relevant UFT policy solutions; iii) assessing consistency between policy priorities and H2020 research funding.

Selection of policy documents

Three criteria have been used for selecting policy documents analysed is 3.1. The first criterion refers to the type of documents. A premise on legal aspects is necessary to motivate the choice made. At European level, there are various forms of action: recommendations, directives, communications and acts concerning the organization and functioning of the institutions. Their qualification, structure and legal effects result from various provisions of the treaties or the rules adopted in their application. Also of note is the importance of White Papers¹⁸, Green Papers¹⁹ and Action programmes, through which agreements on long-term objectives among MSs are made. The EC prepares and publishes guidance documents relating to the areas over which it has (full or residual) jurisdiction. In the case of urban mobility, the binding power resides in the hands of the MSs, but, in some cases and for certain types of actions, the EU can intervene through the subsidiarity principle. Since the aim of the research is to focus on the relationship between UFT policies and the research programmes financed by H2020, the types of acts considered are non-binding guidelines, which can take different forms (e.g. White Papers, Green Papers, Communications²⁰), while binding legislative provisions are out of the scope.

The second criterion relates to the field considered. European policies, when addressing any area where concrete intervention is required, very often imply a certain overlapping with other fields. For example, the White Paper on Energy, when dealing with transportation fuels, may

¹⁸ *White Papers communicate a decided Commission policy or approach on a particular issue. They are chiefly intended as statements of Commission policy, rather than a consultation or starting point for debate.*

¹⁹ *Green Papers are usually used to launch a consultation process. They present Commission policy orientations for debate to interested parties who may wish to comment. The Commission will generally prepare a subsequent proposal.*

²⁰ *Communications usually set out a Commission action plan and may include concrete proposals for legislation.*

provide recommendations that indirectly influence the transportation sector. Such considerations could lead to an analysis of all other sectors' policy documents, having even the slightest potential impact on UFT. However, in order to define an accurate picture, the research concentrates solely on the documents drafted by the European Directorate-General for Mobility and Transport (DG MOVE) of the European Commission and directly related to UFT²¹. In fact, since each DG has a key role in the definition of the H2020 affecting its sphere of influence, it is considered appropriate to assess the alignment between policy documents and H2020 calls produced by the same DG in the first place. The only exception is the Freight Transport Logistics Action Plan, since it specifically analyses UFT, delving into a significant aspect of logistics in general.

The third criterion simply assumes that only publicly available documents are considered.

Adopting the criteria illustrated above produces the list of documents reported below (more details in 5.1):

1. Transport White Paper 2001
2. Green Paper *Towards a new culture for urban mobility*
3. Freight transport logistics action plan
4. Action Plan on urban mobility
5. Transport White Paper 2011
6. Urban Mobility Package
7. A call to action on urban logistics

Identification of most relevant UFT policy solutions

The second methodological step is the identification of the most important UFT policy solutions so to successively link them with H2020 Work Programmes. A qualitative analysis of the above-mentioned policy documents, investigating the entire set of relevant topics addressed, was carried out. An in-depth description is provided in section 4.2. The selection of the policy solutions is based on the following factors: i) how many, among the seven documents investigated, advocate these solutions (must be at least two), ii) the elements of continuity

²¹ Although many are the policy documents DG MOVE has published in the last 20 years, partly addressing urban mobility, this paper refers only to those explicitly dealing with UFT that are also listed on the DG move urban transport webpage: http://ec.europa.eu/transport/themes/urban/urban_mobility/index_en.htm

throughout all the seven documents, and iii) a qualitative assessment of the specific weight and degree of priority within each document.

The list of UFT solutions detected is reported here (more details in 5.1):

1. Including UFT in Sustainable Urban Mobility Plans (SUMP) + guidelines for LAs (focus on stakeholder engagement)
2. Deployment of ITS systems for (urban) freight
3. Clean Freight vehicles
4. UFT demand management
5. eFreight
6. Integration between long-distance freight transport and last-mile distribution
7. Shift Modes (bike, boat, rail)
8. Integration between passenger and freight transport
9. Eco-labels
10. Public procurement for freight

Assessing consistency between EU priorities and H2020 research funding

The third step refers to the evaluation of the consistency between UFT priorities and H2020 funding. Firstly, a quantitative analysis of the *weight of freight* in the policy documents and H2020 Work Programmes is performed. As it is for the former, a matrix is produced counting the number of recurrences of the following words and combinations of them: i) urban ii) urban logistics; iii) city logistics; iv) urban freight; v) logistics; vi) freight; vii) passenger; viii) public transport. The logic behind the choice of these words is the following:

- ‘Urban’: this study narrows the scope of the analysis to the urban dimension of the goods distribution.
- ‘(urban/city) logistics’ and ‘(urban) freight’: according to a complete literature review, these are the most commonly used terms in the literature to refer to urban goods distribution.
- ‘Passengers’ and ‘public transport’: many studies (Lindholm 2010; Lindholm and Browne, 2013; UN-Habitat 2013) have underlined the insufficient attention public authorities and European institutions pay to UFT operations. For various reasons, they seem to pay more attention to movements of people, rather than freight, i.e. undertaking

policies for public transport and other passengers-related modes (Lindholm, 2014). Therefore, the count of these words is used to compare the weight of the freight sector compared to the weight of the passenger sector in the European policy documents and H2020 Work Programmes.

This analysis indiscriminately considers how many times the specific words are mentioned in the documents, including titles, index and tables. A similar quantitative analysis is performed to provide an estimate of the weight urban logistics/freight topics hold in the H2020 programme considering the various calls, within *Mobility for Growth*, directly or indirectly addressing UFT. The analysis is based on the calculation of the funding share actually allocated to UFT projects' proposals.

Finally, the work i) analyses the linkage between UFT policy solutions and H2020 Work Programmes and ii) ranks the selected UFT policy solutions according to the weight, in monetary terms, resulting from the research funds allocated to each of them.

3.2.1.2 National level: SUMP Guidelines & legislation evaluation

A two-phase approach is adopted to assess the adoption of national SUMP guidelines and legislation in the 28 MSs, and their consistency with the EU SUMP Guidelines.

Phase 1 enables the categorisation of MSs according to the state of the art of the deployment of SUMP guidelines/legislation in their respective national frameworks. This preliminary assessment is based on two indicators: i) existence, at national level, of a legal definition of SUMP and/or legal obligation for LAs to implement them; ii) presence, at a national level, of a complete and unique document setting guidelines for SUMP implementation.

Phase 2 qualitatively evaluates the different approaches adopted by the MSs for the transposition of SUMP principles into their respective national contexts. The comparative analysis is based on five, distinguishable and assessable, criteria representing the minimum requirements for SUMP to be considered effective from a EC perspective. The selected criteria are illustrated in Table 3, and are: i) *Stakeholders and citizens' engagement*, ii) *Policies coordination and integration*, iii) *Evaluation and monitoring tools*, iv) *Long-term and sustainable vision*, v) *Specific provisions for freight transport*. The five criteria derive from the SUMP principles as explained in 5.2. The first four criteria directly refer to SUMP definition. The fifth criterion, being UFT often neglected in the urban planning process (see section 2.3.4),

has been selected as benchmark to assess the balanced and integrated development of all modes, also considered a key element of the SUMP.

A descriptive identification of the five criteria per MS has been considered too complicated and dispersive, mostly because of the high number of countries. The analysis does not go into detail about the kind of legislative instrument used to introduce the definition of SUMP at national level, nor the conditions establishing the obligation to adopt it, or even the level of accuracy of the principles to whom the five criteria are related. These parameters would affect the flexibility of the instrument, and consequently its effectiveness. Thus, the analysis only considers the presence of each criterion in each national framework, establishing minimum requirements to assess if it is satisfied or not, without entering into details about its scope and specific aims²².

Table 3 - Criteria for SUMP schemes comparative analysis, and their minimum requirements

#	Criterion	Description and minimum requirements
1	Stakeholder & citizens engagement	This criterion requires the provisions ensuring the active involvement of all stakeholders and interested citizens in all the stages of the preparation and implementation process of the plan. This involvement should not be merely reduced to ratifying <i>ex post</i> the measures planned by the LAs.
2	Policies coordination & integration	The SUMP needs to include specifications on (at least one of) the three level of integration/coordination outlined in the EC Guidelines: (i) strategic integration (among different sectors); (ii) institutional integration (among different authority levels and neighbouring authorities); (iii) operational integration (among different transport modes).
3	Evaluation & monitoring tools	This criterion should guarantee the development of (at least one of) three evaluation schemes: (i) the setting of quantitative targets, linked to the strategy set according to criterion 4; (ii) the identification of a (reliable) set of indicators; (iii) a constant monitoring activity.
4	Long-term & sustainable vision	The national tool should provide a long-term, consistent and coherent approach, by: (i) defining a timeline for adoption/implementation/revision of the plan in the short/medium/long term; (ii) developing a common and consistent urban mobility strategy, highlighting its sustainable dimension.
5	Specific provisions for freight	The national guidelines/legislation must include a specific reference to UFT sector. It is likely that a detailed strategy for UFT is not directly embedded there, nevertheless it should: (i) ideally, envisage the draft of a specific guidance document for UFT planning; (ii) at least, state the importance and the consideration of UFT, recommending to take account of this aspect in the planning phase.

Source: self-elaboration

²² The analysis does not go into detail about the kind of legislative instrument used to introduce the definition of SUMP at national level, nor the conditions establishing the obligation to adopt it, or even the level of accuracy of the principles to whom the five criteria are related. These parameters would affect the flexibility of the scheme proposed in 5.2, and consequently its effectiveness.

3.2.1.3 Identify, assess and validate UFT SPMs

According to the combined literature review on BE and SPMs in the transport sector and on UFT, 3 criteria and 2 attributes to define a UFT SPMs have been identified:

Table 4 - Criteria to define UFT SPMs

#	Criterion	Theoretical support and description	To be satisfied
A	Voluntary-based	<p>THEORETICAL SUPPORT: Thaler and Sunstein, 2009</p> <p>Nudge theory: a nudge is any aspect of the choice architecture that alters people’s behaviour in a predictable way without forbidding any options or significantly changing their economic incentives. To count as a mere nudge, the intervention must be easy and cheap to avoid. Nudges are not mandates.</p>	yes
B	Public sector-led	<p>THEORETICAL SUPPORT: Thaler and Sunstein, 2009</p> <p>Libertarian Paternalism, a new approach to policy-making, believes that the institutions should lead, through nudges, people make optimal choices in their effective interest, although in accordance with their preferences.</p>	yes
C	Low investment	<p>THEORETICAL SUPPORT:</p> <p>C-LIEGE project: “Soft measures imply relatively low-cost investment”.</p> <p>ENCLOSE project: “Soft measures: measures not requiring high-value investments”.</p> <p>According to two of the most important EU UFT projects of the last years, SPMs do not require high implementation and/or infrastructural costs.</p>	yes
#	Attributes	Theoretical support and description	To be satisfied
D	Providing additional services, rewards or (non-financial) incentives	<p>THEORETICAL SUPPORT: Giger (1996); Kahneman (1981); (Cherry, 2013)</p> <p>Incentive theory investigates which factors are capable of influencing human behaviour. Citizens and business’ choices can be driven by extrinsic motivators, which attract actors through a desire for reward. The extrinsic motivator is outside of, and acts on, the individual, and can be used to nudge someone who does not have an intrinsic interest in performing a certain action, but that the decision maker considers useful in the interest of the community.</p> <p>Behavioural economics argues that marketing actions (valid also for point E) can successfully affect the experienced appeal by manipulating <i>non-intrinsic</i> attributes of goods: preferences are often dependent on how the options are presented (<i>framing effect</i>, Kahneman 1981). In the (soft) policy-making processes, policy-makers can work on the non-intrinsic attributes of the most suitable solutions, to make them more attractive for the users.</p> <p>Only non-financial incentives are considered here (see point A).</p>	Either D or E – not necessarily both.
E	Information and awareness raising	<p>THEORETICAL SUPPORT: Bamberg (2011)</p> <p>Behaviour theory and soft transport policy measures: the basic concept is that information and awareness raising about the effects of car use on personal and societal wellbeing is essential for promoting travel behaviour change.</p> <p>See also point C.</p>	

Source: self-elaboration

As specified in the table, criteria A, B, C are to be satisfied for a measure to be considered a UFT SPMs as intended in this study. D, E are the main attributes characterising SPMs, but they do not necessarily need to be satisfied all at the same time – either one or the other is enough. They are used as benchmarking attributes to identify the *UFT SPMs mega-categories* (see step II, Table 5) Moreover, they are meant to characterise measures aiming to involve private operators and stakeholders. However, there are some UFT SPMs developed by the public sector for itself, in order to regulate and make the public logistics system more efficient (e.g. innovative procurement plans, waste management optimisation, etc.). In those cases, criteria D and E do not apply, since those refer to actions typically directed to external, private parties.

Starting from a comprehensive literature review of the main EU projects testing and investigating UFT SPMs - NOVELOG (review of 250 UFT measures), CITYLAB (Allen and Browne, 2016), C-LIEGE (Soft measures database), ENCLOSE (Soft measures for UFT implemented in 9 pilots), STRAIGHTSOL, etc. – the study selects of the ones satisfying the criteria above.

This scheme reports a summary of the methodology to identify, assess and validate SPMs in the UFT sector (in Chapter 6).

Table 5 - Methodology to identify, assess and validate SPMs in the UFT sector

What	How	Where (Chapter)
<p>I) Identification of <u>criteria to define UFT SPMs</u>:</p> <ul style="list-style-type: none"> A. Voluntary-based B. Public sector-led C. Low investment 	<p>Steps:</p> <ol style="list-style-type: none"> 1) Starting point: literature review about SPMs in general (Ch. 2 – Theoretical Background) 2) Integration with definitions provided by recent European UFT projects 3) Validation: Delphi Analysis with UFT experts: do these criteria make sense to define UFT SPMs, as intended in Behavioural Economics and Libertarian Paternalism, and specifically for UFT? 	<p>4 (Methodology, Table 4)</p>
<p>II) Identification of <u>UFT SPMs mega-categories</u>, based on the criteria above applied to a set of 300 existing UFT measures:</p> <p>0. Stakeholder cooperation</p> <ol style="list-style-type: none"> 1. Incentives, rewards & recognition 2. Information & awareness raising 3. Positive regulation & smart procurement 	<p>Steps:</p> <ol style="list-style-type: none"> 1) Literature review: NOVELOG (review of 250 UFT measures), CITYLAB (D2.3), C-LIEGE (Soft measures database), ENCLOSE (Soft measures for UFT in 9 pilots), STRAIGHTSOL, etc. 2) Selection of the ones satisfying the criteria (see point I). 	<p>6 (Research and Innovation for new UFT SPMs)</p>
<p>III) Mapping of real UFT SPMs (packages) applied and/or planned in 37 selected EU cities / regions. Selection and analysis of 3 best practices (London, Rotterdam, Turin).</p>	<p>Steps:</p> <ol style="list-style-type: none"> 1) Analysis of official locally-implemented mobility plans and strategies, as well as EU projects deliverables mapping the implementation of UFT measures; 2) direct input and contribution from local planners and city officers about UFT measures planned or in place. 	<p>6 (Research and Innovation for new UFT SPMs)</p>
<p>IV) Assessment of effectiveness of UFT SPMs selected in (III).</p>	<p>Steps:</p> <ol style="list-style-type: none"> 1) Literature review: measures already evaluated in NOVELOG (review of 250 UFT measures), C-LIEGE, CIVITAS WIKI, scientific papers. 2) Comparison of above mentioned (IV.1) evaluation studies: are the results consistent, i.e. has the same measure been (positively/negatively) assessed in the same way by all the studies? 3) Limited to the 3 best practices outlined in III), identification and reporting of studies which proved the measures to be successful in the local context. 4) Validation: interviews with LAs that actually implemented the measures identified in II: do their evaluation and feedback correspond to the theoretical ones (IV.1 & IV.2)? 	<p>6 (Research and Innovation for new UFT SPMs)</p>

Source: self-elaboration

3.2.1.4 Assessment of the most suitable UFT SPMs for Rome

After identifying, evaluating and validating UFT SPMs, the case-specific application in Rome considers: i) the state of the art of UFT in the city of Rome and of any UFT SPMs already implemented or planned; ii) the potential effectiveness and, therefore the potential transferability, of the above-mentioned measures in the context of UFT in Rome; and finally iii) the definition of a strategy for the introduction of UFT SPM to support the local SUMP, currently being developed (www.pumsroma.it).

Table 6 - Assessment of the most suitable UFT SPMs for Rome

What	How	Chapter
IV) UFT SPMs in Rome: <ul style="list-style-type: none"> - Schemes already applied, or only theoretically studied? - Effectiveness of the measures? - Role of stakeholders in Rome? 	Steps: <ol style="list-style-type: none"> 1) Desk research. 2) Reviews of previous and current results from EU and local projects: SMARTSET, LOGECO, NOVELOG, CITYLAB, etc. 3) Definition of the current situation of UFT SPMs adoption in Rome. 	5 (Analysis and results) and 6 (Research and Innovation for new UFT SPMs)
V) Identify the most suitable UFT SPMs for Rome. Final outcome: A strategy for Rome: improving UFT via SPMs (supporting the new SUMP).	Steps: <ol style="list-style-type: none"> 1) Dedicated UFT soft strategy for Rome. A strategy for Rome, <i>improving UFT via SPMs - supporting the new SUMP</i>, is developed, based on the results derived from the previous steps. 2) Validation with stakeholders. Focus Group with Rome local stakeholders (LA, industry stakeholders, researchers), to present the findings and discuss about their potential implementation. This could be done by the UFT Scientific Technical Committee, coordinated by prof. Edoardo Marcucci, tutor of this thesis, who invited the author to participate in the activities of the committee. 3) Application of a Transferability analysis²³ (adapted from CITYLAB project) to the case of Rome, performing a systematic analysis of potential replication in Rome of successful SPMs identified in (II) and (III) – <i>at a later stage</i>. 	7 (Policy implication)

Source: self-elaboration

²³ CITYLAB performs a transferability analysis focusing on the potential for rolling out the UFT solutions to other cities. A chart overview is developed to show to which extent an applied solution has the potential for a successful roll-out in other cities.

4 The evolution of urban (freight) transport planning policy in Europe

This chapter revisits the evolution of urban transport planning policies in Europe. It highlights the fact that the approach of PAs with respect to mobility planning significantly changed over the years, passing from a mere technical analysis (rational planning model) to the promotion of sustainability through integrated transport policies. Moreover, the objective of planning is no longer limited to making the road network more efficient, but it shifted to the concept of ensuring accessibility of citizens and companies to places and activities (Litman 2017, Ricardo et al., 2017). SPMs assume a change of mentality and behaviour on a voluntary basis, in line with the development of a more aware and conscious attitude in dealing with the environmental and social related challenges of urban mobility.

4.1 A new approach to urban mobility and freight planning

The vision of *choice architects* with respect to how cities are planned, or what is the role and the space of cars and pedestrians, needs to consider the dynamics of the composition of the urban context and of the primary reason for moving in the cities: is demand for travel intrinsic, or rather derived from the demand for participating in activities, i.e. travel as the means to the end (Litman, 2013)? SPMs come as a result, after having addressed these “issues that are politically contentious at a national level, yet they are vital to address if we are to adopt meaningful social practices for promoting sustainable mobility” (Barr, 2015).

Transport planning is needed to ensure consistency in the planning process: “Planning transport means managing a *chain of decisions* that, periodically and through their interaction, give rise to the transformation of the transport/ territory system - following a path considered optimal for society” (de Luca, 2000).

The discussion here focuses on the approach of the EC towards urban mobility, and in particular UFT: over the last 20 years, the EC has undertaken a *bottom-up* approach, learning from the best practices on planning at local and national level, collecting and synthesising them in a new planning policy approach based on inclusive and sustainable criteria (see more in chapter 5).

As regards UFT, many scholars (Kaszubowski 2016, Browne 2007, Rodrigues 2006, Sjöstedt 2007) have underlined the insufficient attention PAs pay to UFT operations, despite they represent a substantial part of mobility related issues in cities both in terms of congestion and emissions, and plays a key role for the functioning of the city in terms of goods and services supply (Russo and Comi, 2016). For various reasons, they seem to pay more attention to movements of people, rather than freight, i.e. undertaking policies for cars, public transport, and other persons-related modes (Lindholm, 2014). This situation is in contrast with the new planning approach illustrated in chapter 5, and represented by the SUMP concept, which encourages the balanced and integrated development of all modes, including both passengers and freight. Different models have been used to investigate urban freight stakeholders' behaviour and reactions to different policy formulations, including stated preference models for yet-non-existing policies (Gatta and Marcucci, 2015; Marcucci et al., 2012, 2013a). Lindholm (2010) focuses on LA's perspective with respect to sustainable UFT policies, demonstrating how a limited knowledge and awareness of this sector prevents an adequate setting of measures for their effective and integrated management. This can be improved via SPMs, especially cooperation between LAs and UFT stakeholders could result in Freight Quality Partnerships (FQPs, see 6.1), providing good results in the short-term, solving specific problems, but also enhancing mutual understanding and generating useful inputs for policy formulation by LAs in the long-term (Lindholm et al., 2013).

4.2 European strategy and evolution of UFT policies

During the last two decades, the European Commission has developed a growing awareness with respect to the challenges of the urban transport sector, and, consequently, has started defining specific policies and developing dedicated tools to tackle them. Transport is a shared responsibility between the EU and MSs where the subsidiarity principle applies. Urban mobility is essentially a local responsibility. However, in the light of the challenges mentioned above, there is an increasing demand for strengthening cooperation. In fact, urban mobility policies are too heterogeneous, both between and within MSs. For this reason, the European Union provides LAs with support in the following areas: i) setting a common policy framework; ii) funding for implementation; iii) funding for research and innovation; iv) facilitating the exchange of experience and best practice; v) raising awareness.

The EU addresses urban transport challenges in comprehensive transport policy documents as, for example, the 2011 White Paper on Transport, where it identifies the need for additional steps to ensure that cities contribute to reducing Europe's dependence on imported oil and cutting carbon emissions in transport by 60% by 2050, and achieving essentially CO₂-free city logistics in major urban centres by 2030 (European Commission, 2011).

As already mentioned, European MSs need to further integrate UFT in the general city mobility management system. The EC is setting coordinated UFT initiatives, improving their best practice dissemination and uptake, preparing guidance documents that provide practical assistance for their improvement, and facilitating the procurement of clean vehicles. These initiatives address both LAs and MSs, which are required to ensure that UFT is properly considered in their approach to urban mobility, and to create platforms for cooperation, exchange of data and information, training, etc. for all the actors involved in the logistic chain. All these provisions are contained in the document *A call to action on urban logistics* (European Commission, 2013a), accompanying the *Urban Mobility Package (UMP)* (European Commission, 2013b) to reinforce EC supporting actions in the area of urban transport.

The first European policy proposals in the area of urban mobility, the *Citizens' Network*, date back to 1995 and 1998. They resulted in the launch of a series of initiatives based upon a "best practice" approach. However, the documents do not present any direct reference to UFT.

In 2001, the 1st White Paper on Transport was released (European Commission, 2001). In *Part 3 - Placing users at the heart of transport policy*, Section 4 specifically addresses the rationalisation of urban transport. The White Paper strategy for urban mobility essentially pursued two main objectives: 1) the promotion of a diversified energy portfolio for transport, by establishing a new regulatory framework for substitute and **sustainable fuels** and stimulating demand by experimentation; 2) the promotion and exchange of good practices, aiming at taking better use of public transport and existing infrastructure.

This White Paper didn't specifically address UFT. However, the CIVITAS initiative²⁴, launched in October 2000 to support the development of innovative projects on clean urban transport, represented an important step for research in this field, aiming at reducing private car

²⁴ *The CIVITAS Initiative is a European action supporting cities across Europe to test and implement innovative and integrated strategies to achieve energy, transport and environmental objectives*

use in city centres and promoting clean urban transport. The solutions envisaged went in three different directions: **demand management** measures, the **integration of urban transport services**, and the promotion of **low and zero emissions vehicles**, also for freight.

In 2007, a European policy document made explicit reference to UFT for the first time. In fact, the Green Paper *Towards a new culture for urban mobility* (European Commission, 2007b) suggests LAs to consider all urban logistics related to passenger and freight transport together as a single logistic system. Urban distribution needs for an efficient **integration between long-distance freight transport and last mile distribution**. To this end, the use of smaller, more efficient and **clean vehicles** is encouraged. When addressing UFT, LAs should ensure the active **involvement of all relevant stakeholders**. UFT should be better integrated within the **local policy-making process** and institutional setting: freight transport distribution is often neglected and considered a mere responsibility of the private sector. Moreover, the role of intelligent transport systems (**ITS**) for freight becomes essential in order to improve efficiency, especially through better timing of operations, higher loading factors and more efficient use of vehicles. Finally, the document suggests **(joint) green procurement** of clean and energy-efficient vehicles by public authorities as a new solution to boost the deployment of clean vehicles.

The urban dimension of freight logistics is further developed in the Freight Transport Logistics Action Plan (European Commission, 2007a). It reiterates that LAs should focus their attention on transport demand management, supported by the deployment of innovative **ITS-based solutions**. In order for this to happen, a roadmap for the implementation of **eFreight**²⁵ should identify the critical areas where European actions are required (e.g. standardisation). The European Commission also commits to help establishing a set of recommendations, best practice and standards for urban transport logistics, aiming to define common benchmarks or performance indicators for the measurement of efficiency and sustainability of UFT solutions. This aims to reinforce the freight section of CIVITAS fostering the coordination and **integration between passenger and freight transport, and between interurban (long-distance) and urban transport logistics**.

Based upon the results of the consultation of the Green Paper, in 2009 the Action Plan on urban mobility was adopted (European Commission, 2009), presenting for the first time a

²⁵ *The concept of eFreight refers to the favouring of the multimodal transport of goods by creating the appropriate framework to allow tracing goods in real time and ensure intermodal liability*

comprehensive support package of 20 measures in the field of urban mobility. This stresses again the importance of **urban areas as efficient interconnection points** for the trans-European transport network and places for a well-organised last mile transport. Action 1 introduces the concept of **Sustainable Urban Mobility Plans**, aiming to cover all types of transport, **including UFT**. Action 19 specifically addresses UFT, requiring to better incorporate it in the local transport strategy and to “better manage and monitor transport flows”. Finally, the Plan aims to find new ways for improving and sharing data collection and statistics for urban transport and mobility (Actions 16 and 17).

In 2011, the 2nd White Paper on Transport was released (European Commission, 2011). This document represents the current official position of the European Commission for transport in Europe, and sets a roadmap of 40 initiatives for the next decade to build a competitive transport system to increase mobility, foster growth and employment, reduce Europe's dependence on imported oil and cut carbon emissions in transport by 60% by 2050. It includes the specific objective of achieving “essentially CO₂-free city logistics in major urban centres by 2030”. The initiative n. 33, “a strategy for near- ‘zero-emission urban logistics’ 2030”, encourages again the realisation of **best practice guidelines** to “better monitor and manage urban freight flows”, and promotes **joint public procurement for low emission freight vehicles**. Inspired by the above-mentioned Freight Transport Logistics Action Plan, it claims a more efficient **interface between long-distance and last-mile freight**; the **deployment of ITS** for real-time traffic management, to increase efficiency for last mile distribution, and the definition of strategies for off-peak deliveries, to reduce air emissions and noise. The document also reinforces the concept of **eFreight**. The initiative n. 28, “**vehicle labelling** for CO₂ emissions and fuel efficiency”, launches a review of the labelling directive and also extends its scope to light freight vehicles.

The UMP (European Commission, 2013b) promotes two non-regulatory initiatives related to the urban mobility sector. On the basis of the subsidiarity principle, it addresses initiatives 31, 32 and 33 of the 2011 White Paper. Initiative n. 33, as described before, refers to **best practice guidelines** to improve urban freight flows monitoring and management. The central element of the UMP is the Communication *Together towards competitive and resource-efficient urban mobility*, complemented by an annex that sets out the concept of Sustainable Urban Mobility Plans (Wefering et al., 2013), as well as four Staff Working Documents (European Commission, 2013a), one of which is dedicated to UFT. The central Communication, stressing

the importance of the coordination between the public and private sector, claims the coordinated **deployment of urban ITS** and the importance of **urban nodes**, considered the “starting point or the final destination (first/last mile) for passengers and freight moving on the trans-European transport network”. It fosters more action on UFT (aspect further developed in the Staff Working Document), promoting measures for the **procurement of freight clean vehicles** in the framework of the Clean Vehicle Portal²⁶. It also defines the future scope of action of the CIVITAS initiative, which will focus on “tackling urban road congestion, reducing the use of conventionally-fuelled vehicles in urban areas, reducing UFT impacts and costs, and strengthening the capacities of LAs to develop and **implement sustainable urban mobility plans**”. All these topics directly or indirectly refer to UFT.

Finally, the most specific document on UFT is the *A call to action on urban logistics*, Staff Working Document of the UMP. The document discusses the main challenges related to UFT and identifies possible solutions, also clarifying the **role of each governance level** (European, National, local) in the process. It highlights that the European research programmes have been supporting and will support research and dissemination for UFT vehicles and solutions, such as the CIVITAS projects. Some of them are focusing particularly on UFT, in testing innovative policy and technological solutions. As regards the challenges at stake, the document identifies e-commerce and online services; **comprehensive UFT strategies for cities; cooperation and understanding amongst stakeholders**; information and understanding of freight flows; information for urban transport operators about UFT policies, regulations and services; joint procurement of low emission urban freight vehicle; **proper consideration of UFT in SUMPs**. The solutions should follow four main directions: i) **Manage urban logistic demand** (service and delivery plans); ii) **Shift modes (bike, boat or rail)**; iii) Improve efficiency (better selection of modes and vehicles, increasing load factors, new **ITS solutions, eFreight** initiatives, driver training); iv) **Improved vehicles and fuels**: new types of vehicles and operational models (e.g. electric vehicles, off-peak deliveries), deployment of alternative fuels infrastructure”.

To sum up, the main policy solutions are summarised in Table 7.

²⁶ www.cleanvehicle.eu [27-08-2016 – offline]. *The Clean Vehicle Portal as a new web-database aims to ensure a level of demand for clean and energy-efficient road transport vehicles and encourage manufacturers to invest in development of vehicles with low energy consumption CO2 emissions and pollutant emissions.*

Table 7 - Selected UFT policy solutions and their descriptions

Policy solutions	Description
Including UFT in SUMP + guidelines for LAs	Member States should ensure UFT is given proper consideration in their national approaches to urban mobility and in SUMP guidelines. LAs should include specific UFT provisions in their own SUMP and enhance UFT stakeholder engagement in the planning/implementation process.
Deployment of ITS systems for (urban) freight	New ITS solutions can help to optimise routes, improve service and reduce costs and impacts. ITS allow for optimised trip planning, better traffic management and easier demand management.
Clean Freight vehicles	The operational characteristics of UFT can often be suitable for the early introduction of new types of vehicles (e.g. electric vehicles). Improvements in vehicles can make UFT quieter, safer, cleaner and more efficient.
UFT demand management	<ul style="list-style-type: none"> - new operational and business models: e.g. off-peak deliveries, reverse logistics, consolidation, increase load factors, logistic hotels, etc. - incentives and regulations: parking policies, traffic and access regulations and charges, rewarding schemes, information and awareness raising.
eFreight	The concept of eFreight refers to the favouring of the multimodal transport of goods by creating the appropriate framework to allow tracing goods in real time and ensure intermodal liability. As part of the eFreight initiative, attention is given to the optimisation of information exchange for UFT as part of longer (international) logistics chains.
Integration between long-distance freight transport and last-mile distribution	Urban nodes are key elements for the construction of a comprehensive European transport network. Action by European cities is crucial for achieving the objectives of TEN-T policy. The European Commission recognises the need to "provide for the development of the comprehensive network in urban nodes, as those nodes are the starting point or the final destination ('last mile') for passengers and freight moving on the trans-European transport network and are points of transfer within or between different transport modes" (EC, 2013b).
Shift Modes (bike, boat, rail)	Framework solutions provided by city authorities to create favourable conditions for freight shift modes, e.g. strategy, dedicated space, enforcement, privileged access, planning conditions, free parking etc., in order to achieve economic viability in addition to overall improvements.
Integration between passenger and freight transport	LAs need to consider all UFT related to passenger and freight transport together as a single logistics system.
Eco-labels	Introduction of a 'labelling' scheme to recognise the efforts of pioneering cities to combat congestion and improve living conditions.
Public procurement for freight	Support to projects and exchange of best practices to understand and facilitate joint procurement of urban freight vehicles and of public services and goods by public administrations.

Source: self-elaboration

5 The Choice Architecture Chain. A multi-level governance approach

The different scales of planning to be effective should talk to each other and be coordinated with each other. Often this does not happen. Why? What are the problems that should be addressed? How to do it? What are the appropriate changes to the current operations of the urban transport planning systems at the various levels to solve the issue?

As for the Italian case, the ICity Rate 2017 Report²⁷ highlights a delay of the Italian urban system towards sustainability objectives, which risks limiting the attractiveness and liveability of urban centres. There is a lack of a coordinated policy and a shared framework to respond to major challenges such as climate change, sustainable mobility, land use and security. Coordination of all levels of government is needed, with the urban dimension at the core (Forum PA, 2017).

Urban mobility planning in Europe must comply with principles of subsidiarity and proportionality, and (almost) never implies a coercive power. Therefore, the EC is trying to involve more and coordinate the policies of European MSs, but it also has to consider the presence of unique regional and local situations.

LAs have to define specific goals they want to pursue locally, and the most appropriate solutions for their effective achievement. At a European level, it is important to define general long-term objectives (European Commission, 2011), and establish policy guidelines and strategic reference frameworks to facilitate the implementation of sustainable planning and measures at the local level, according to the subsidiarity principle. In other words, there is the need to provide national and LAs with relevant tools to address their respective planning processes, taking account of the sustainability objectives defined at the European level. The support provided by the EC, therefore, should complement rather than replace existing regulatory frameworks and policies, providing methods, tools and process-oriented support to the local sustainable urban mobility planning, to integrate and articulate different needs and perspectives. The higher the institutional level, the more the approach should be strategic and procedural in

²⁷ ICity Rate is the annual report produced by Forum PA to monitor the situation of Italian cities on the way to more intelligent, more inclusive, more liveable cities

nature (Silva, 2009). The way this strategic framework is then put in place in form of concrete measures, depends on the local context and available resources.

SUMP is the only common planning scheme for urban mobility in Europe. Therefore, the case of SUMP is taken as a reference to analyse the CAC approach from the European to the local level. In this regard, the analysis and evaluation of the policy framework setting and the multi-governance approach definition seem often missing, such as in the studies about SUMP. Some exceptions that emphasise the need to further investigate this missing link exist: Papaioannou et al. (2016) highlights the absence of an appropriate policy on SUMP at the national level. Using the case of Greece as an example, he analyses the interaction between the various levels of government for the realisation of SUMP, stressing the need to insist on the national level: it is at this level that a reference framework for the lower levels of government should be defined. May (2015) argues that this lack of attention to the role of national governments is also evident in the policy activity of the EC, which, while it actively supports LAs in the implementation of their SUMP, for example through the CIVITAS initiative, it provides limited guidance to national officers on how to better manage the process of drafting an appropriate and consistent legislation and guidelines on SUMP. For May (2013) national governments should cooperate with all the local governments in this perspective.

In Europe, MSs regulate the transport sector, and provide LAs with the funds needed to deploy the interventions foreseen (ECMT, 2002). Therefore, it is necessary to embed sustainable mobility guidelines in the national legislative framework, in order to make them consistent with other relevant national strategies. Also, the existence of language barriers, especially in some countries, necessarily requires their translation in the local language, so that local policy-makers can fully understand and properly use them.

A comprehensive multi-level governance approach should consider both the city-to-city (horizontal) and the EU-to-state-to-local (vertical) influences. This work develops a new conceptual structure, called CAC, identifying multilevel governance co-operation mechanisms to establish a dialogue and undertake joint actions, both vertically (with different levels of governance, from the EU to local communities) and horizontally (peer-to-peer, at all levels). The structure is simplified in

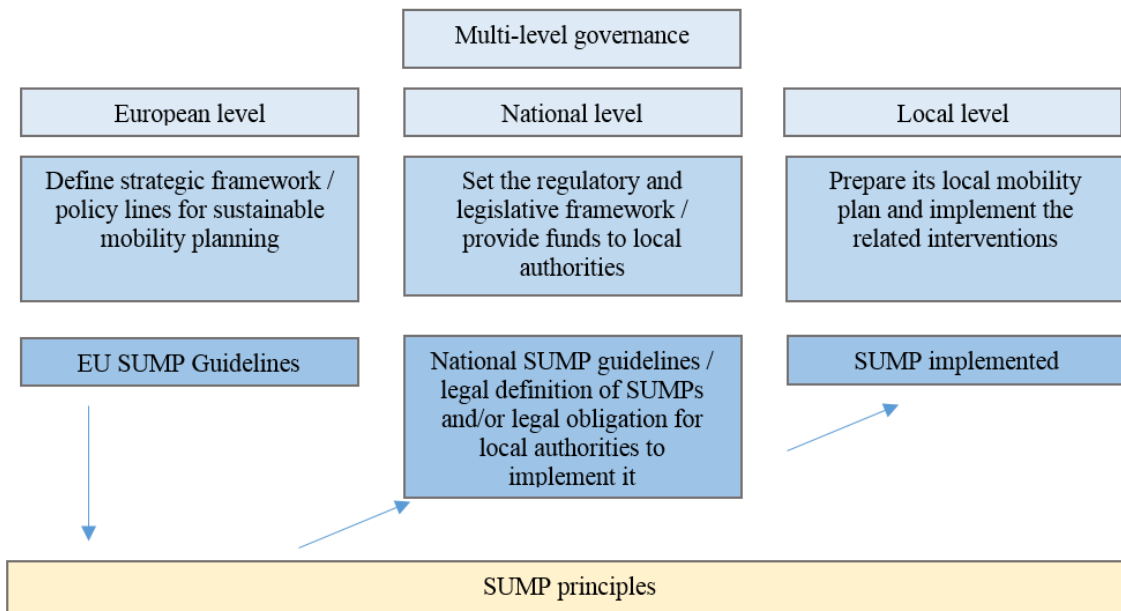
Figure 1.

In order to reach such an ambitious degree of cooperation, active involvement and engagement of policy makers and citizens is needed.

The CAC, applied in the urban mobility public policy sector, should deploy from the European to the local level: each higher level of the chain has the power to influence the following. However, the action of the chain is not just *top-down*: a *bottom-up* preliminary approach, involving stakeholders and citizens, is essential to understand what the problems and needs are. This collaboration enables policy-makers to define a shared, and therefore more effective, set of UFT measures, including SPMs (see section 6.1).

Figure 3 graphically represent the identified conceptual framework for multi-level governance for the specific case of SUMP deployment in Europe.

Figure 3 - A conceptual framework for multi-level governance of SUMP in Europe



Source: self-elaboration

This section reports the results of the analysis of the European, national and local decision-making dimension, trends and their interaction with regards to urban mobility policy and planning. As highlighted above, each governance level is supposed to carry out different and

complementary actions, satisfying the principles of subsidiarity and proportionality, in order to create the best conditions to spread and implement the EU common sustainable mobility planning principles. It is important to recall that these principles are not the results of a top-down approach, but have been defined through a bottom-up approach, collecting best practices developed at local level all over Europe. The EU should set common technical standards, support research, promote the exchange of good practices and monitor performance and results. MSs should put in place urban planning frameworks and general transport policies, and align legislation on transport-related subjects. Local governments are the ones setting the local vision on urban mobility, and practically implement the measures.

Are these expectations satisfied in reality? Are the different governance levels in contact with each other? What is going well and what should be enhanced, considering the CAC approach defined above? In order to attempt to give an answer to these questions, the following three sections address the three governance levels considered in this research, respectively European, national and local.

Section 5.1 describes UFT policy priorities of the EC, and assesses the linkage and consistency between these and the corresponding calls of the H2020 Research Programme, created by the EC to foster research and innovation in MSs; section 5.2 conducts a large comparative study on the transposition of EC SUMP guidelines at national level; section 5.3 investigates whether a coherent transposition of EC provisions at national level ensures a high quality of locally implemented SUMPs and stimulates their broad diffusion throughout the country. In order to do so, we quantify the ratio of the number of SUMPs adopted in each country with respect the total number of cities in that country, investigating the correlation between the quality of national SUMP policies, as investigated in section 5.2, and the actual diffusion of SUMPs. A particular focus is dedicated to the freight dimension, and how this is integrated in the planning process at all governance levels.

5.1 European level: policies and priorities for UFT

In recent decades, public authorities have developed a growing, yet probably insufficient, awareness of the crucial role UFT policies play with respect to cities' mobility (Gatta and Marcucci, 2014). While long distance freight nowadays appears to be quite efficient, the urban freight part is probably much less so (Marcucci et al., 2015a). Coordinated UFT measures are

now spreading among various MSs, but there is still a need to further tackle this issue in order to harmonically integrate UFT in the general city mobility management system. So far, SUMP and Sustainable Urban Logistic Plans (SULPs) have been considered as separated tools regulating different areas, whereas there is a need to integrate urban freight plans into the whole urban mobility planning approach (Morfoulaki et al., 2015). The EC is setting coordinated UFT initiatives and actions. One of these supporting actions is to promote research and innovation to deliver innovative and effective solutions to tackle urban mobility challenges. This is realised through H2020, a specific research and innovation programme for the period 2014-2020.

Section 3.2.1.1 illustrates the methodological steps and the logic behind the analyses performed. Chapter 4 discusses the main topics and the corresponding solutions reported in the EU policy documents with respect to UFT. This section aims at evaluating the correlation between EU priorities and funding. In more detail, after having defined UFT challenges for EU policy-makers and how policy priorities are defined at EU level (section 4.2), here we assess whether H2020 funds are consistently allocated to the identified UFT policy solutions according to the weight attributed to UFT in the policy documents.

5.1.1 Quantitative analysis of the *weight of freight* in the policy documents and H2020 Work Programmes

This sub-section reports the results of a quantitative analysis performed taking into account the seven selected EU policy documents (section 3.2.1.1) and the two H2020 Work Programmes 2014-2015 and 2016-2017 published so far. It is divided into two parts. The first provides a quantitative estimation of the *weight of freight* based on the number of recurrences of specific UFT-related words in the policy documents. The second part focuses on H2020 Work Programmes, illustrating the most relevant information linked to the calls for proposal specifically dealing with UFT providing an overview of the resources allocated to the various projects.

5.1.1.1 EU policy documents

In order to support and reinforce the qualitative analysis performed in Chapter 4 that enables selecting the main UFT-related policy solutions, a simple and straightforward quantitative approach is proposed here. The number of recurrences of specific UFT-related words have been

systematically counted in the seven policy documents selected, so to provide a snapshot of the *weight of freight* for each of them.

In order to calculate the relative weight of UFT within the policy documents, the study establishes a simple criterion: all the identified key words are standardised with respect to 'urban' (last column in

Table 8), which represents the minimum common denominator encompassing all the other ones. ‘Urban’ is central in this analysis, since it represents the physical and conceptual dimension of both the freight and passenger transport sector policies at stake. In other words, the number of times ‘urban’ is mentioned represents the ‘proxy’ which allows us to quantify the relative *weight of freight*.

Noticeably, in some cases and for single documents, the number of recurrences of some key words is higher than the number of recurrences of ‘urban’ (in particular in *Transport White Paper 2001* and *Freight transport logistics action plan*). This reflects the fact that those are broader documents addressing not only the ‘urban’ dimension, but the whole transportation panorama in Europe. Therefore, key words such as ‘passengers’ and ‘freight’ quantitatively prevail, since they also refer to long-distance, extra-urban aspects of transportation.

The results of the quantitative analysis of the *weight of freight* in the policy documents is shown in

Table 8 which reports, in absolute terms, the number of times given words or their combinations, directly or indirectly referring to UFT, appear in the documents considered.

As expected, the most frequently mentioned item is ‘urban’ (547), followed by ‘freight’ (241), while ‘logistics’ (165) has less occurrences with respect to ‘passenger’ (176). These items only partially address the specific topic considered in this study. ‘Urban logistics’ appears 72 times, whereas ‘urban freight’ and ‘city logistics’ 28 and 8 times, respectively, obtaining an overall result of 108 recurrences. It is interesting to note that most of the documents use both ‘urban logistics’ and ‘city logistics’, without explaining whether they are considered synonyms or different concepts. Moreover, an interesting result is that ‘passenger’ and ‘public transport’ occur, combined, the same number of times as ‘freight’ (241). This result suggests a greater attention the freight sector has constantly gained among the European policy-makers over the last 20 years. However, when focusing the analysis at the urban level, the gap is still significant.

Table 8 - Recurrences of UFT related words in EU policy documents (absolute terms)

Policy docs*	1	2	3	4	5	6	7	Total	Weight wrt 'urban'
Key word(s)									
Urban	42	44	10	105	38	186	122	547	-
<i>City logistics</i>	0	0	0	0	2	2	4	8	1%
<i>Urban logistics</i>	0	1	0	1	2	13	55	72	13%
<i>Urban freight</i>	0	2	1	4	1	1	19	28	5%
city logistics + urban logistics + urban freight	0	3	1	5	5	16	78	108	19%
Logistics	10	6	52	3	5	18	71	165	30%
Freight	84	19	53	10	37	2	36	241	44%
Passenger	110	20	2	10	32	1	1	176	32%
public transport	32	13	0	12	5	3	0	65	12%

*The documents taken into account are the following: 1) Transport White Paper 2001; 2) Green Paper 'Towards a new culture for urban mobility'; 3) Freight transport logistics action plan; 4) Action Plan on urban mobility; 5) Transport White Paper 2011; 6) Urban Mobility Package; 7) A call to action on urban logistics.

Source: self-elaboration

5.1.1.2 H2020 Work Programmes

H2020 is the European Research and Innovation programme, a source of nearly €80 billion²⁸ for European research activities for the 2014-2020 programming period. H2020 takes over the Seventh Framework Programme for Research and Technological Development (FP7)²⁹, and the Innovation section of the Competitiveness and Innovation Framework Programme (CIP).

The programme is based on three pillars: Excellent Science, Industrial Leadership and Social Challenges. The largest share of the budget (38.5%, €29.7 billion) is dedicated to the *Social challenges* pillar, which is, in turn, divided into seven thematic areas including *Smart, Green and Integrated Transport*. A budget share of 8.2% (€6.3 billion) was allocated to the transport sector (Gavigan, 2014). The challenge of H2020 is to create a transport system making efficient use of resources, which is environmentally friendly and safe. H2020 supports the research for

²⁸ <https://ec.europa.eu/programmes/horizon2020/en/what-horizon-2020>

²⁹ FP7 was the main research programme for the 2007-2013 period, to give financial support to European initiatives promoting research, innovation and technological development for the creation of a European research area (ERA). With a budget of 50.521 billion euro, FP7 funded projects relating to research and technological development with the aim of stimulating growth, competitiveness and employment.

new methods to obtain these results, and identifies two key topics, i) technology and ii) behavioural analysis, to develop innovative intervention strategies.

The budget is allocated every two years via a biannual Work Programme.

Table 9 and Table 10 provide a budget overview of the H2020 Work Programmes 2014-2015 and 2016-2017, respectively, and an estimation of the (potential) financial support allocated for UFT in the framework of the *Mobility for Growth* call. With respect to FP7, the budget was increased by about 30%, considering the same topics (Gavigan, 2014).

The first H2020 Work Programme (European Commission, 2015a) was adopted on 10 December 2013 and structured in four broad cross-cutting lines of activities (i.e. resource efficient transport that respects the environment; better mobility, less congestion, more safety and security; global leadership for the European transport industry; socio-economic and behavioural research and forward looking activities for policy making) and three Calls for proposals (i.e. Mobility for Growth; Green Vehicles; Small Business Innovation for Transport) for an overall budget of €792.5 mln. Different calls for proposals directly or indirectly addressed UFT, but the call *MG.5.2-2014* was specifically dedicated to this topic. In particular, it aimed at (i) improving basic knowledge and understanding on freight distribution and service trips, (ii) implementing innovative policies and solutions to ensure a better use of infrastructure (e.g. delivery spaces, off peak deliveries, non-road modes, urban waterways) and vehicles, (iii) testing consolidation and distribution centres. This call was directly linked to *MG.6.1-2014* which looked for the right business models fostering (horizontal and vertical) synergies to decouple the growth of urban and inter-urban freight transport demand from its consequences on traffic and the environment. Other calls addressing UFT were *MG.5.1-2014*, *MG.5.3-2014*, *MG.5.4-2015* and *MG.5.5-2015*. All of them generally referred to ‘freight’, while the latter makes a specific reference to ‘urban freight logistics’.

Table 9 - H2020 Work Programme 2014-2015: a budget overview

Selected Call (Key: normal: calls <i>directly</i> addressing UFT; <i>Italic</i> : calls <i>indirectly</i> addressing UFT)	Budget (mln €)
<i>MG.5.1-2014 - Transforming the use of conventionally fuelled vehicles in urban areas</i>	40
MG.5.2-2014 - Reducing impacts and costs of freight and service trips	
MG.5.3-2014 - Tackling urban road congestion	
MG.5.4-2015 - Strengthening the knowledge and capacities of local authorities	9
MG.5.5-2015 - Demonstrating and testing innovative solutions for cleaner and better urban transport and mobility	57.5
MG.6.1-2014 - Fostering synergies alongside the supply chain, including e-commerce	32
MG.6.2-2014. De-stressing the supply chain	
<i>MG.7.1-2014 - Connectivity and information sharing for intelligent mobility</i>	28
<i>MG.7.2-2014 - Towards seamless mobility addressing fragmentation in ITS deployment in Europe</i>	
TOTAL (selected calls)	166.5
Share of total funds allocated to calls to be potentially used for UFT projects	(29.8%)
Total budget of Mobility for Growth calls [374.50 (2014) + 184 (2015)]	558.5

Source: self-elaboration

The Work Programme 2016-2017 was adopted on 13 October 2015, accompanied by an overall budget of €756.1 mln (European Commission, 2015b). It presents the same structure and lines of activities of the previous one, with a small change in the calls for proposals. Again, in the urban mobility section there is a call dedicated to UFT, but in this case it addresses an even more specific topic. In fact, the title of the call is *MG-4.3-2017 - Innovative approaches for integrating urban nodes in the TEN-T core network corridors*. The solutions tested in this framework should investigate: (i) new approaches for linking long-distance with last-mile freight delivery in urban areas, (ii) the design of freight corridors in cities, (iii) an efficient and sustainable (e.g. using alternative fuel vehicles) solution for 'last mile' delivery, and a greater use of intermodal urban freight logistics. Nevertheless, other types of UFT innovative solutions can still be funded and tested through other urban mobility calls. In particular, the call *MG-4.1-2017* includes issues such as new governance models for freight and passenger transport, better coordination and cooperation, synergies between passenger and freight transport, stakeholder engagement, etc. In the Logistics section, the first call *MG-5.1-2016* is directly linked to *MG-4.3-2017*. In particular, it aims at connecting (sections of) the TEN-T freight network with each other and last mile delivery services, and developing prototype Modular Load Units, optimised for automated handling and high load factors in all transport modes. Although not directly

related to UFT, the calls *MG-5.2-2017* and *MG-5.3-2016* pursue the deployment of ITS and green transport in the logistics sector. Other related calls are *MG-4.2-2017* and *MG-4.4-2016*.

Table 10 - H2020 Work Programme 2016-2017: a budget overview

Selected call (<u>Key</u> : normal: calls <i>directly</i> addressing UFT; <i>Italic</i> : calls <i>indirectly</i> addressing UFT)	Budget (mln €)
MG-4.4-2016 - Facilitating public procurement of innovative sustainable transport and mobility solutions in urban areas	2
MG-4.1-2017 - Increasing the take up and scale-up of innovative solutions to achieve sustainable mobility in urban areas	22
MG-4.2-2017 - Supporting 'smart electric mobility' in cities	
MG-4.3-2017: Innovative approaches for integrating urban nodes in the TEN-T core network corridors	2
<i>MG-4.5-2016 New ways of supporting development and implementation of neighbourhood-level and urban-district-level transport innovations.</i>	10
MG-5.1-2016: Networked and efficient logistics clusters	12
MG-5.2-2017 - Innovative ICT solutions for future logistics operations	12
MG-5.3-2016 - Promoting the deployment of green transport, towards Eco-labels for logistics	2
<i>MG-6.2-2016: Large-scale demonstration(s) of cooperative ITS. Enable services based on appropriate access and sharing of data leveraging in-vehicle resources and 2-way V2V, V2I, I2I and vulnerable road users connectivity in complex urban environments</i>	25 (6.1 & 6.2 together)
MG-6.3-2016 - Roadmap, new business models, awareness raising, support and incentives for the roll-out of ITS	5
TOTAL (selected calls)	92
Share of total funds allocated to calls to be potentially used for UFT projects	(21.1%)
Total budget of Mobility for Growth calls [210.10 (2016) + 225.50 (2017)]	435.6

Source: self-elaboration

The total amount of funds allocated to the *Smart, Green and Integrated Transport* sector is €1,572.5 mln for the entire period 2014-2017. Out of this amount, the funds allocated to Mobility for Growth calls are €994.1 mln. According to the results shown in

Table 9 and Table 10, the share of the total funds allocated to calls that can be potentially addressed by UFT projects' proposals is €258.5 mln (26% of the total available budget), of which €166.5 mln (29.8% of the budget) for the period 2014-2015 and €92 mln (21.1% of the budget) for the period 2016-2017. This means that about a quarter of the total budget of the first 4 years of the H2020 programme is potentially available to fund UFT projects. Attention should be called to the difference in funding between the two periods: the first puts out a general call for UFT (*MG.5.2-2014*), and potentially allocates almost a third of the total funds to UFT projects; the second period proposes a very specific call for UFT (*MG-4.3-2017*) and potentially allocates only a fifth of the total funds to UFT projects.

As for the first period (2014-2015), the study provides a further step of analysis. Since the funding period is over, it is possible to define the degree of alignment between the resources potentially available and the ones actually allocated (see Table 11). It may be noticed that 95% of the budget potentially available was actually assigned to projects (€157.4 vs €166.5 mln). Among these, considering the freight scope in general, a total of €57.5 mln has been allocated to this type of projects, corresponding to 36% of available funds. Moreover, €31.7 mln have been specifically allocated to UFT projects³⁰. This corresponds to 20% share of the overall available fund for the period 2014-2015.

³⁰ UFT projects are those whose main objective is the adoption of sustainable solutions for UFT (for example, the SETRIS and PORTIS projects have a specific work package dedicated to UFT, but the main aim of the projects does not refer to this topic).

Table 11 - Comparison between the resources potentially available and the ones actually allocated (Work Programme 2014-2015)

Call	Acronym (Key: bold: UFT projects; bold&italic: freight projects)	European Union contribution (mln €) (Key: bold: UFT projects; bold&italic: freight projects)	Budget/call (mln €)	
MG.5.1-2014	EMPOWER	4.9	40	
	ELIPTIC	6.0		
MG.5.2-2014	SUCCESS	3.2		
	NOVELOG	4.4		
	CITYLAB	4.0		
	U-TURN	2.7		
MG.5.3-2014	CREATE	4.0		
	FLOW	3.8		
	TRACE	2.9		
	CIPTEC	3.5		
MG.5.1, 5.2, 5.3	Total	39.4		40
MG.5.4-2015	SUMPS-UP	4.0		9
	PROSPERITY	3.2		
MG.5.4	Total	7.2		
MG.5.5-2015	CIVITAS ECCENTRIC	17.4	57.5	
	CIVITAS DESTINATIONS	17.9		
	PORTIS	16.4		
	CIVITAS SATELLITE	3.0		
MG.5.5	Total	54.7		
MG.6.1-2014	NEXTRUST	18.1	32	
MG.6.2-2014	SYNCHRO-NET	7.6		
MG.6.1, 6.2	Total	25.7		
MG.7.1-2014	SocialCar	5.9	28	
	OPTIMUM	6.0		
MG.7.2a-2014	EuTravel	3.9		
	ETC	4.5		
	MASAI	3.3		
	BONVOYAGE	4.0		
MG.7.2b-2014	ITS Observatory	1.3		
	CODECS	1.6		
MG.7.1, 7.2a, 7.2b	Total	30.5		
Total		157.5		166.5
Total UFT projects		31.7 (20%)		
Total freight projects		57.4 (36%)		
Total non-freight projects		68.4 (64%)		

Source: self-elaboration

Finally, a comparison between the relative weight of freight, as outlined in

Table 8, and the share of resources actually allocated to UFT projects, has been carried out. Results show an overall consistency: ‘city logistics’, ‘urban logistics’ and ‘urban freight’ (considered as synonyms in this study) are mentioned 19% of times with respect to ‘urban’ (chosen as benchmarking) in the policy documents, the same percentage related to the funding share allocated to UFT projects. Similarly, ‘freight’ is mentioned 44% of times with respect to ‘urban’ in the policy documents, which is a percentage relatively close to the overall funding share of 36% attributed to freight projects. However, the picture changes when considering ‘logistics’ as a synonym of ‘freight’: in this case, the share rises up to 74%, significantly deviating from the share of funds actually attributed to freight projects.

5.1.1.3 Comparison between UFT solutions and corresponding call(s)

This section aims at analysing the link between the ten UFT policy solutions (see section 4.2), considered essential for the achievement of a more efficient, less polluting and less impacting urban distribution of goods, and H2020 Work Programmes considering the weight in monetary terms resulting from the research funds allocated to each of them.

Table 12 shows the ten solutions, ranked according to the total funding budget available, along with the information about the documents where they are mentioned and the extent of their scope³¹, indicating the corresponding H2020 calls in Work Programme 2014-15 and 2016-17.

The ten identified solutions differ in their scope: for example, *Including UFT in SUMP*s and *UFT demand management*, are broad in their scope and can support the testing of different types of measures, according to the specific topic the applicant wishes to address. Conversely, *Eco labels* and *Procurement* are specific enough and they can hardly be suitable for different interpretations. The results reported show that, in principle, each of the selected solutions is covered by at least one call. Figure 4 summarises the information provided taking into account the following variables:

- 1/a) the extent of the scope of the solution that was normalised with respect to 7, which is the number of policy documents investigated;
- 1/b) number of policy documents addressing each solution according to the results of Table 12;

³¹ The research qualitatively attributes a weight from 1 to 3, accordingly to the extent of the scope of each solution: + (narrow), ++ (medium), +++ (wide).

- 2/a) number of calls considering each solution, as reported in Table 12. The maximum number of calls for a given solution is 7, thus normalisation is not needed;
- 2/b) budget (potentially) available for each solution. Directly linked to the calls, the amount per solution, specified in Table 12, is normalised with respect to 7.

Table 12 -Comparison between UFT solutions and corresponding call(s)

UFT solutions	Corresponding call(s)	Budget available
<p><u>Key:</u> normal: policy documents <i>directly</i> mentioning the selected solution. <u>Key:</u> <i>Italic:</i> policy documents <i>indirectly</i> mentioning the selected solution.</p> <p><u>Policy documents:</u> 1= Transport White Paper 2001; 2= Green Paper; 3= Freight transport logistics action plan; 4= Action Plan on urban mobility; 5= Transport White Paper 2011; 6= Urban Mobility Package; 7= A call to action on urban logistics</p> <p>Extent of the scope of the solution (qualitative assessment) from + to +++.</p>	<p><u>Key:</u> normal: calls <i>directly</i> addressing the solution. <u>Key:</u> <i>Italic:</i> calls <i>indirectly</i> addressing the solution.</p>	<p><u>Key:</u> <i>Italic:</i> estimated budget in the case more calls are grouped under a unique budget item</p>
<p>1) Including UFT in SUMP+ + guidelines for LAs (focus on stakeholder engagement)</p> <p><u>Policy documents:</u> 2, 3, 4, 6, 7</p> <p>Extent of the scope of the solution: +++</p>	MG.5.2-2014	<i>13</i>
	MG.5.4-2015	9
	MG.5.5-2015	57,5
	MG-4.1-2017	22
	MG-4.2-2017	
	MG-4.3-2017	2
	Total	103,5
<p>2) Deployment of ITS systems for (urban) freight</p> <p><u>Policy documents:</u> 2, 3, 5, 6, 7</p> <p>Extent of the scope of the solution: ++</p>	MG.6.1-2014	<i>16</i>
	<i>MG.7.1-2014</i>	28
	<i>MG.7.2-2014</i>	28
	<i>MG-6.2-2016</i>	12,5
	MG-6.3-2016	5
	<i>MG-4.2-2017</i>	11
	MG-5.2-2017	12
	Total	84,5
<p>3) Clean Freight vehicles</p> <p><u>Policy documents:</u> 1, 2, 4, 5, 6, 7</p> <p>Extent of the scope of the solution: ++</p>	<i>MG.5.1-2014</i>	<i>13</i>
	GV.4-2014	18
	<i>MG-4.2-2017</i>	11
	GV-08-2017	16
		Total
<p>4) UFT demand management</p> <p><u>Policy documents:</u> 1, 3, 4, 5, 6, 7</p> <p>Extent of the scope of the solution: +++</p>	MG.5.2-2014	26
	MG.5.3-2014	
	MG.6.1-2014	16
	MG-4.1-2017	11
	MG-4.3-2017	2
		Total
<p>5) eFreight</p> <p><u>Policy documents:</u> 5, 7</p>	<i>MG.6.1-2014</i>	32
	MG.6.2-2014	
	MG-5.2-2017	12

Extent of the scope of the solution: +	<i>MG-4.2-2017</i>	<i>11</i>
	Total	55

UFT solutions (continues)	Corresponding call(s)	Budget available
6) Integration between long-distance freight transport and last-mile distribution <u>Policy documents:</u> 2, 3, 4, 5, 6 Extent of the scope of the solution: ++	MG.6.1-2014	16
	MG-4.3-2017	2
	MG-5.1-2016	13
	Total	31
7) Shift Modes (bike, boat, rail) <u>Policy documents:</u> 1, 7 Extent of the scope of the solution: +	MG.5.2-2014	26
	MG.5.3-2014	
8) Integration between passenger and freight transport <u>Policy documents:</u> 2, 3 Extent of the scope of the solution: +	MG-4.1-2017	11
	MG-4.5-2016	10
	Total	21
9) Eco-labels <u>Policy documents:</u> 2, 5 Extent of the scope of the solution: +	MG-5.3-2016	2
10) Public procurement for freight <u>Policy documents:</u> 2, 5, 6, 7 Extent of the scope of the solution: +	MG-4.4-2016	2

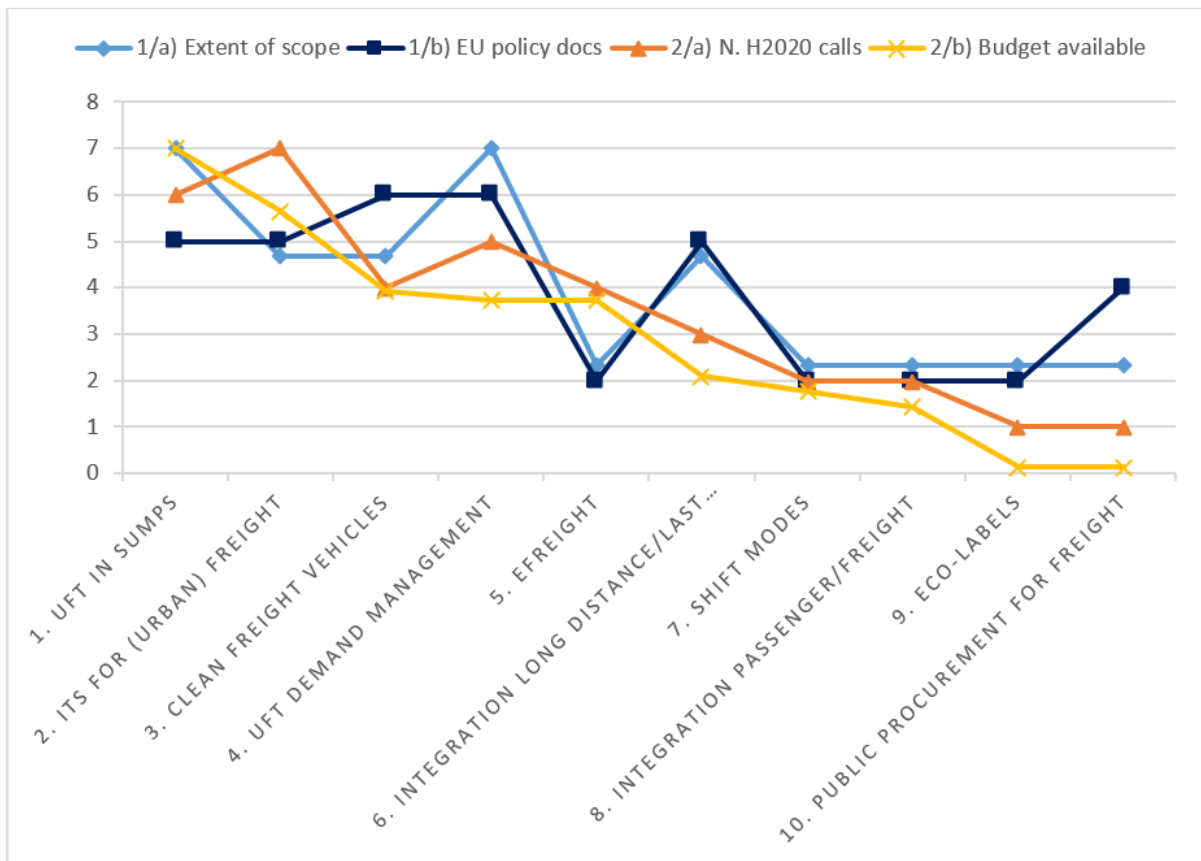
Source: self-elaboration

In general, 2/a and 2/b follow the same steady decreasing trend, highlighting the consistency between the amount of funds and the related calls that make them available. 1/a and 1/b both follow a more volatile path, nevertheless presenting the same fluctuations and a decreasing trend which is overall consistent with the one of 2/a and 2/b.

Four of the UFT solutions present an overall consistency when it comes to comparing 1/a) and 1/b), on the one hand, and 2/a) and 2/b), on the other: the greater (lesser) the scope of the solution and the higher (lower) the number of mentions in policy documents, the more (less) it is addressed in H2020 calls and, therefore, more (less) potential budget available for its implementation. This seems the case for *UFT in SUMP*s, *Clean freight vehicles*, *Shift modes*, *Integration passenger/freight*.

There are five solutions, out of ten, which do not present a clear path: *UFT demand management*, *eco-labels* and *public procurement for freight* seem under-funded (or over-covered), whereas *eFreight* and *ITS*, on the contrary, seems over-funded (or under-covered).

Figure 4 - Analysis of the selected UFT policy solutions



Source: self-elaboration

These solutions are discussed in more detail in what follows. In recent years, TDM has been discovered to influence agents' behaviour in the urban sector (e.g. Ben-Elia and Avineri, 2015; Dziekan and Kottenhoff, 2007; Juhász, 2013; Marcucci et al., 2007, 2013a, 2013b; Mokhtarian and Salomon, 2001; Watkins et al., 2011), also through the introduction of SPMs. These are gaining increasing attention in the field of sustainable mobility for various reasons, such as the lack of large budgets available or public dissent against coercive measures (Gärling and Schuitema, 2007). SPMs aim to influence transport actors' mobility choices, and therefore altering the demand for mobility (Jones et al., 2011, Holguín-Veras et al., 2016a). SPMs are often 'low-cost', compared to the other solutions, making *UFT demand management* a very cost-effective approach. In fact, it does not require a significant financial investment for

research and innovation, but rather an extensive investigation on how the implementation and exchange of UFT SPMs' best practices can be spread to ensure it is raising awareness and successfully transferring and adapting to different contexts. It is important to note that a robust demand analysis should foresee an evaluation of stakeholders' policy acceptability, behaviour change and willingness to pay measures (e.g. Gatta et al., 2015; Le Pira et al., 2017b; Marcucci and Gatta, 2016). Recent trends in freight demand management includes: i) off-hour deliveries (e.g. Holguín-Veras et al., 2014; Marcucci and Gatta, 2017); ii) crowdshipping (e.g. Marcucci et al., 2017c; Punel and Stathopoulos, 2017).

Public procurement for freight and *Eco-labels* are also an effective and relatively low-cost solution and, in some respects, they follow the same principles as the *UFT demand management* category: the use of the procurement leverage and recognition schemes (including eco-labelling) potentially enhance safety and reduce emissions. Indeed, public administrations might set rules to procure external services according to certain "green" standards: in this way, they i) give signals to UFT stakeholders to improve their sustainability standards in order to participate in public tenders, and ii) give an example of good practice, triggering a virtuous circle that allows them to frame these choices in the framework of behaviour change campaigns ('practice what you preach principle').

eFreight, mentioned in four calls, obtains an average ranking position, and *Deployment of ITS systems for (urban) freight* is also present in many documents. They can be addressed in many different calls, but only some of them specifically refer to UFT, affecting the possibility that a UFT-related project gets funded, because of the strong competition of other non-UFT-related project proposals.

To conclude, unlike other solutions, *Integration between long-distance freight transport and last-mile distribution*, is cited in almost all the documents but is considered only in few and very specific calls. This apparently biased result can be explained by the intrinsic characteristics this solution has, requiring more implementation than research supporting activities. In this case, other types of funding instruments which are not considered in this study (e.g. Connecting

Europe Facility³² funds which finance the trans-European transport network projects³³) seem more appropriate.

5.1.2 Implications

The work proposes an innovative approach for the assessment of the coherence and consistency between policy priorities and funds allocated to related research activities. It provides a systematic (living) *matching tool*, capable of constantly monitoring the parallel evolution of policies and projects.

Section 4.2 carries out a detailed analysis identifying the UFT challenges, and the related policy solutions defined at European level. Findings show that, starting from 2001, with the 1st White Paper on Transport, and, in a more comprehensive way, from 2007, with the Green Paper, the European Commission addresses UFT challenges through a systematic and coherent approach. Most of the significant priorities (constantly updated) aim to reach the same long-term objectives. Moreover, in 2013 the European Commission decided to dedicate one of the four accompanying documents of the Urban Mobility package to UFT (*A call to action on urban logistics*). This testifies the growing attention conferred to this topic. Ten solutions are proposed for the achievement of a more efficient, less polluting and less impacting urban distribution of goods.

Here, the new H2020 research programme is presented, providing an overview of the total budget allocated to it and the share of funds allocated to the transport sector. Based on the main UFT priorities identified in the policy documents, the study selects the corresponding calls from the 2014-2015 and 2016-2017 H2020 Work Programmes to quantify the funds available to (potentially) finance UFT projects. The total amount of funds allocated to the *Smart, Green and Integrated Transport* sector is €1,572.5 mln for the period 2014-2017. About a quarter of the total budget of the first 4 years of the programme is potentially available to finance UFT projects, which represents a satisfactory share of available funds. The study also investigates, limited to the concluded funding period 2014-2015, whether and how the funds *a priori* allocated correspond to those actually credited. Encouraging results are found. In fact, €31.8

³² *The Connecting Europe Facility for Transport is the funding instrument to realise European transport infrastructure policy. It aims at supporting investments in building new transport infrastructure in Europe or rehabilitating and upgrading the existing one.*

³³ *Since 2014, some Connecting Europe Facility calls address the urban nodes i.e. the cities on the network. Over 2014-2015, up to €500 million were dedicated to urban nodes.*

mln are allocated to UFT projects, representing a 20% share of the overall potentially available funds. Moreover, considering the ‘freight scope’ in general, a total of €57.4 mln are allocated, representing a 36% share of the available funds. These findings show an overall consistency with the *weight of freight* index. In fact, ‘city logistics’, ‘urban logistics’ and ‘urban freight’ hold together a relative weight of 19% in the policy documents, almost the same percentage of funds attributed to UFT projects (20%). ‘Freight’ holds a relative weight of 44% in the policy documents, again close to an overall funding share of 36% of freight-related projects.

The approach proposed gives the opportunity to ‘weight’ the importance of all significant UFT solutions proposed, by tying them with the H2020 Work Programmes and the corresponding budget allocated for their development and deployment. Results show that each of the selected solutions is covered by at least one call. As a consequence, there is the opportunity to undertake research and innovation projects in each of the UFT priority areas. Four of the UFT solutions present an overall consistency when it comes to comparing the extent of the scope of the solution and the number of documents addressing it, on the one hand, and the number of calls considering it and the budget (potentially) available, on the other. Other solutions do not follow a clear path. *UFT demand management* policies, *Eco-labels* and *Public procurement* can be considered cost-effective solutions, not requiring a significant financial investment. According to these findings, future research should identify the most promising UFT SPMs in the field of *UFT demand management*, implying a behaviour changing approach, and consequently test their potential for rolling out to different local environments. This also implies a higher level of local UFT stakeholders’ involvement and cooperation, led by LAs (Lindholm and Browne, 2013; Marcucci et al., 2017b; Quak et al., 2015), which can materialise into cooperative schemes, incentives and public-private partnerships. Indeed, recent literature indicates the need for including stakeholders’ preferences and their interactions within a participatory planning process (Gatta et al., 2017; Le Pira et al., 2017a; Marcucci et al., 2017a).

To sum up, over the past 20 years, the identified challenges and the proposed solutions are developed in a consistent manner and UFT is sufficiently covered by H2020 research funds. However, funds are heterogeneously allocated between the UFT policy solutions investigated. It should be borne in mind that the research funds allocated by the H2020 Work Programmes are specifically intended for research projects. The study does not investigate other funding, in particular the structural funding, nor other related European programmes, such as the

Connecting Europe Facility for Transport, created for the implementation of the identified solutions, in particular as regards infrastructure improvements.

Future endeavours could imply extending the research to other DGs, policy documents and European funds, to understand and evaluate how the urban transport sector policy fits with and is affected by the overall European policies in terms of environment, energy, growth, competition, regionalism, etc. This will require a fully dedicated new study, since details and a complete coverage of European non-binding instruments addressing urban transport is difficult to obtain and incomplete, and the amount of those is likely to be very high.

5.2 National level: urban planning schemes

SUMPs represent an innovative approach for city planning fostering effective, coordinated and consistent initiatives in European MSs in line with the general guidelines provided by the EU. A SUMP constitutes a comprehensive framework including present plans and provides a clear vision and reachable targets.

SUMP is the only common planning scheme for urban mobility in Europe. Therefore, it is essential to analyse its transposition at the national level, representing the intermediate level of the CAC in the framework of a multi-level governance approach (see Figure 5). This section assesses the effective adoption of the most innovative SUMP principles in the different national frameworks, through a systematic comparative analysis. Specific attention is paid to UFT: the EU SUMP Guidelines promote a balanced and integrated development of all modes, and the case of UFT is then taken as prime example to verify whether this principle is actually satisfied. EU SUMP Guidelines also support the introduction of SPMs to improve performance and cost-effectiveness, in line with the approach of this research.

The methodological approach adopted for analysing and geographically comparing MSs' efforts towards SUMPs promotion and implementation has been introduced in 3.2.1.2.

The state of the art of the implementation of national guidelines and legislation within the 28 MSs and the assessment of their consistency with respect to the EU SUMP Guidelines is performed through a systematic, comparative analysis based on five, distinguishable and assessable, criteria: i) *stakeholder & citizens engagement*, ii) *policies coordination & integration*, iii) *evaluation & monitoring tools*, iv) *long-term & sustainable vision*, v) *specific*

provisions for freight transport. These criteria are derived from five key principle (see Figure 3) enounced in the EU SUMP Guidelines, and strengthened by a comprehensive literature review. They are: i) *participation*, ii) *integration*, iii) *evaluation*, iv) *long-term and sustainable vision*, v) *balanced and integrated development of all modes*.

The section is structured as follows: sub-section 5.2.1 describes the SUMP philosophy; sub-section 5.2.2 provides an extensive literature review on the studies about SUMP, as well as about the five principles inspiring the criteria; sub-section 5.2.3 reports the main findings, while policy implications and suggestions are discussed in sub-section 5.2.4; in sub-section 5.2.5, the Italian case is examined in detail, whereas 5.2.6 focuses on UFT.

5.2.1 Sustainable Urban Mobility Plans

In recent years, LAs in European cities have developed increasing awareness (Gatta et al. 2017) to initiate the shift towards cleaner and more sustainable transport modes (e.g. walking, cycling, public transport and new way of conceiving car use and ownership). This awareness is partly due to the persistent economic crisis in Europe drastically reducing financial resources available to LAs and inducing them to find more economically and environmentally sustainable solutions (Galanis et al., 2017).

In order to support cities experiment innovative solutions for sustainable mobility, the EU provides LAs with support in setting a common policy framework and facilitating the exchange of experience and best practice. In this context, the EC drew up specific guidelines on SUMP, providing LAs concrete instructions and suggestions for the preparation of plans based on EU principles promoting participation, integration, evaluation, long-term sustainable vision, balanced and integrated development of all modes. However, each plan has to be tailored to specific national and local characteristics (Kaszubowski, 2016). Table 13 shows the main characteristics of a traditional planning process compared to a sustainable one, in line with the SUMP approach.

Table 13 - A new way of planning urban mobility

Traditional Transport Planning	Sustainable Urban Mobility Planning
Focuses on <i>traffic</i>	Focuses on <i>people</i>
Primary objectives: Traffic flow capacity and speed	Primary objectives: Accessibility and quality of life, as well as sustainability, economic viability, social equity, health and environmental quality
Mode-focused	Balanced development of all relevant transport modes and shift towards cleaner and more sustainable transport modes
Infrastructure focus	<i>Integrated set of actions</i> to achieve cost-effective solutions
Sectorial planning document	Sectorial planning document that is <i>consistent and complementary to related policy areas</i> (e.g. land use and spatial planning; social services; health; enforcement and policing; etc.)
Short- and medium-term delivery plan	Short and medium-term delivery plan embedded in a <i>long-term vision and strategy</i>
Related to an administrative area	Related to a functioning area based on travel-to-work patterns
Domain of traffic engineers	Interdisciplinary planning teams
Planning by experts	Planning with the <i>involvement of stakeholders using a transparent and participatory approach</i>
Limited impact assessment	<i>Regular monitoring and evaluation</i> of impacts to inform a structured learning and improvement process

Source: Wefering et al. (2013), p. 7.

The EU SUMP Guidelines, inspired by previous successfully developed planning tools (e.g. *Local Transport Plans* in the United Kingdom, *Plans de déplacements urbains* in France), illustrates lessons learnt from national best practices within a comprehensive framework without imposing a *top-down* approach (Wefering et al., 2013).

Wefering et al. (2013) provide the following definition: “A *Sustainable Urban Mobility Plan* is a strategic plan designed to satisfy the mobility needs of people and businesses in cities and their surroundings for a better quality of life. It builds on existing planning practices and takes due consideration of integration, participation, and evaluation principles” (p.8). “A *SUMP* is based on a long-term vision for transport and mobility development for the entire urban agglomeration, which covers all modes and forms of transport” (p. 48). Figure 5 illustrates the suggested SUMP planning cycle. SUMPs focus on improving life quality and not just solving traffic bottlenecks. Also for this reason, there is a reference to accessibility and mobility rather than transport (Litman 2017, Ricardo et al., 2017).

Figure 5 - Planning cycle for a Sustainable Urban Mobility Plan



Source: Wefering et al., 2013, p. 15.

5.2.2 A conceptual framework for SUMP

The way this strategic framework is then put in place, depends on the local context and available resources. The priority, here, is to establish the essential principles guiding each planning activity at local level. In the case of sustainable mobility plans, the basic reference should be the concepts of liveability and accessibility. The emphasis has to be shifted from ‘transport’ to ‘mobility’. ‘Transport’ refers to different types of modes, services and infrastructures that allow the accomplishment of individual trips, while ‘mobility’ refers to a set of individual movements

from one point to another, regardless of the transport service or infrastructure used to perform it (Pizarro, 2013).

The planning of movements in the city should focus on how to make them as sustainable as possible, from an economic, social and environmental point of view. To accomplish such a result, it is not always necessary to build new infrastructure or set up additional transport services: in this regard, SPMs play a key role in supporting the accessibility performance of the city, simply by *nudging* and incentivising users towards more sustainable and effective transport choices. LAs have to define long-term objectives, and ensure their achievement with a sustainable framework: the type of corrective action shall be defined through a long-term planning process that takes into account the principles of participation, evaluation and integration. The EU SUMP Guidelines reflect this approach.

For this method to be effective, a common and coherent approach is needed, both at national and at European level, in order to ensure the free and non-discriminatory circulation of citizens (passengers), goods and services, to effectively reduce the effects of climate change through cleaner transport systems, and to achieve the objectives of cohesion among the EU countries.

This section focuses on the national level. In Europe, MSs regulate the transport sector, and provide LAs with the funds needed to deploy the interventions foreseen (ECMT, 2002). It is necessary to embed sustainable mobility guidelines in the national legislative framework, so make them consistent with other relevant national strategies and overcome language barriers. After the introduction of the EU SUMP Guidelines in Europe in 2011, research has begun to analyse their impact. An extensive literature exists on the assessment of the SUMPs locally adopted on the basis of the EU SUMP Guidelines (Diez et al., 2014, Decker et al., 2012, Chakhtoura et al., 2016, Morfoulaki et al., 2015, to name a few). Nevertheless, the analysis and evaluation of the policy framework setting and the multi-governance approach definition seem missing in the studies about SUMP, as we saw in the introduction of Chapter 5. Some exceptions that emphasize the need to further investigate this missing link exist (Papaioannou et al., 2016). May (2015) argues that this lack of attention to the role of national governments is also evident in the policy activity of the EC which, while actively supporting LAs in the implementation of their SUMP, for example through the CIVITAS initiative, provides limited guidance to national officers on how to better manage the process of drafting appropriate and consistent national legislation and guidelines on SUMP.

The target of the analysis of this section is the *national planning process setting*: in order to perform a comparative analysis involving all EU countries, we need to identify those criteria that can be applied to assess any planning tool. For this reason, this study does not discuss, among others, the definition of sets of indicators, which must necessarily take account of the particular local situation that must be analysed, including elements such as scale, context, time and data availability (Chakhtoura et al., 2016). The criteria selected in this study directly derive from the EU SUMP Guidelines, since they represent the conceptual framework suitable to promote a new sustainable mobility planning approach rather than to suggest specific measures and solutions. This study, departing from the fundamental principles presented below, transforms them in analytic evaluation criteria. In what follows, the five principles are illustrated in detail discussing their relevance and motivating their inclusion in the analysis proposed.

Participation

“A SUMP focuses on people and meeting their basic mobility needs. It follows a transparent and participatory approach, which brings citizens and other stakeholders on board from the outset and throughout the plan development and implementation process. Participatory planning is a prerequisite for citizens and stakeholders to take ownership of the SUMP and the policies it promotes. It makes public acceptance and support more likely and thus minimises risks for decision-makers and facilitates the plan implementation” (Wefering et al., 2013, p. 8).

This subject is more pervasively investigated in section 6.1, therefore we directly recall those findings for this section.

Integration

“The development and implementation of a SUMP follows an integrated approach with high level of cooperation and consultation between the different levels of government and relevant authorities. Integrated planning and implementation encompasses: (a) sectors (transport, land use, environment, economic development, social policy, health, safety, energy, etc.); (b) authority levels; (c) neighbouring authorities” (Wefering et al., 2013, p. 9).

May et al. (2006) argue that effective integration benefits depend on the types of instrument implemented and the extent of its use. It is important to define what integration is designed to deliver, rather than considering it as an end in itself. The EC Guidelines stress the importance

of the complementarity of an effective integrated strategy, providing an added value since ‘the benefits derivable from the sum of the elements is greater than the sum of their single benefits’. Rouboutsos et al. (2008) propose a model to assist transport policy decision-makers, concerned with public transport integration, identifying the most cost-effective form of intervention and its timely implementation. They focus on public transport operational integration demonstrating that, if the PA initially invests on integration, individual operators will not have an interest in implementing additional measures. Regarding UFT, Marcucci et al. (2015b) illustrate the main steps for integrating collaborative governance models into city planning accounting for spatial, temporal and technical coordination of different planning activities.

Evaluation

“The development of a SUMP focuses on achieving ambitious, measurable targets [based on a realistic assessment of the baseline and available resources]. Specific indicators are used to measure progress towards targets (...). The implementation of a SUMP is monitored closely. A Monitoring Report transparently shared and communicated with citizens and stakeholders informs about the progress in developing and implementing the SUMP” (Wefering et al., 2013, p. 9).

The debate on the evaluation of the measures introduced by SUMP is open and encompasses several issues. Burggraf et al. (2015), in a study for the EU co-funded project CH4ALLENGE, addressing significant barriers obstructing the wider take-up of SUMP in Europe, illustrate the difficulties of various LAs in dealing with the evaluation and monitoring phase. The authors develop a scheme suggesting what types of data, both qualitative and quantitative, should be collected to provide a robust assessment, accounting for the difference between big and small-medium cities. Diez et al. (2014) focus on the fact that in Europe there is insufficient attention paid to the assessment of the effectiveness of measures proposed in a SUMP. Mouter et al. (2013) and Beukers et al. (2012) indicate cost-benefit analysis (CBA) and multi-criteria analysis (MCA) as well-developed evaluation tools to be used for this purpose. Nevertheless, there is often disagreement concerning their applicability and usefulness for different actors in the planning process (Beria et al., 2012). With reference to UFT, Browne et al. (2011) argue that, in order to make evaluation more complete, a comprehensive environmental and socio-economic impact assessment should also be performed. This allows for participatory analysis

and qualitative assessment, although implying risks of subjectivity and value-laden judgments. Gatta and Marcucci (2016) provide a policy evaluation methods review highlighting the relevance of behavioural analysis based on stated preference techniques. In the framework of the NOVELOG project, Nathanail et al. (2016) have developed a methodology for the evaluation of the efficiency of UFT policies and measures, taking into account sustainability aspects.

Long-term and sustainable vision

“A SUMP is based on a long-term vision for transport and mobility development for the entire urban agglomeration, which covers all modes and forms of transport” (Wefering et al., 2013, p. 48). *“It contains a plan for the short-term implementation of the strategy, which includes an implementation timetable and budget plan as well as a clear allocation of responsibilities and resources required for the implementation of policies and measures set out in the plan”* (Wefering et al., 2013, p. 9).

Stakeholders in the transport sector recognize the necessity of approaching the planning process through a long-term strategy, which is also taken for granted by scholars when discussing and proposing new models (Lindenau, 2016). This concept can differ regarding the temporal extension of the vision, according to the type and scope of the measure or initiative to be implemented. Therefore, research focuses on the optimal time horizon of a plan, and the scope of its provisions. May (2005) analyses the trade-off between short and long-term plans setting: a longer term enables the elaboration of a more comprehensive and coherent vision, but at the same time encompasses higher risks for implementation linked to uncertain future circumstances. Consequently, it suggests to formulate different, but interconnected, strategies for different scenarios and scopes.

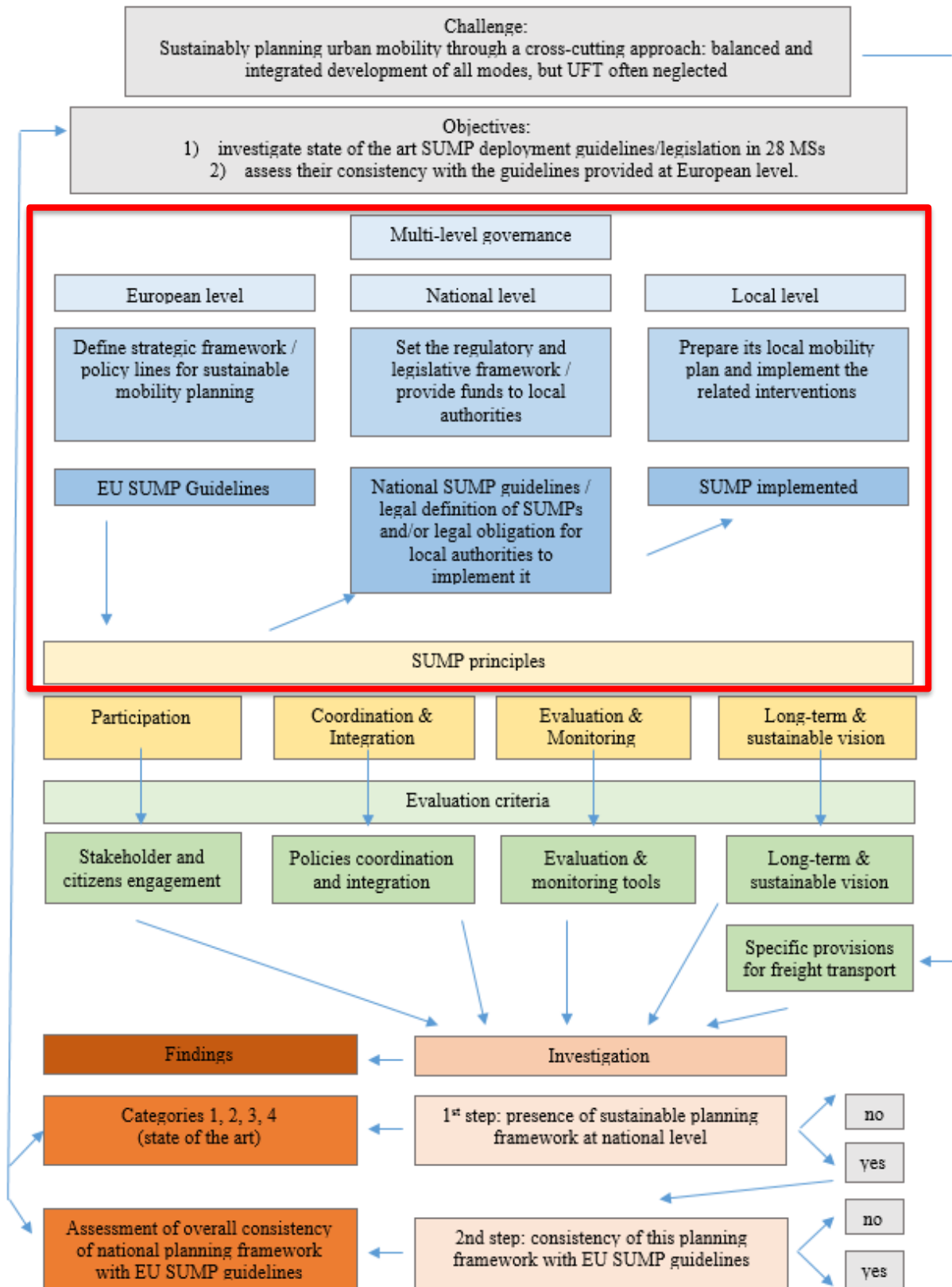
Balanced and integrated development of all modes: the case of UFT

The presence of this cross cutting criterion is motivated by the fact that many scholars (Kaszubowski 2016, Browne 2007, Rodrigues 2006, Sjöstedt 2007) have underlined the insufficient attention public authorities pay to UFT operations, compared to persons-related modes (Lindholm, 2014). This situation is in contrast with the SUMP concept, which encourages the balanced and integrated development of all modes. Different models have been used to investigate UFT stakeholder behaviour and reactions to different policy formulations, including stated preference models for yet-non-existing policies (Marcucci et al., 2012, 2013a).

Lindholm (2010) focuses on LA's perspective with respect to sustainable urban freight transport policies, demonstrating how a limited knowledge and awareness of this sector prevents an adequate setting of measures for their effective and integrated management. In line with EC prescriptions, the author argues that LAs should increase their awareness and interest in this topic: several measures could be implemented, the most important being i) continuous stakeholders' engagement, ii) creation of a full-time team focusing on freight transport related issues and iii) investigation of main barriers and drivers.

Based on the conclusions of the literature review, we build a conceptual framework for assessing the status of implementation of national urban mobility planning frameworks in the EU MSs (Figure 6), built upon the conceptual framework for multi-level governance of SUMP in Europe (Figure 3).

Figure 6 - A conceptual framework for SUMP



5.2.3 A comparative analysis of national urban mobility planning schemes

This section reports the results of the analysis of national urban mobility planning schemes for each of the 28 MSs according to the two-phase approach proposed (see methodology explained in section 3.2.1.2).

Phase 1 enables the categorisation of MSs according to the state of the art of SUMP guidance implementation. This preliminary assessment is based on two indicators: i) *existence, at the national level, of a legal definition of SUMP and/or legal obligation for LAs to implement them*; ii) *presence, at the national level, of a complete and unique document setting guidelines for SUMP implementation*. The first phase is useful to map the current situation in Europe and identify all the relevant tools adopted by the MSs.

After collecting information from various official sources and carrying out all the necessary checks and follow ups³⁴, thanks to a direct contact with the members of the MS Expert Group on Urban Mobility³⁵ providing valuable feedback, the previously described indicators are constructed. Accordingly, four categories of countries are identified, considering the level of the adoption process of SUMP guidelines and legislation. The starting point for the categorisation exercise is a report including materials and recommendations for SUMP development and implementation (Wefering and Rye, 2012)³⁶.

Results, graphically showed in Figure 7, are reported in Table 14.

³⁴ The main difficulties encountered have to do with the lack of a unique and pre-identified data source. The search was performed by an in-depth web search of all the national transport authorities' websites. An additional problem encountered relates to the availability of the information only in national languages whose content was translated. This phase took place in the framework of a research activity at the European Commission (www.eltis.org/mobility-plans/member-state-profiles), started in October 2014. Colleagues of different nationalities contributed to the translation the content of the relevant sections of the websites and the documents.

³⁵ The MS Expert Group on Urban Mobility was established by the EC in October 2014.

³⁶ Wefering and Rye (2012) propose the following categorisation: (i) Countries which have a well established transport planning framework (combined with a legal definition and/or national guidance on SUMP); (ii) Countries which are moving towards an approach to sustainable mobility planning; (iii) Countries which have yet to adopt sustainable mobility planning. In this work, the proposed categories have been re-elaborated and extended to enable an optimal categorisation of the countries according to the 2 identified indicators, which give the possibility to add an additional category (n. 2, Countries with a partially implemented transport planning framework): countries satisfying both indicators (i) and (ii), are in category 1, countries satisfying only one of the two are in category 2.

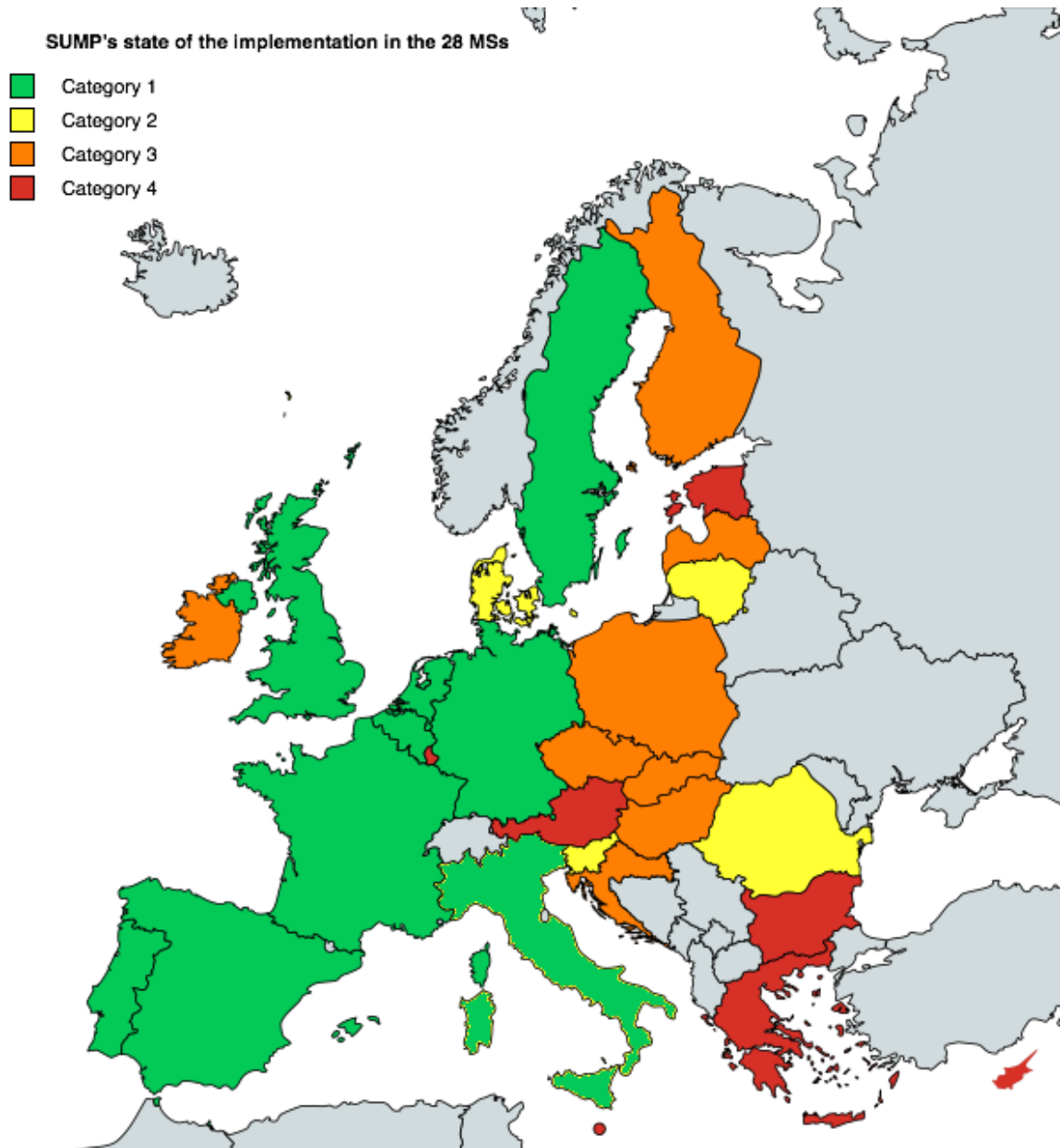
Table 14 - Overview of state of the art SUMP deployment guidelines/legislation in 28 MSs.

#	Category	MSs	Countries and description
1	<i>Countries with a well-established transport planning framework</i>	9	Belgium - Flanders, France, Germany, Italy, Netherlands, Portugal, Spain, Sweden and United Kingdom belong to this category, where guidelines and a legal definition of SUMP exists, and when a legal obligation does not, other instruments are in place (e.g. the funding priority for cities having a SUMP).
2	<i>Countries with a partially implemented transport planning framework</i>	4	Denmark, Lithuania, Romania and Slovenia belong to this class since either legislation or guidelines are weak and need to be improved to provide a complete urban planning framework.
3	<i>Countries moving towards an approach to sustainable mobility planning</i>	8	Croatia, Czech Republic, Finland, Hungary, Ireland, Latvia, Poland and Slovakia fall into this category since only few initiatives are already in place (e.g. national general strategies on transport including sustainable urban objectives, SUMP guidelines referring to one city of the country) and further steps are needed for establishing a structured urban planning framework
4	<i>Countries having yet to adopt sustainable mobility planning</i>	7	Austria, Bulgaria, Cyprus, Estonia, Greece, Luxembourg and Malta belong to this class since, at national level, there is not a legal definition of SUMP and/or legal obligation for LAs to implement them, nor a complete and unique document setting guidelines for their execution.

Source: self-elaboration

In some cases, classification was easily performed. For instance, France and United Kingdom, having a long tradition regarding sustainable urban planning and developing a legal framework that effectively encourages its adoption at local level, were included in the first category. When some legislation or guidelines features were considered borderline, a further qualitative evaluation was performed in order to include a country into a specific category. The case of the Netherlands is peculiar. Notwithstanding a legal definition of a Communal Traffic and Transport Plan (GVVP) was introduced without any obligation of adoption, the country was placed in the first category. This choice is motivated by the fact that the basic principles of the various GVVPs adopted at local level were consistent with the SUMP guidelines as testified by the study promptly conducted by Goudappel Coffeng (2012).

Figure 7 - SUMP's state of the art SUMP deployment guidelines/legislation in 28 MSs



Source: self-elaboration

As already clarified, SUMP constitutes a comprehensive planning framework, including present plans, and provides a clear vision and reachable targets. Given its inherently strategic nature, it can, *de facto*, display substantially different forms and characteristics in each MS. However, any SUMP, regardless of its shape and scope, should be characterized by common traits based on few common criteria. Therefore, the second step (Phase 2) of the analysis relates to the assessment based on the presence of the previously described 5 evaluation criteria (see

section 3.2.1.2), identified as key requisites for national SUMP frameworks to be considered in line with the EU Guidelines.

The countries belonging to the fourth category have been excluded from comparison since they do not foresee any planning scheme to address urban mobility issues.

The countries in the third category have implemented national general strategies on transport including sustainable objectives and/or sector-based strategies. **Croatia** recently introduced the *National transport development strategy (2014-2030)*, which for the first time includes the urban dimension of transport, and foresees several measures directly linked to SUMP: in particular, regions and cities will be required to develop proper SUMP, which should include not only infrastructural aspects, but also operational and organisational provisions. In June 2013, **Czech Republic** released a policy document, prepared by Czech Ministry of Transport, named the *Transport Policy of the Czech Republic 2014-2020 with the perspective 2050*. In this document, the number of cities adopting a SUMP is taken as an indicator to assess transport sector sustainability. Moreover, LAs are obliged to develop a public transport transport plan at regional and state level. **Poland** adopted a document for promoting sustainable mobility policy, *the National Transport Development Strategy 2020 with the perspective 2030*, and the *National Urban Policy* (focused not only on transport), adopted in 2013. This document identifies the need to optimise the transport system by integrating different modes of transport and reducing urban sprawl. Moreover, since 2011, Poland envisages the legal obligation for cities with more than 50,000 inhabitants to prepare a plan for the organisation of local public transport (*Plans for sustainable public transport development*). Although the scope of these plans can be widened on a voluntary basis in order to include other transport modes, the main focus on public transport doesn't allow to qualify these plans as SUMP. In **Slovakia** there are some national-level documents promoting sustainable objectives in the transport sector, as the *Strategy of the Development of Transport up until 2020*, the *Strategy of Public Passenger and Non-motorised Transport Development of SR until 2020* and the *National Cycling Strategy*. Moreover, the *Integrated Regional Operational Programme 2014-2020* envisages the obligation to prepare SUMP in order to get funds for sustainable transport projects. **Finland** presents 4 strategic sectorial documents supporting the planning of sustainable urban transport policy: the *Environmental Strategy for Transport 2013–2020*, defining the environmental policy for the transport sector, the *Intelligence in Transport and Wisdom in Mobility* (2013), which is a smart

mobility strategy focusing on transport and information services, the *National Strategy for Walking and Cycling* (2011) and the *National Energy and Climate Strategy* (2013). The remaining countries develop well-implemented SUMP guidelines and legislation, but only referred to the capital city of the country. The case of **Latvia** is particular: the capital city Riga is the only major city, therefore a specific Mobility Plan was developed at national level by the Ministry of Transport in 2010. In **Ireland**, the National Transport Authority is legally mandated to produce a Transport Strategy for the Greater Dublin Area, to whom regional and local development plans in the area must refer and be submitted. Budapest, capital city of **Hungary**, has just recently implemented a SUMP, based on a strategic document called *Transport Development Plan for Budapest*.

The countries in the first category have with a well-established transport planning framework. They are presented according to the 5 selected criteria. Italy is presented in a dedicated section (5.2.5).

1. Stakeholder and citizens engagement

In **Belgium (Flanders)**, the *Decree on local mobility policy*³⁷ (2009, amended in 2012) presents two specific articles (11 and 12) on public consultation: art. 11 defines the basic aspects concerning participation to be addressed by the plan, and art. 12 makes citizens' public consultation compulsory. In **France**, during the drafting process, it's compulsory to involve a number of public authorities at different levels, as well as users' representatives. There is a regulatory requirement to involve citizens once the draft has been produced, but more and more LAs are running consultations as part of the assessment and drafting process. In **Germany**, there are not binding rules on participation: however, about 80% (source: MS Expert Group on Urban Mobility) of the Transport Development Plan³⁸ (VEP) are worked out with an accompanying working group of politicians, administration and associations. In order to achieve a higher level of sustainability, citizens' participation is often foreseen in all phases of the planning procedure. In **the Netherlands** there is a specific recommendation to involve citizens and stakeholders throughout the process, not only during certain phases, stressing the point that a solid communication plan is essential. In **Portugal** participation is not compulsory, but the guidelines design a public participation model to be developed during the planning

³⁷ *Decreet betreffende het mobiliteitsbeleid*

³⁸ *Verkehrsentwicklungsplan*

process. **Spain** envisages the same situation, where the guidelines provide both a list of stakeholders to be consulted and recommendation for guaranteeing citizens' and other local representatives' participation in the planning process. The **Swedish** Guidelines introduce the workshop as a tool to adjust the LA's vision by involving participants from different municipality departments, politicians, regional planning authorities, national transport administrations and public transport authorities. No specific provisions on citizens' participation are envisaged. In **United Kingdom**, according to the legislation on Local Transport Plans, stakeholders and public consultation should be considered at various stages. As well as undertaking formal written consultation, authorities may wish to consider using representative working groups, fora, ongoing market research and questionnaires, as a means of reaching and involving a wide range of stakeholders.

2. Policies coordination and integration

The **Flanders** Mobility and municipal mobility plans contain provisions governing coordination of the spatial structure, the environmental plans and water management plans. In **France**, the *Solidarity and Urban Renewal Act*³⁹ (2000) aims to ensure coherence between urban development policies and transport systems. The *domestic transport orientation law*⁴⁰ (1982) envisages the coordination of sector-specific measures: car, public transport, walking & cycling, parking and freight delivery. Recently, the PDU has been expanded accounting for a number of interconnected issues, such as road safety, environmental protection, accessibility of people with disabilities. Moreover, the PDU can be produced on the same level as the Territorial Coherence Scheme⁴¹ to enable coordinated thinking about strategic urban planning and transport development. In **Germany**, VEP calls for cooperation with other planning instruments, such as the public transport plan, environmental and noise pollution policies, regional boards. In the **Netherlands** the coordination with other elements such as health and environment foresees the inclusion of life quality into the planning vision; an integrated approach is necessary to consult between policy fields within the municipality and neighbouring municipalities during the execution of the plan. **Portuguese** Guidelines recommend to develop an integrated approach, with a horizontal (i.e. with other policies, strategies and plans), vertical (i.e. with relevant levels governance) and spatial (i.e. considering

³⁹ *Loi solidarité et renouvellement urbain.*

⁴⁰ *Loi d'orientation des transports intérieurs (LOTI)*

⁴¹ *SCoT – Schéma de cohérence territoriale.*

the surrounding area) coordination effort. In **Spain**, SUMP Guidelines claim for an integrated vision proposing coordination actions among the local plans on city planning, transport and environment. In **Sweden**, the Guidance *Transport for an Attractive City* (TRAST) is developed for an integrated implementation with spatial planning. TRAST comprises a set of guidelines developed by the Swedish Association of Local Authorities and Regions, the Transport Agency and the Swedish National Board of Housing, Building and Planning, with the aim of supporting integrated planning and the development of balanced and sustainable urban transport systems. In **United Kingdom**, the Local Transport Plans (LTP) should present 3 levels of integration: i) with Regional Strategies, to consider a broader range of objectives, ii) with the Local Government Policy, to integrate transport and spatial planning, iii) with relevant Plans and Duties, that need to be reflected in LTPs themselves.

3. Evaluation and monitoring tools

In **Flanders**, detailed rules for content, methodology, procedure for the preparation, evaluation, review and publication of the municipal or inter-municipal mobility plans are established by the Flemish Government. The plans should be evaluated at least every five years and, if necessary, wholly or partially revised. In **France**, the law stipulates that the PDU must be evaluated every five years, but does not specify the methodology to be used. The evaluation focuses primarily on the implementation of the measures set out in the PDU and measuring their effects. An additional evaluation form has been introduced in 2004 measuring the effects of the PDU on the environment. In **Germany**, only parts or separate phases of the plans are evaluated. According to the **Dutch** recommendations, a clear and feasible monitoring and evaluation plan is required to assess the goals achieved and determine the potential needs of policy adjustment. Beside the traditional traffic engineering indicators, also indicators linked to climate change targets, energy and accessibility should be considered. In **Portugal**, the Follow-up and Monitoring process envisages the development of four tools: i) measurement of implementation progress, ii) SUMP management and decision support systems, iii) learning and improvement of the performances, iv) communication and participation. The results of the evaluation should generate mechanisms of regular feedback in the process, in order to allow adjustments to the plan; changes in the future policies should also be taken into consideration in the plan review set at the end of the 5-year period. In **Spain**, a periodic evaluation must be carried out, based on predefined indicators of the results obtained, to verify compliance with

targets and implement corrective measures. For each of the measures it must provide annual monitoring mechanisms through indicators and review procedures capable of adapting to the evolution of city mobility. The SUMP evaluation process should include criteria on environmental and life quality. In **Sweden**, monitoring and evaluation are considered as a key part of the implementation process. The evaluation should be done both quantitatively and qualitatively. Monitoring and evaluation can be performed via yearly reports, and the transport strategy should be reviewed to check whether updates are required. In **United Kingdom**, LTPs should consider what performance indicators are most appropriate for monitoring their plan, and what targets might be set to incentivize and secure delivery. Moreover, authorities should systematically track and record benefits from interventions, to measure the impact of specific actions, to know whether similar measures should be pursued in future, and to judge where best to direct funding.

4. Long-term and sustainable vision

According to the **Flemish** law, the mobility plan should reflect the long-term view of the sustainable mobility development policy. The plan has a time horizon of twenty years and contains a surveillance period of thirty years. The **French** PDU is a medium- and long-term planning document, but the law also gives it an operational dimension: several recent PDUs provide local measures within five years and a more strategic forward-looking vision of fifteen or even twenty years. In **Germany**, there is no specific reference to time frame, while the **Netherlands** ask their LAs to sketch a realistic picture of the implementation period and to avoid the influence of *ad-hoc* political sentiments, by adopting a predetermined process view. In **Portugal**, it is recommended a 5-year period of validity for SUMP, including a Programme of Action of 10 years coherently with other territorial planning instruments. In **Spain**, the SUMP should consider the short (up to 2 years), medium (2-4 years) and long (4-8 years) term, providing measures for all time horizons. In **United Kingdom**, prior to the 2008 Act, Plans were required to be renewed at least every five years. The new legislation allows local transport authorities replacing their Plans whenever necessary.

5. Specific provisions for freight

As it is for the 5th criterion, four countries (i.e. **Belgium**, **France**, **Sweden** and **United Kingdom**) implemented additional guidance on freight related to the national SUMP general

framework. Nevertheless, 6 out of 13 countries do not include specific provisions for freight. As pointed out above, this is a critical topic, which horizontally affects all the other 4 principles considered. This result confirms the need to further integrate UFT in the general city mobility management systems and specifically in the SUMP framework.

Table 15 and 16 synthetize the results for the countries belonging respectively to the first and second category, providing an overview of the countries that have already implemented legislation and/or guidelines on SUMP. The following information are included: i) references to the laws (normal style) and guidance documents (*italic*); ii) presence of legal definition of SUMP and/or the obligation to implement the SUMP; iii) date of the adoption of the law and/or of guidelines publication, to check whether it precedes or follows the publication of the EC Guidelines; (iv) presence of the five key criteria in the national planning framework.

Table 15 - Countries with a well-established transport planning framework

#	1 st CATEGORY Country	Definition / Obligation by law	Date (before / after EC Glines)	# criterion (par. 4)				
				1	2	3	4	5
1	Belgium (Flanders) Decree on local mobility policy, 2009 (amended 2012) <i>The Local Mobility Plan, 2010</i>	Def	Before: 2010	✓	✓	✓	✓	✓ ⁴²
2	France PDU, Urban mobility plans: - Domestic transport orientation law (LOTI, 1982, Def) - Law on air quality (LAURE, 1996, Obl) <i>PDU – Guide (1996)</i>	Def/Obl	Before: 1996	✓	✓	✓	✓	✓ ⁴³
3	Germany VEP (Transport Development Plan), defined by law <i>Notes on transport development planning (2013)</i>	Def	After: 8/2013	✓	✓	✓	✓	X
4	Italy Law 340/2000, art. 22 (amended Law decree 257/2016) <i>PUM, Urban Mobility Plans. National guidelines (2017)</i>	Def/ Obl	Before: 2005 (update in 2017)	✓	✓	✓	✓	✓
5	Netherlands GVVP (Communal Traffic and Transport Plan), defined by law (Art. 9, Traffic and Transport Planning Act, 1998) <i>Dutch Transport Knowledge Resource Centre (KPVV), Official guidance for development of GVVP</i>	No* (but def. of GVVP)	After: 6/2012	✓	✓	✓	✓	✓
6	Portugal National Programme of the Land Use Planning Policy, Law n. 58/2007) National Directives on Sustainable Mobility and Transport (2011) <i>Guide to the preparation of plans for Mobility and Transport (2011)</i>	Def/Obl (only Lisbon & Porto)	Before: 3/2011	✓	✓	✓	✓	✓
7	Spain Sustainable Urban Plans, Law 2/2011, artt.101-102 <i>TRANSyT, PMUS: Practical guide for elaboration and implementation of SUMP</i>	Def/Obl (to get funds)	Before: 7/2006	✓	✓	✓	✓	✓
8	Sweden <i>Guidance Transport for an Attractive City (TRAST), 2005</i>	No* (but def. of TRAST)	Before: 2005 (latest ed. in 2015).	✓	✓	✓ ⁴⁴	✓	✓ ⁴⁵
9	United Kingdom Local Transport Plans (Local Transport Act, 2008) <i>Department for Transport’s statutory Guidance on Local Transport Plans</i>	Def/Obl	Before: 2009	✓	✓	✓	✓	✓ ⁴⁶

Source: self-elaboration

⁴² See: “How to get an efficient and sustainable urban distribution in Flanders”.

⁴³ See: “Les PDU – Prise en compte des marchandises”.

⁴⁴ See: Handbook “The effects of transport strategies”.

⁴⁵ See: “Handbook for freight transport in the good City”.

⁴⁶ See: “Freight Quality Partnership” (FQP).

Table 16 - Countries with a partially implemented transport planning framework

#	2 nd CATEGORY Country	Definition / Obligation by law	Date (before / after EC Glines)	# criterion (par. 4)				
				1	2	3	4	5
1	Denmark <i>Guide til Sustainable Urban Mobility Plans, 2nd edition (2014)</i>	No	After: 3/2014 (2 nd ed.)	✓	✓	✓	✓	Na
3	Lithuania Legal definition of SUMPs + <i>guidelines</i> - [to be approved]	Def	After: 2014	X	✓	✓	✓	✓
4	Romania Urban Mobility Plan (UMP), Law 190/2013	Def/ Obl	Before: 7/2011	✓	✓	✓	✓	X
5	Slovenia <i>Sustainable mobility for successful future: Guidelines for preparation of Integral transport strategy (2012)</i>	No	After: 2012	✓	✓	✓	✓	Na

Source: self-elaboration

According to these findings, half of the MSs is on the correct way in adopting a sustainable urban planning strategy, but only one third (1st category) are characterized by an already satisfactory approach according to the EU point of view. Only few measures put forward in EU SUMP Guidelines have been formally implemented in MSs procedures, and only five guidelines/legislations have been adopted after the first publication of the EU SUMP Guidelines in September 2011. However, the detailed inspection of the existing planning schemes indicates a broad understanding of the EU SUMP Guidelines by the vast majority of MSs: SUMP guidelines/legislation, if introduced, generally include all the first four criteria, whereas the balanced and integrated development of all modes, as demonstrated in the case of UFT, is not sufficiently considered.

5.2.4 Implications

This work assesses the effective adoption of the most innovative SUMP principles in the different national frameworks, and compares the different approaches adopted by the 28 MSs, identifying the areas of potential improvement. This work is based on a two-phases methodology, which enables to classify MSs according to i) *the state of the art of SUMP's national frameworks implementation* (phase 1) and ii) *the degree of consistency of the national*

SUMP tools with respect to the EC Guidelines, based on five simple and comparable criteria (phase 2).

The preliminary research on the presence of legislation and guidelines on SUMP at national level (phase 1) has been initiated at the EC last October 2014, and the main output is a new section on the Eltis website (Member States Profiles)⁴⁷ describing the current situation at national level. Phase 2 proposes a benchmarking exercise, to systematically mapping, through five simple and easily comparable criteria, the status of adoption of national SUMP guidelines and legislation in EU, and their degree of compliance with the EU Guidelines, providing an immediate and constant overview of the European situation. The main innovation of this methodological approach is the creation of a new *comparative tool for policy-makers*: at European level, it helps monitor the overall state of art of SUMP in Europe; at national level, it enables to self-positioning with respect to other countries: this raises awareness among MSs about diverse initiatives in other countries, creating a positive competition and *nudge* in order to reach a cohesive improvement.

As specified in the introduction, the EU is not required to legislate for this sector: however, creating awareness, providing (non-financial) incentives, resources and know-how, exchanging experiences, and thus encouraging cities to learn from each other, ensure that, locally, public authorities have additional tools available to design modern planning systems, focused on sustainability and attentive to the needs of citizens and business. This awareness is created through stakeholder engagement and cooperation systems, representing the first criterion identified in this work. Indeed, as widely demonstrated in literature (see section 5.2.2), a clear and strong consultative approach is essential to create consensus and to increase the effectiveness of new initiatives. This is particularly true for UFT, which affects several typologies of stakeholders with very different, and often conflicting, interests (Gatta et al., 2017).

Results show that only few measures put forward in EC Guidelines have been formally implemented in MSs procedures, and suggest that a strong effort is still required from the EC in order to reach the stated cohesion objectives. The majority of MSs presents unsatisfactory sustainable planning framework (countries belonging to categories 3 and 4). Only five

⁴⁷ <http://www.eltis.org/mobility-plans/member-state-profiles>

guidelines / regulations were adopted after their 1st release in September 2011. A strong effort is still required from the EC in order to reach its cohesion objectives. Nevertheless, the detailed inspection of the various planning tools indicates a significant compliance with the EU SUMP Guidelines of the national frameworks of the countries within categories 1 and 2. This means that national governments give high consideration to the planning framework and support provided by the EC, recognising the criteria considered in this study as essential for the development of an effective plan. Indeed, the national guidelines and legislation on SUMP, when introduced, generally include the first four criteria considered in this analysis, while very often freight-related policies are neglected. In this respect, the EC's choice to dedicate the 2016 SUMP award⁴⁸ to UFT planning is encouraging. Moreover, national experts, involved by the EC through its MS Expert Group on Urban Mobility, are actively contributing to the dissemination of relevant best practices adopted within their countries. This demonstrates the increasing interest and involvement of MSs in the urban mobility planning improvement process.

However, since only 9 countries have already reached category 1, the EC should continue providing direct support to cities interested in the practical implementation of a SUMP, through funding, training and coordination activities. Direct funded projects could provide an important added value to test effective models and coordination actions throughout Europe. Some examples: the EU-funded project Urban Transport Roadmaps⁴⁹ recently launched an online tool to support cities in developing preliminary scenarios for their SUMP; the SUMPS-UP⁵⁰ project aims to support European cities in the development of their SUMP: more than 100 cities and 200 European experts will receive economic support and training from the EC; the European project REFORM⁵¹ aims at bringing a SUMP to at least 60% of the LAs of the four regions participating in the project. Other interesting projects are SUITS⁵² and PROSPERITY⁵³. However, the EU, on the basis of the subsidiarity principle, has only residual competence in local transport planning. Therefore, it is essential that, via the structural funds' operational programmes and a coherent policy framework, policy indications of the EC with regard to the

⁴⁸ <http://www.mobilityweek.eu/sump-award/>

⁴⁹ <https://www.interregeurope.eu/reform/>

⁵⁰ <http://sumps-up.eu/>

⁵¹ <https://www.interregeurope.eu/reform/>

⁵² <http://www.suits-project.eu/>

⁵³ <http://sump-network.eu/about/>

implementation of SUMP are successfully transposed at, firstly, national level, and consequently, local level.

It is important to note that this section does not investigate or question the quality of locally implemented SUMP and their level of diffusion throughout the countries. In fact, the research does not outline the specific sources of the inefficiencies of the actual SUMP implementing process at local level, and also it does not allow investigating the correlation between the five criteria and the actual effectiveness of locally implemented SUMP. It focuses on guidelines and legislation existence at national level and on the compliance level with the five evaluation criteria selected, and consequently with the EC Guidelines, released for the first time in 2011.

It finds that UFT is often neglected, and suggests that its impact on the liveability of the city should be stressed to make the sector more ‘attractive’ for local policy-makers. The output is a new policy comparative tool, useful for both European and national policy-makers: at European level, it monitors the overall state of art of SUMP in Europe; at national level, it raises awareness among MSs about diverse initiatives in other countries, and generates a motivation to improve the national framework.

Section 5.3 investigates whether a coherent transposition of EC provisions at national level stimulates their broad diffusion throughout the country. Additional future research endeavours will tackle, in a future work, the following issues: (1) analyse the specific sources of inefficiencies derivable from SUMP implementing processes; (2) evaluate both the adequacy of the solutions proposed at EU level and the capacity of directly transferring them to the interested LAs; (3) examine UFT planning strategies already in place in few MSs, in order to compare the different approaches adopted in absence of a specific EU guidance document.

5.2.5 The Italian case

Italy recently moved to the category of Countries with a well-established transport planning framework (Category 1). Law 340/2000 (Article 22) introduced the Urban Mobility Plan (*Piano Urbano della Mobilità*), ‘PUM’ in Italian), intended as a systematic and integrated long-term (ten-year) planning tool for managing mobility in urban areas. The Ministry of Infrastructure and Transport issued national guidelines on PUMs in 2002, and some Regions have drawn up regional guidelines.

The decree 257 of the Ministry of Infrastructures and Transport of 4 August 2017 reports the provisions on the *Identification of the guidelines sustainable urban mobility plans (PUMS in Italian)*. The decree contains also the *Procedures for the drafting and approval of the urban plan for sustainable mobility* and the *Objectives, strategies and actions of a PUMS*. The PUMS explicitly takes the EU SUMP Guidelines as a basis of reference, and is in line with the contents of the annex *Connecting Italy: needs and infrastructure projects* of the 2017 Economic and Financial Document⁵⁴. Consistently with the provisions of this annex, metropolitan cities are proceeding to define their PUMS in order to access state funding for new infrastructural interventions for fast transportation, such as metropolitan railway systems, metro and tram.

The purpose of the decree is to encourage the homogeneous and coordinated application of guidelines for the drafting of PUMS throughout the national territory. Two annexes to the decree containing the PUMS guidelines, composed of:

- a uniform procedure for the drafting and approval of the PUMS
- the identification of the reference strategies, the macro and specific objectives and the actions that contribute to the concrete implementation of the strategies, as well as the indicators to be used for monitoring and evaluation.

In order to promote a unitary and systematic vision of the PUMS, also in line with the EU Guidelines, to achieve a balanced and sustainable development, the mandatory minimum macro objectives, with the related indicators listed in Annex 2, are monitored every two years by the *National Observatory for Public Transport (PT) policies*, to assess the degree of contribution to the progressive achievement of national policy objectives. Most major Italian cities are starting to adopt a PUMS, which is now consistent with the SUMP concept defined in EU SUMP Guidelines, introducing a strong participatory element and a clear reference to UFT (criteria 1 and 5, missing in the previous version of the PUMS guidelines).

The other major urban planning tool envisaged by Italian law is the Urban Traffic Plan (PUT). It is a management plan for a very short period (two years), mandatory for municipalities with more than 30,000 inhabitants or characterized by seasonal tourist flows or seasonal commuting.

⁵⁴ http://www.mef.gov.it/focus/article_0031.html (in Italian)

Established in 1986⁵⁵, it became mandatory in 1992, with the approval of the new rules of the Road Code⁵⁶. The PUT is widely implemented since it is mandated by law.

In 2016, the Ministry of Infrastructures and Transport has set up the *Italian Urban Logistics Working Group*, involving all metropolitan areas and institutional stakeholders of the sector, the Ministry wishes to pursue a dialogue with the aim of abandoning a classical approach to the theme, based on prohibitions and restrictions, in favour of rewarding policies supported by new technologies. The Ministry is keen on taking the lead in the process, providing non-binding guidelines and support, in full respect of local autonomy, with a soft-law approach. However, after the 1st meeting (April 2016) there seems to be no public material available about the next steps of the Working Group.

5.2.6 The significance of UFT: urban freight planning tools in Europe

Four of the countries belonging to category 1 also implemented additional guidance/legislation on freight: Belgium, France, Sweden, UK. Nevertheless, this aspect is often neglected in the selected national tools: 6 out of 13 do not include any specific provisions for freight. As pointed out above, this is a topic that horizontally affects all the other principles taken into consideration. This result is in line with the conclusions pointed out in section 5.2.2: UFT sector is a complex, fragmented and a multi-stakeholder, multi-level decision-making environment. The EU SUMP Guidelines clearly emphasise the need of considering goods distribution into the overall urban mobility planning process, promoting a balanced and integrated development of all modes: the case of UFT is then taken as prime example to verify whether this principle is actually satisfied. The EC Communication UMP of 2013 specifically states that freight planning should be better integrated in urban mobility management. However, for its strategic, overarching nature, the SUMP cannot provide detailed guidance on how to do that in concrete. Moreover, the freight sector, unlike others, such as passenger transport, presents marked stakeholder fragmentation and heterogeneity, generating contradictory stakeholders objectives of context-specific, dynamic business actors. This makes it difficult to propose standard measures that might suitably adapt to different urban contexts, to develop a common understanding about future expectations. Moreover, a consolidated strategic ‘vision’ for the future is difficult to elaborate, since there is a lack of information and expertise for a proper

⁵⁵ Circolare del Ministero dei Lavori Pubblici 8 agosto 1986, n. 2575.

⁵⁶ CdS - D.Lgs 285/1992.

problem definition at local level. When planning for the freight sector, it is also essential to ensure that its economic performance maintains satisfactory standards.

The specific characteristics of the freight sector impose to develop dedicated planning tools (SULP), to understand the local situation, and determine the optimal combination of measures with respect to the context conditions (Delle Site et al., 2013). Little attention has been paid so far by cities to the planning dimension of the freight sector (Dablanc, 2011). National guidelines for the development and implementation of SULPs within urban areas are not common. The integration of freight-related policies in the larger context of urban planning development is of great significance. Focus should be given on how to incorporate the freight dimension into urban mobility plans, either embedding the SULP into the SUMP, or creating a strong link between two different plans. Indeed, ensuring that a long-term UFT strategy is embedded in the overall sustainable mobility local strategy makes easier to implement the envisaged policies and measures (Lindholm and Behrends, 2010 and 2012).

Findings from a review of the characteristics of SULP implemented in different European cities show that these normally consider the main elements recommended by the existing European planning methodologies (Fossheim and Andersen, 2016). However, it is important to develop complementary and specific tools, models and schemes, which can be easily applied to the different local contexts, also considering the lack of competence of LAs regarding UFT (NOVELOG D2.2, Lindholm, 2014) and the consequent need of tailored support. Some European projects, funded in the framework (but not only) of the H2020 research programme (see section 5.1) are working on this. The objective, like for the SUMP Guidelines, is to develop dedicated guidance for national and LAs, to embed the freight dimension in their own urban mobility planning context. Here we give a few examples of projects providing guidance and support for the development of both freight strategies (identifying challenges and defining objectives) and action plans (proposing policy measures). They can be separated or combined in a unique document, but policy-makers and planners should be aware of the difference and at the same time of the need to draft both of them (Fossheim and Andersen, 2016).

The **ENCLOSE** project⁵⁷ developed SULPs for historical towns. The SULP Guidelines developed are a policy support tool for small and medium-sized cities in Europe who may not

⁵⁷ www.enclose.eu

have the resource for major policy assessment and modelling work for sustainable city logistics. The Sulp methodology is related to SumpS: it takes on and develops the city logistics elements:

- Participatory approach and political level involvement.
- Bottom-up approach, starting from users' needs, operators'/associations' requirements and towns' objectives.

This methodology has been used and tested by the nine ENCLOSE towns for developing their local SulpS⁵⁸.

The **SUGAR** project has developed the Best Practice Guide in urban logistics, featuring case studies from across the EU & Japan. These best practices feature details about the design of the policies and their implementation, supporting actions, the results of the measures and key considerations. Moreover, this handbook addresses the problem of inefficient and ineffective management of urban freight distribution. The project promoted the exchange, discussion and transfer of policy experience, knowledge and good practices through policy and planning levels in the field of urban freight management.

The **CIVITAS WIKI** project published the CIVITAS Policy Note, providing evidences to support the activities of actors and stakeholders when making crucial decisions on, and planning for, urban freight logistics, through a selection of measures offering a variety of possible solutions to be implemented by local small and medium-sized European cities for sustainable UFT.

The **BESTUFS** project also produced a Good Practice Guide on urban freight: small and medium-sized cities need help and advice to understand how they can transfer good practice to their own context. The guide, available in 17 different European languages, aims to give cities the advice and tools they need.

The **C-LIEGE** project released the Toolbox for City Logistics Managers. It is a compendium of hard and soft measures for making freight and logistics systems more efficient, including financial instruments, technical and regulatory restrictions, additional services or information

⁵⁸ http://www.enclose.eu/upload_en/file/deliverables/Enclose%20Sulp%20Portfolio.pdf

and communication campaigns. It also provides a detailed guide to the establishment and function of the City Logistics Manager role.

The **Freight TAILS** project is developing tailored freight management policies using the URBACT Integrated Action Planning methodology⁵⁹. Action plans aim to develop sustainable urban logistics approaches, highly connected to the soft approach described in this work, like micro/consolidation, SME co-ordination, retiming deliveries, efficient road space allocation. This is done with a focus on specific urban areas, such as areas of high multi-tenanted office blocks, high street retail areas, public attractors areas (universities and administrative offices), historic central areas. Business cases, data and recommendations for implementation are key elements of the Action Plans.

The **SULPITER** project focuses on the multi-level regional governance model of UFT: it develops the concept of functional urban areas (FUAs), taking into consideration the functional transport and economic relations between inner urban centres and the surrounding urban territories. Within this context, it supports policy makers in improving their understanding of FUAs freight phenomena in an energy and environmental perspective, enhancing their capacity in urban freight mobility planning in order to develop and adopt SULPs.

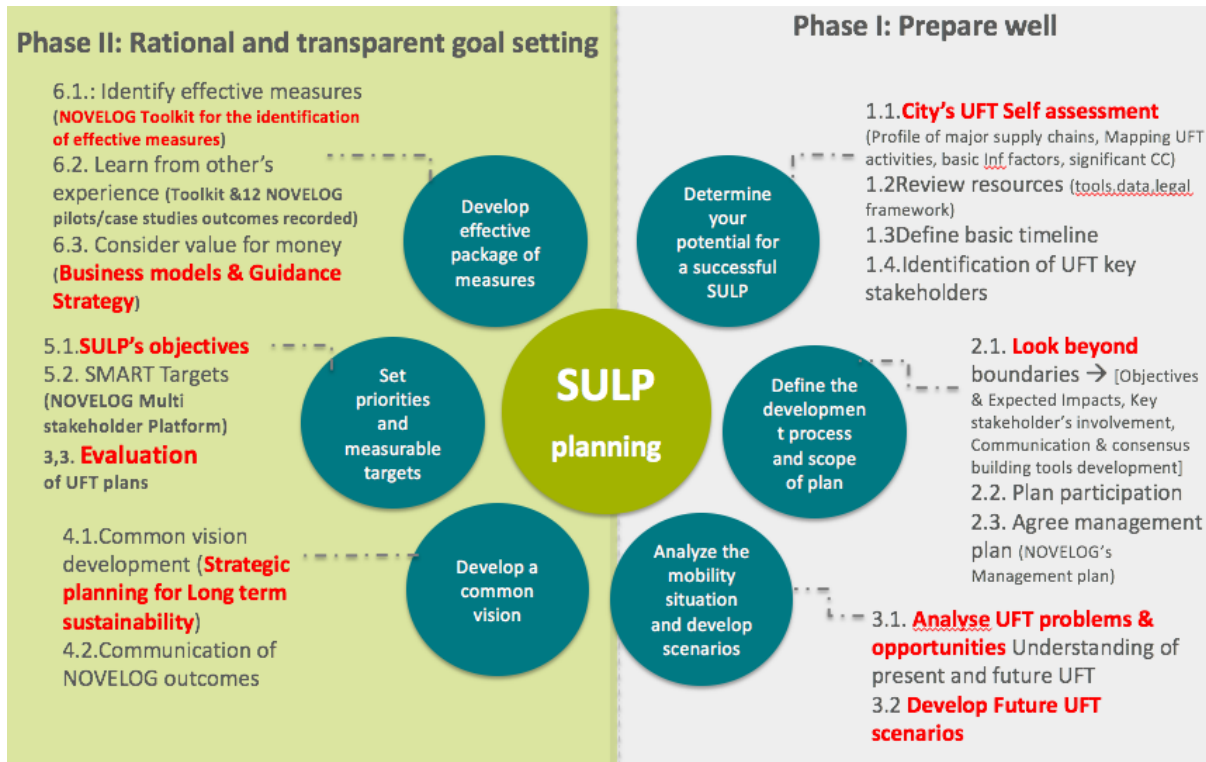
The key concept of the **NOVELOG** project, which will also be exploited in Chapter 6 for the identification and evaluation of UFT SPMs, is to initiate and enable urban freight policy formulation and decision-making as part of the city's sustainable urban mobility planning, and support LAs in the implementation and uptake of appropriate policies and measures⁶⁰. This is achieved through tailored guidance provisions to policy makers, with the support of the four tools developed during the project: i) Understanding City Tool; ii) Toolkit - City Impact; iii) Evaluation Tool; iv) Guidance Tool (Stathacopoulos et al. 2016).

Cooperative business models for each intervention are being developed, innovative because they refer to continuous local stakeholder collaborations and cooperative schemes rather than individual actor models. NOVELOG aims at integrating the NOVELOG tools in the European recommended SUMP methodology. For this reason, from the very beginning the tools have been designed to be complementary to the SUMP approach (as defined in 5.2.1).

⁵⁹ http://urbact.eu/sites/default/files/media/guidelines_for_iap_final.pdf

⁶⁰ www.novelog.eu

Figure 8 - NOVELOG SULP Guidance process



Source: www.noveleg.eu

As already discussed for SUMP, and as it is further discussed in 6.2, national guidance and legislation is essential to increase the amount and consistency of implemented freight plans at local level, by means of pressure from the upper governance level (the national one, in this case) and of awareness raising among city officers (Fossheim and Andersen, 2016).

Lindholm and Blinge (2014) assert that, in order to increase and make more effective the development and diffusion of freight related strategies, some 'soft' policy elements shall be pushed forward, such as including freight-related issues in other planning procedures, awareness raising and knowledge building regarding urban freight transport within LAs. These aspects are addressed in section 6, where we discuss about the nature and the application of UFT SPMs in European cities.

5.3 Local level: implementation of SUMP in European cities

This section explores what happens where the European and national top-level ambitions and instruments are expected to be turned into real, local actions. It investigates whether a coherent

transposition of EC provisions at national level, as discussed in 5.2, ensures a high quality of locally implemented SUMPs and stimulates their broad diffusion throughout the country.

The European Commission has created a database of European cities having implemented an urban mobility plan and involved in ongoing and completed EU-supported SUMP projects and initiatives⁶¹. Data processing enables to draw some important conclusions about the correlation between the 4 categories of countries identified in 5.2 and the degree of actual implementation of SUMP in cities belonging to these countries. It is important to point out how the urban mobility plans outlined here do not necessarily meet the SUMP principles as identified in 5.2. Moreover, the data are uploaded on a voluntary basis by LAs, therefore it might not correspond to the real picture. This database represents a useful tool to develop a general idea of the number and diffusion of urban mobility plans in place or under preparation, however the data analysis and the corresponding inference cannot be considered a rigorous scientific process, but rather an attempt of validation of theoretical assumptions developed in 5.2 against a remarkable set of data collected by the EU. Moreover, there might be distortions that in many cases reflect a different guidance approach of the countries concerned, but do not necessarily implies a worse level of planning (cfr. Germany in Table 17). As already explained in section 5.2, not all European countries, although active in the definition of guidelines and legislation on local mobility planning tools, have adopted principles corresponding to those promoted in the EU SUMP approach.

This section presents a quantitative analysis of the data collected in the EC database, with the aim of extrapolating the number and relative weight (total and by category) of i) *European cities mapped in the ELTIS Database*, and ii) *the urban mobility plans in place and under preparation*, in order to understand their relationship. In the light of what has been clarified above, this survey cannot be expected to investigate any type of correlation between a country's association to one of the four categories identified in section 5.2 and the number of plans per country, because of the non-reliable data collection approach populating the database. However, the results give the possibility to make some considerations, providing additional elements to the implications discussed in the previous sections.

⁶¹ <http://www.eltis.org/mobility-plans/city-database>

Table 17 - Number of cities and urban mobility plans per MS category

Country	Number of cities	Urban mobility plan	Under prep.	NA	Involved in SUMP EU	% UMP wrt # cities	% involved in SUMP EU
Belgium	7	6		1	5	86%	71%
France	74	53	1	21	17	73%	23%
Germany	81 (53*)	14 (45*)	2 (0*)	67 (0*)	n.a.	20% (85%*)	n.a.
Netherlands	24	13		11	9	54%	38%
Portugal	9	3		6	6	33%	67%
Spain	56	34		22	29	61%	52%
Sweden	13	5		8	8	38%	62%
UK	98	85		13	25	87%	26%
Italy	46	36	2	10	25	78%	54%
Subtotal	408 (380*)	249 (280*)	5 (3*)	159	139		
	% cities in cat. 1	% UMP in cat. 1				% UMP wrt cities in cat. 1	
	76% (75%*)	75% (77%*)				62% (74%*)	
Denmark	5	4	1		4	80%	80%
Lithuania	4	1	1	3	3	25%	75%
Romania	29	17		12	16	59%	55%
Slovenia	4	3		1	3	75%	75%
Subtotal	42	25	2	16	26		
	% cities in cat. 2	% UMP in cat. 2				% UMP wrt cities in cat. 2	
	8% (7%*)	9% (8%*)				64%	
Croatia	6	3	1	3	3	50%	50%
Czech Rep.	5	4	1	1	5	80%	100%
Finland	7	4		3	5	57%	71%
Hungary	9	7	2	2	7	78%	78%
Ireland	3	2		1	2	67%	67%
Latvia	1	1			1	100%	100%
Poland	31	8	2	23	11	26%	35%
Slovakia	2	2			2	100%	100%
Subtotal	64	31	6	33	36		
	% cities in cat. 3	% UMP in cat. 3				% UMP wrt cities in cat. 3	
	12% (13%*)	12% (11%*)				58%	
Austria	5	2		3	2	40%	40%
Bulgaria	9	7	1	2	9	78%	100%
Cyprus	2	1		1	0	50%	0%
Estonia	1	1	1		0	100%	0%
Greece	5	1		4	2	20%	40%
Luxembourg	1	0		1	0	0%	0%
Malta	1	0		1	1	0%	100%
Subtotal	24	12	2	12	14		
	% cities in cat. 4	% UMP in cat. 4				% UMP wrt cities in cat. 4	
	4% (5%*)	4% (4%*)				58%	
TOTAL	538 (510*)	317 (348*)	15	220	215		
% of cities with a UMP (incl. under prep.)		62% (71%*)	% of cities involved in SUMP EU		40% (42%*)		
<p>Note: 4 cities <100,000 inhabitants (2 Bulgaria, 2 Spain) included in the database, but NOT considered in the data elaboration.</p> <p>* http://civitas.eu/sites/default/files/uwe_mueller.pdf</p>							

Source: self-elaboration from ELTIS City database

Key of
Table 17:
Number of cities = it is the total number of cities mapped in the ELTIS City database, corresponding to cities with an urban centre population of more than 100 000 inhabitants in 2011 as well as their administrative units.
Urban mobility plan = number of urban mobility plans adopted in the cities investigated.
Under prep = number of urban mobility plans under preparation in the cities investigated.
NA = number of cities where it was impossible to collect data.
Involved in SUMP EU = number of cities involved in ongoing and completed EU-supported SUMP projects and initiatives.
% UMP wrt # cities = ratio between the number of urban mobility plans put in place and under preparation, and the total number of cities (per country / per category / total).
% involved in SUMP EU = ratio between the number of cities involved in ongoing and completed EU-supported SUMP projects and initiatives, and the total number of cities (per country / per category / total).
% cities in cat. X = proportion of cities per category.
% UMP in cat. X = proportion of number of urban mobility plans put in place and under preparation per category.

Table 17 reports the number of EU cities mapped in the ELTIS City database, corresponding to cities with an urban centre population of more than 100,000 inhabitants in 2011 as well as their administrative units, according to a new harmonised definition⁶² of city and its commuting zone, jointly developed by the OECD and the European Commission (Dijkstra and Poelman, 2012). The table also reports the number of urban mobility plans implemented or under preparation in these cities, as well as the number of cities involved in ongoing and completed EU-supported SUMP projects and initiatives. On the basis of these numbers, we derive some additional quantitative information, in terms of:

- ratio between the number of urban mobility plans put in place and under preparation, and the total number of cities (per country / per category / total).
- ratio between the number of cities involved in ongoing and completed EU-supported SUMP projects and initiatives, and the total number of cities (per country / per category / total).

⁶² http://ec.europa.eu/regional_policy/en/information/publications/regional-focus/2012/cities-ineurope-the-new-oecd-ec-definition

- proportion of cities per categories of countries (see section 5.2.3).
- proportion of number of urban mobility plans put in place and under preparation per category.

Countries belonging to Category 1 gather together three-fourth (76%, i.e. 408) of the total cities (538). The remaining 24% are in the other 3 categories (8%, 12% and 4% respectively). This figure is in line with the findings of the previous section: the aggregate percentage of cities belonging to countries presenting unsatisfactory mobility planning frameworks (*Category 3 - Countries Moving Towards an Approach to Sustainable Mobility Planning* and *Category 4 - Countries having yet to adopt sustainable mobility planning*) is only 16%. This means that, regardless of the number of European cities that have actually implemented or are preparing a SUMP, 84% of them have access to a satisfactory national mobility planning framework. Consequently, for countries with a low percentage of local SUMP adopted, perhaps because legislation or guidelines have just been introduced, it seems reasonable to expect a rapid increase.

Not all of these quantitative elaborations are useful to infer further reliable information. For example, the low percentage of urban mobility plans adopted or in preparation in Germany over the number of cities (just 20%) strongly stands out. However, this does not mean that in the other cities there are no plans, but simply that information is not available. Moreover, other sources (Müller, 2013) provide very different figures about Germany (ratio of 85%), demonstrating how the data of the database ELTIS is not always reliable. Another inaccuracy is represented by the Netherlands, where plans are implemented on a voluntary basis. Although the ELTIS City databases reports that only about half of the Dutch municipalities have a plan in place, other sources report that nearly all municipalities have a GVVP⁶³, which in many cases has the characteristics of an SUMP (Goudappel Coffeng, 2012). Moreover, the ELTIS website itself states that “in the Netherlands there is a long tradition of drafting urban traffic and transport plans”⁶⁴.

Nevertheless, although it is not possible to come to systematic and rigorous conclusions, it is still possible to note how the weighed ratio between the number of urban mobility plans put in place and under preparation and the total number of cities in Categories 1 and 2 countries is

⁶³ <http://www.epomm.eu/endurance/index.php?id=2809&country=nl>

⁶⁴ http://www.eltis.org/mobility-plans/member-state/netherlands#_ftn1

slightly higher (62% for Category 1 - 74% if we consider data from Müller, 2013 - and 64% for Category 2) than the corresponding data for Categories 3 and 4 (58% for both). Moreover, when analysing this ratio per single country, especially for Category 1, which provides the broadest, and therefore the most reliable, sample, an inverse relationship between the number of urban mobility plans and the involvement in EU-supported SUMP projects and initiatives can be noticed. The interested countries are highlighted in light blue in Table 18.

Table 18 - Inverse relationship between the number of urban mobility plans and the involvement in EU-supported SUMP projects and initiatives

Country	% UMP wrt # cities	% involved in SUMP EU
Belgium	86%	71%
France	73%	23%
Germany	20% (85%*)	n.a.
Italy	78%	54%
Netherlands	54% (higher in reality)	38%
Portugal	33%	67%
Spain	61%	52%
Sweden	38%	62%
UK	87%	26%

Source: self-elaboration from ELTIS City database

This might mean that EU cities are sufficiently aware of the existence and utility of the European SUMP methodology and related planning tools, and in order to put them in practice, they take advantage of the supporting projects and initiatives, as described in section 5.2, that the EC funds and undertakes. On the contrary, the ones with a well-established mobility planning framework do not need to join these initiatives.

In general, it has been noticed a direct correlation between the four categories identified in 5.2 and the number of plans implemented at local level, with respect to total number of cities in each country. These considerations are in line with the encouraging conclusions in section 5.2, regarding the diffusion of SUMP Guidelines in European MSs.

5.3.1 Planning of transport policy measures for urban freight distribution in Rome

This section provides an overview of the status of transport policy interventions in the urban distribution of goods in Rome, and proposes a review of the measures implemented and the planning tools developed in recent years by the Roman Administration, with some ideas for policy implications that will be taken over in sections 6 and 7.

5.3.1.1 Problems and weaknesses of the UFT system in Rome

The city of Rome is the capital of Italy, and it counts 2.8 million of residents, distributed on a surface of 1,285 sq. km.

The main problems and weaknesses affecting the city in terms of UFT are identified by the Rome SUMP guidelines (Roma Capitale, 2017), and other: Gatta and Marcucci (2015, 2014); Gatta et al. (2015); Marcucci et al. (2015a); Nuzzolo et al. (2015); RSM (2014); Roma Capitale (2017); Filippi (2014), Regione Lazio (2006). This study does not aim to report and discuss them in detail, but simply group them on the basis of four typologies: i) *General issues*, ii) *Non-compliance*, iii) *Lack of stakeholder cooperation*, iv) *Vehicles technology issues*:

- i. General issues
 - Air pollution
 - Traffic congestion
- ii. Non-compliance
 - Logistic bays not always respected, lack of regulation and control
 - Weak controls - only for the Limited Traffic Zone (LTZ) there are e-gates
- iii. Lack of stakeholder cooperation
 - Difficult cooperation among Municipality, transport operators and shop owners
 - High permit costs to enter in LTZ can cause barriers in entrance for some logistic operators, especially own account, limiting the efficiency of the economic performance of the sector
 - Limited and ineffective advertising campaign
 - Low incentives compared to total cost of ecological vehicle
- iv. Vehicles technology issues
 - Market unavailability of more ecological vehicles
 - Limited use of EVs due to their limited autonomy/recharging time/load factor

These issues will be resumed in sections 6 and 7, where the SPMs already applied in Rome are discussed and some proposals for future measures and strategies are recommended.

5.3.1.2 The historical evolution of the regulation of freight traffic in Rome

In Rome, the city administration adopted the first restrictive measures aimed at streamlining freight traffic in the city since the mid-1980s. They envisaged the introduction of a free permit

and, subsequently, a fee of € 32.70 for the access to a delimited area of the city center, embedded in the General Urban Traffic Plan (*Piano Generale del Traffico Urbano* - PGTU) June 1999.

In 2000, the administration initiated the activation of electronic passes (IRIDE system) for access control in the LTZ. To discourage the access of freight vehicles into the LTZ, in 2006 it introduced a substantial increase in tariffs, rising to € 550 per year. The tariff does not consider to what extent each carrier actually affects pollution and congestion. Unlike other measures, such as the congestion charge of Milan and London, the intervention does not therefore aim to internalise the external cost of the community generated by each transport operator through its activity, according to the principle of *pay as you use* (Di Bartolo, 2012).

The following year, the City Council (CC) Resolution 44/2007 defined the LTZ according to the current boundaries. Compared to the Historical Centre LTZ, the provision extended the freight LTZ by including an additional area (Trastevere, Monti, Esquilino and Aventino districts), and confirmed the access times already provided for in CC Resolution 856/2000 (ban between 10 -14 and 16-20 per weight <3.5 t and 7-20 per weight > 3.5 t, valid only for own account operators).

In 2008, the administration revised access fees according to a rewarding logic for the most virtuous fuelling systems. Three years later, the CC Resolution 58/2011, authorised free circulation in the LTZ for electric vehicles (EVs).

CC Resolution 245/2011 significantly differentiated the cost of LTZ permits according to vehicles emissions, with reductions for vehicles with lower environmental impact and increases for the most polluting ones, based on the Euro class. It introduced the criterion of progressive and gradual ban of vehicles belonging to the less polluting class, that can no longer purchase permits. The restrictive criteria for access times, in addition to the disincentivation of own account, aims at penalising polluting vehicles.

Table 19 - Annual tariffs for vans and truck access to freight LTZ - by ‘Euro’ category. Resolution CC 245/2011

Year	Euro 2	Euro 3	Euro 4	Euro 5	Euro 6	LPG/CNG/Hybrid
2011	800	650	450	400	<i>n. a.</i>	100
2012	800	650	550	400	“	100
2013	<i>banned</i>	800	550	400	“	100
2014	“	800	650	450	350	100
2015	“	<i>banned</i>	650	450	350	100
2016	“	“	<i>banned</i>	450	350	100

Source: <https://romamobilita.it/>

Finally, vehicles are subjected to a 30-minute limit to park in the dedicated loading and unloading (L/U) bays.

CC Resolution 215/2012 allocated funds for approximately € 2,500,000 for the purchase of new environmental-friendly commercial vehicles, confirming the incentive measures already introduced with previous CC resolutions 276/2001 and 86/2005.

CC Resolution 119/2014 of April 30, 2014 introduces a substantial increase in access permit fees: all amounts are tripled, including those for LPG, CNG, hybrid and electric vehicles. The measure marks a turn-around with respect to what has been implemented so far, i.e. the progressive fees reduction for alternatively fuelled vehicles. However, for these vehicles the fare remains significantly lower than those conventionally fuelled. Temporary permits increase from € 20 to € 73-102 per day, depending on the engine power of the vehicle. Lastly, it is possible to buy online a carnet of 50, 100 or 200 daily entries to the freight LTZ (CC Resolution 378/2014).

Table 20 - Annual tariffs for vans and truck access to freight LTZ - by ‘Euro’ category. Resolution CC 119/2014

Year	Euro 3	Euro 4	Euro 5	Euro 6	LPG/CNG/ Hybrid/electric
2014	2,516	2,016	1,436	1,136	376
2015	<i>banned</i>	2,016	1,436	1,136	376
2016	“	2,016	1,436	1,136	376

Source: <https://romamobilita.it/>

Table 21 - 2017 Tariffs and Carnet Cost for single accesses to Freight LTZ x Merchandise - by "Euro" category. Resolution CC 119/2014

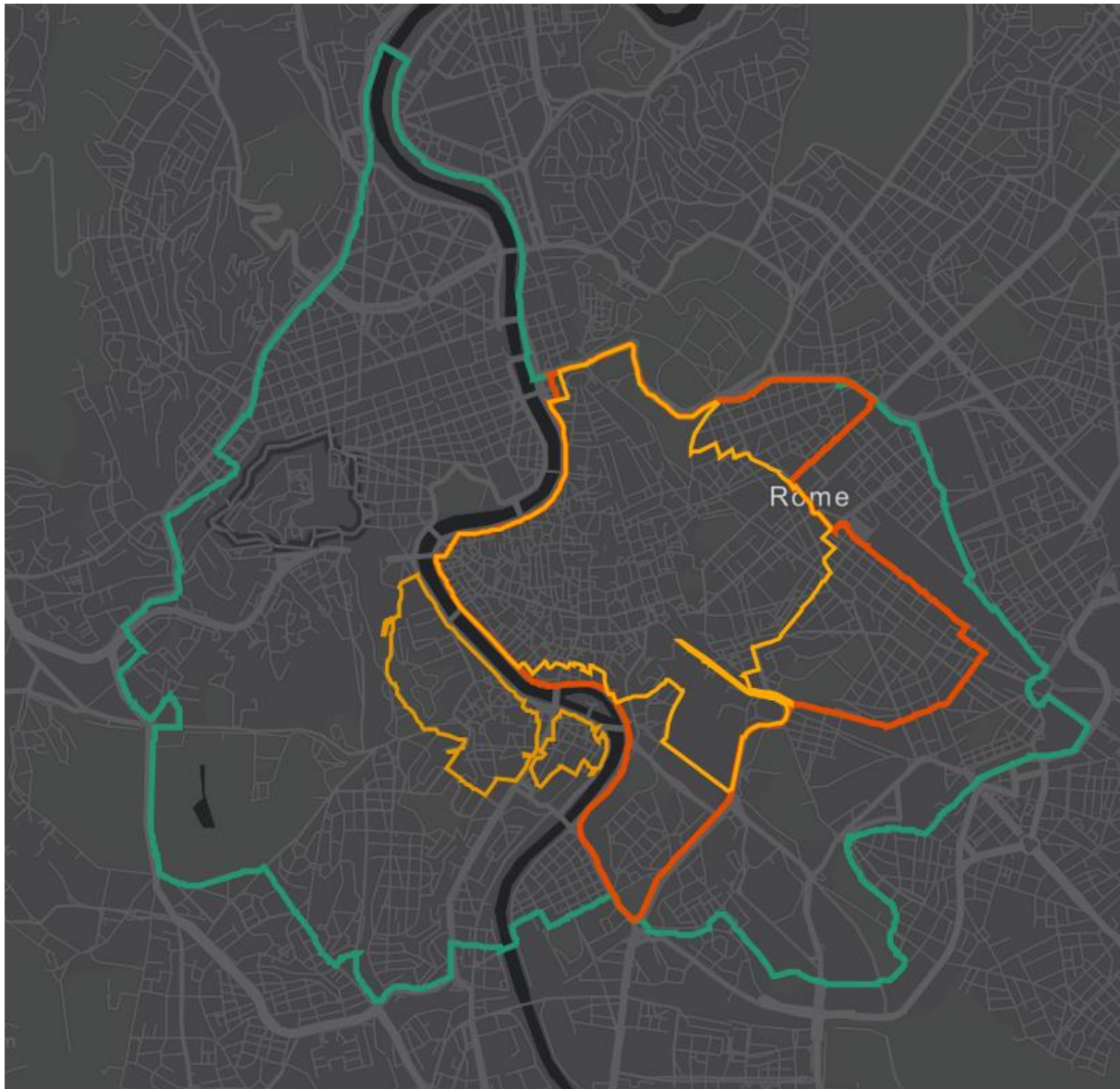
Entry days				
	50	100	200	Full year
Euro 4	382	732	1,432	2,032
Euro 5	282	532	1,032	1,452
Euro 6	232	432	832	1,152
LPG/CNG/ Hybrid/electric	107	182	332	392

Source: <https://romamobilita.it/>

The resolution justifies this increase with the need to “reduce pollution and promote the functioning of public transport by progressively disincentivising the use of private means within the LTZ”. The rationale of the intervention should therefore be identified in the reduction of pollution and congestion. However, since the increase in tariffs also affects the most virtuous vehicles, some stakeholders perceived this measure as mainly aimed at generating higher takings for the city (PSMS, 2009).

Furthermore, since November 2016, the electronic gates of the LTZ AF1 VAM, daily active from 5 to 24, control the accesses to a broader area of freight vehicles with a length of more than 7.5 meters. This new restricted area is currently being tested. The e-gates application is connected in real time with the national plate recognition system, in order to allow the immediate and automatic acquisition of the company data (VAT number, registered office) and the characteristics of the vehicles (length, etc.) without further communication by the user. Figure 9 reports in green the new LTZ AF1 VAM, in orange the Freight LTZ, in yellow the LTZ for the Historical Center.

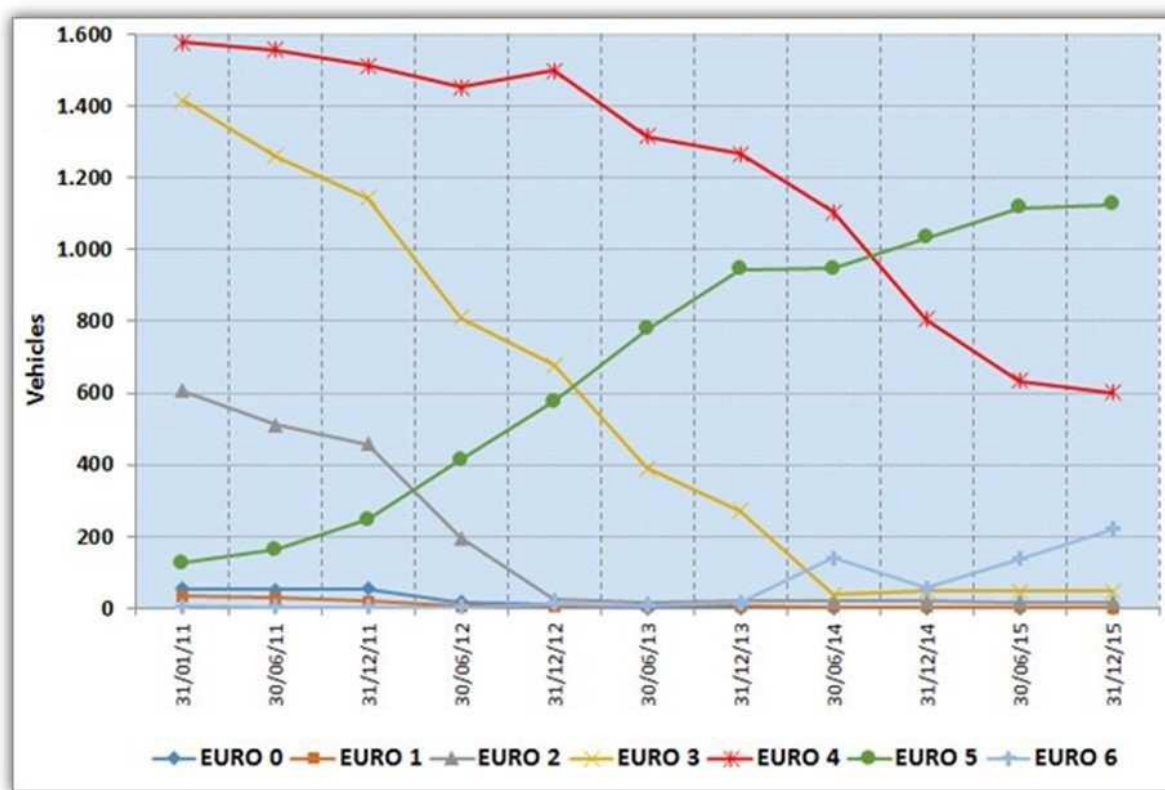
Figure 9 - LTZ AF1 VAM (green), Freight LTZ (orange), LTZ for the Historical Center (yellow)



Source: <https://romamobilita.it/it/servizi/ztl/distribuzione-merci-vam>

The introduction of the regulations described above has brought benefits in terms of decrease of LTZ access permits issued between 2011 and 2015 by 47%, which should correspond to a reduction in congestion.

Figure 10 - Freight permits time series (2011 – 2015)



Source: Fuschiotto, 2016

Moreover, between 2011 and 2015 a reduction of CO2 emissions of 54% was recorded.

Figure 11 - CO2 emissions time series (2011 – 2015)

CO2 emission (Kg) inside LTZ for euro category	31/01/11	30/06/11	31/12/11	30/06/12	31/12/12	30/06/13	31/12/13	30/06/14	31/12/14	30/06/15
EURO 0	443	443	442	132	87	0	0	0	0	0
EURO 1	262	219	131	44	43	43	43	0	0	0
EURO 2	5.720	4.820	4.298	1.831	186	139	185	136	137	134
EURO 3	13.638	12.140	10.978	7.752	6.405	3.689	2.546	324	418	408
EURO 4	14.971	14.775	14.336	13.676	14.028	12.274	11.782	10.028	7.404	5.654
EURO 5	1.131	1.448	2.216	3.693	5.147	6.922	8.375	8.306	9.058	9.648
EURO 6	38	0	0	0	76	38	115	1.028	422	1.033
Total	36.204	33.845	32.401	27.128	25.973	23.106	23.046	19.821	17.439	16.877

Source: Fuschiotto, 2016

5.3.1.3 Planning tools in Rome

In the previous section, we reviewed the history of the UFT rationalization actions adopted by the administration for the LTZ. Below are some of the measures proposed in the framework of the planning tools developed over the last few years, and a consistency evaluation with what has actually been achieved is performed.

The first document mentioning the UFT planning and rationalization in Rome is the PGTU of 1999 (of CC 84/1999), setting the long-term objectives for the drafting of an Urban Freight Plan (UFP). In particular, it aimed to limit the time windows for access and parking of freight vehicles (FVs) for loading and unloading operations, especially in the most central areas of the city. However, the Plan has not been implemented so far.

In September 2009, the municipality published guidelines for a Sustainable Strategic Mobility Plan (PSMS), approved six months later by Resolution CC 36/2010. The objective of the Plan was to revise and redefine the urban mobility rules system. As far as UFT is concerned, the Plan makes a distinction between short-term and long-term actions. These indications were reiterated by the municipality with an act (*Memory*) of 24 November 2010, which also indicated the guidelines for drafting the UFP for the LTZ. Regarding the short-term, based on the results of a Roman public transport agency (ATAC) survey (Filippi and Campagna, 2008), the PSMS stresses that the measures so far adopted “have proved to be insufficient to ensure the right balance between the freight accessibility requirements and those for the protection of public health in relation to the high environmental impact generated”. To overcome this ineffectiveness, it suggests increasing the number L/U bays, even for non-exclusive use of FVs, and their greater control by assessing the use of advanced technology systems. It also expects greater flexibility for time windows to access the LTZ (possibly to be negotiated with operators) and greater incentives for low or zero emission vehicles, with tariff re-modulation in relation to the emissions. The flat fee in force is criticized and described as a fee to be paid for no service and independent of the number of entries. Therefore, the Plan proposes the elaboration of a "articulated and selective" entry fee to encourage environmentally-friendly, full-load and small-size vehicles in low-traffic schedules, and lower for third-parties operators (PSMS 2009).

A 2009 survey of the LTZ in Rome (Marcucci et al., 2013a), focused on transport operators, revealed that the major perceived problems are related to: 1) insufficient, unattended L/U bays, often illegally occupied; 2) time windows, with too many exemptions that make them

ineffective; 3) the entry fee, too high and requiring a different articulation on the basis of vehicle categories.

Also in the light of these results, the Plan seems to go in the right direction. For the long term, the Plan sets the ambitious goal of creating a “logistics model of excellence for the metropolitan area of Rome”. It is intended to start a pilot project, to test an innovative service aimed at the distribution of goods in the city center. The system involves the use of transit points for load consolidation, and distribution by eco-friendly vehicles.

The thorough analysis of the UFT measures currently in place in Rome highlights that the Plan has only partially been implemented: short-term interventions are in place to redefine tariffs and to provide flexible access hours for the most virtuous vehicles (GC 245/2011). The increase of the number and the control of L/U bays remain unmanaged, even though their illegal use is one of the major causes of congestion. In addition, the Administration has so far failed to take into consideration the proposal to abandon the flat-rate criterion for issuing permits. The exponential increase in the tariff (CC 119/2014), on the contrary, amplified the perception of the current permit as a ‘tax’ for no real benefit in turn, which is in contrast with the ‘soft’ planning approach proposed in this work. Moreover, long-term interventions have not yet taken shape.

In June 2013 Ignazio Marino was elected mayor of Rome. In March 2014, the New PGTU of Rome Capital was published, and approved in 2015 (Resolution CC 21/2015). In the section dedicated to freight distribution, the last two pages outline the action lines for the new UFP. The objectives are: i) reduction of the number of vehicles, through the aggregation of the UFT operators; ii) increase in load factor; iii) switching power supply to environmental-friendly modes; iv) rationalisation of L/U areas.

The measures to be implemented in the UFP envisages (Roma Capitale, 2015):

- Enlargement of the freight LTZ;
- Planned new booking service to optimize parking areas;
- Timetable and pricing policy evaluation, based on vehicle models and commodities;
- Van-sharing policy promotion;
- Increasing vehicles load capacity and reducing unloaded trips, through new transit points

- Revise/update the L/U freight plan in the city centre

Other actions under development concern (Fuschiotto, 2016):

- New freight L/U bays, to be identified in 20 neighbourhoods in the city centre, as well as logistics operation areas for new Urban Freight Terminals in the North of the city;
- Revised rules to limit private traffic according to increasing Euro categories in the inner rail ring zone (500,000 inhabitants).
- Promotion of sharing and electric mobility in a multi-modal approach
- New LEZ concept: installation of e-gates for enforcement
- Rewarding scheme for non-pollutant drivers with pollution charging concept (by 2018)

The innovative elements of this Plan compared to the previous ones concern the extension of the freight LTZ and the introduction of the type of goods category as a criterion for price differentiation, as well as the proposition of the introduction of rewarding incentive systems for operators positively responding to new initiatives by the municipality.

The guidelines approved by the Resolution CC 9/2016 expressly refer to the drafting of a SUMP for the implementation of a “long-term plan for transport infrastructures”. The SUMP guidelines of Roma Capitale are the tool for understanding the contents and the subsequent phases of the implementation process (Roma Capitale, 2017). The SUMP is intended as a complementary plan to the PGTU, it will be published in 2018, and will embed a UFP. As better clarified in Chapter 7, some successful SPMs identified in this work and considered suitable for the context of the city of Rome have been proposed in the consultation phase that the Mobility Agency opened to all citizens, and which ended in January 2018. The aim of the plan is to implement the action lines as defined in the PGTU, and to define a hierarchical network of metropolitan hubs and neighbourhood mini-hubs by organising and decongesting the flows of goods within the city, even involving the PT operators in testing pilots (such as the use of the railway network for night deliveries to the most central hubs). More details and next steps about the SUMP implementation phase are discussed in Chapter 7.

The historical analysis of the UFT policy measures in the city of Rome highlights some important aspects. On the one hand, the municipality has decisively intervened on tariffs and time windows for the access to the freight LTZ: it maintained the flat-rate setting of the entry

fee, discouraged access to most polluting vehicles and favoured the most virtuous ones, with progressively more incisive measures. On the other hand, it has encouraged structural interventions such as the increase and control of L/U bays and the realisation of transit points, even though it has failed to implement them so far. Moreover, it has rarely established effective working groups, it has not produced any joint proposals or memoranda of understanding; the various plans announced have never gone beyond the definition of implementation guidelines so far, even though the EU considers the SUMP an essential planning tool for major metropolitan cities (European Commission, 2013b). In general, there is a marked consistency between plans and implementations regarding short-term and immediately applicable measures, but little or no consistency for interventions that require long-term planning and high costs.

The analysis of available data shows that the measures introduced have in fact led to an environmental improvement of the FVs fleet; however, since the permits are issued on a flat-rate basis, it is difficult to estimate the frequency of access of these vehicles, and calculate the benefits of congestion and emission reductions accordingly. The increase in access tariffs (Resolution 119/2014) seems excessive if we consider that this measure has also affected the most virtuous FVs (Euro 6, LPG, CNG, hybrid, electric). This may give the operators the perception that the administration introduces a fee for no benefit in return, to resume a concern already expressed in the PSMS.

6 Research and Innovation for UFT soft policy measures

After analysing the multi-level governance structure of the urban mobility planning sector and its implications, based on the CAC approach, Chapter 6 narrows down the scope of the research specifically to the *libertarian paternalism* approach, applied to the UFT sector. In particular, it identifies, evaluates and validates SPMs that, in the framework of a broader planning vision and of cooperation mechanisms, could actively engage transport operators and other private stakeholders, and enable them to get benefits instead of restrictions when implementing sustainable urban freight distribution practices.

Firstly, section 6.1 highlights the key role of stakeholder cooperation in identifying and implementing SPMs, as well as the mechanisms and platforms currently used to ensure a fruitful collaboration.

In section 6.2, UFT SPMs typologies and categories are identified according to the criteria introduced in the methodology (Chapter 3), and derived from the literature review on UFT, incentive theory, BE and SPMs carried out in Chapter 2.

Section 6.3 provides an overview UFT SPMs already in place and under development in 37 European cities and regions, and it investigates whether their local SUMPs, or dedicated urban freight plans and strategies, envisage the implementation of UFT SPMs, as defined in 6.2.

In section 6.4, a preliminary assessment of the actual effectiveness of the selected SPMs is attempted.

Section 6.5 investigates the presence of SPMs, the needs and current criticalities in the city of Rome, hindering the deployment of SPMs.

6.1 The role of stakeholder cooperation

This section presents the overarching role of stakeholder cooperation and engagement mechanisms to spread and reinforce the introduction of SPMs at local level, providing an overview of their main characteristics and success factors. Some best practices will be provided in the next sections, together with the identification of UFT SPMs.

In the analysis on the adoption of the SUMP principles in national SUMP Guidelines, the 1st principle considered is *participation* (see 5.2.2). Scholars and experts agree on the need to introduce the participation principle when drafting urban mobility plans (Ballantyne et al., 2013, Lindenau et al., 2014, Lindholm et al. 2013, Marcucci 2015b, Quak et al. 2015). This concept should be pervasively present and applied during the preliminary advisory phase of the drafting of the plans, while should not relate to simple ratification. Various studies have been carried out trying to define the best method to foster citizens and stakeholder involvement. Ballantyne et al. (2013) assert that, despite any local reality has specific characteristics that must be taken into account in the planning stage, these should not prevent developing a generic decision-making framework to facilitate meaningful interaction between various stakeholders. Lindenau et al. (2014) argue that citizens and stakeholder engagement is an essential precondition for SUMP's successful deployment. Participation produces a sense of decision ownership, creating a sense of responsibility not only among politicians and planners, but also among citizens and stakeholders.

Kiba-Janiak (2016) identifies key success factors for UFT, and their importance from the perspective of various groups of stakeholders: findings show that the strongest agreement among stakeholders belonging to the local governments group is around two success factors, i.e. local government's regulations affecting UFT and cooperation of UFT stakeholders during planning, implementation and controlling of projects. This result is in line with what was found in previous European projects, such as BESTUFS (2007), SUGAR (2011), BESTFACT (2015).

In UFT, a higher level of local UFT stakeholder involvement and cooperation, led by LAs (Lindholm et al. 2013, Marcucci 2015b, Quak et al. 2015) can materialise into cooperative schemes, incentives and public-private partnerships (PPPs). LAs seem now sufficiently aware of the importance of stakeholder involvement, especially for freight, in the decision-making process: in their analysis of policy measures included in a significant sample of European freight plans, Fossheim and Andersen (2016) noted that consultation, and in particular FQPs, is one of the most mentioned policy measures. As discussed in the following section, stakeholder cooperation is also important when transferring the development process to other European cities, especially when initiated from LAs.

Cooperation between LAs and UFT stakeholders could result in FQPs. In this context, sharing and transfer knowledge between partners is highlighted as one of the most important effect of

the partnership, as confirmed by the expert panel of the Delphi survey (see 6.2.1). Over the past years, the increase of stakeholder participation in policy making has led to the establishment in many countries of cooperation platforms including LAs and freight transport and logistics business players. In the UK, the concept of FQPs was initiated by local and regional authorities to engage with committed stakeholders in a continuous and structured framework. These partnerships can take different format and combine different types of stakeholders in each local context, however they always aim to i) identify problems for each interest group, and ii) identify best practice measures and principles for action by local government and industry for (economically, socially and environmentally) sustainable freight distribution. Allen et al. (2010) provide a list of stakeholder types participating in the FQPs. These include: LAs; freight transport associations; chambers of commerce; other local business groups; professional bodies; freight transport companies; retailers; manufacturers; service companies; police; environmental/civil amenity groups; resident groups. Their preferences and their behaviour should be carefully mapped and taken into account (Gatta and Marcucci, 2016; Holguín-Veras et al., 2016b), in order for decision-makers to develop a comprehensive and informed overview and take the right decisions accordingly (Gatta and Marcucci, 2014).

A FQP is an effective method for approaching UFT and to involve stakeholders in discussion and development. It has been proved to be an easily transferable good practice from one city to another (Lindholm, 2014). However, as we already clarified in the beginning, there is no one-size-fits-all type of solution, all cities have different possibilities and different objectives, resources, constraints, therefore they have to build their own partnership taking account of these specific characteristics (Lindholm and Browne, 2014). The FQP has to be intended on a long-term perspective, because a good cooperation framework takes time to take off and enable the development of a common vision. However, in order to maintain stakeholders committed and participative, it is important to set and constantly reach small, intermediate steps, providing the feeling of concrete, immediate achievements. A good mix of stakeholders is needed, and they need to have the mandate to change within their organisation. The FQP, in order to be attractive for stakeholders, needs to be politically endorsed (Lindholm and Browne, 2013). Communication, dissemination of outcomes, knowledge sharing and information exchange are essential characteristics of a well-functioning FPQ. This ensures the transferability of knowledge between i) partners and ii) different types of stakeholders, and a good communication strategy systematically reaches also other actors not actively involved in the

FPQ. From an operational point of view, it is important that the LA sets up a strong management and organisation of the partnership, well estimating the resources in terms of staff and time it takes to organise and keep it alive (Lindholm and Browne, 2013).

CITYLAB, a current EU funded project, promotes a new method for collaborative planning based on the Living Laboratory (LL) approach (Quak et al., 2015). A similar project, NOVELOG, support the development of multi-stakeholder platforms (MSP) at local level, to facilitate and guide local stakeholder cooperation for UFT policy making. As already mentioned in section 5.2.2, Lindholm (2010) focuses on LA's perspective with respect to sustainable UFT policies, demonstrating how a limited knowledge and awareness of this sector prevents an adequate setting of measures for their effective and integrated management. In line with the EU prescriptions, Lindholm (2010) argues that LAs should increase their awareness and interest in this topic: several measures could be implemented, the most important being i) continuous stakeholder engagement, ii) creation of a full-time team focusing on UFT related issues and iii) investigation of main barriers and drivers.

Stakeholder cooperation platforms are typically voluntary in terms of members composition and participation, but they are very important to discuss relevant regulation measures and evaluate their potential from the perspective of the private sector. However, some kind of more target-oriented PPPs can be set up, to address a specific issue or test new business models. In this case, more binding forms of cooperation can be implemented (Allen and Browne, 2016).

Not representing a UFT solution or measure itself, a UFT stakeholder cooperation platform can be considered as an overarching framework to support the exchange of knowledge and best practices and the implementation of the most effective UFT (SPMs) measures, given the local context. This aspect is addressed again and deepened in the following section, where its role in the overall SPMs analysis is defined.

6.2 Identification of UFT soft policy measures

After emphasizing the importance of stakeholder participation and engagement in defining the most appropriate UFT measures for each local context, this section addresses the core of the analysis, to provide a satisfactory definition of UFT SPMs. In order to do so, the criteria and attributes identified in Chapter 3, based on the findings of the literature and the experiences reviewed in Chapter 2, apply to a set of approximately 300 UFT measures, and only the ones

meeting the criteria are selected. Categorisation systems proposed by other projects are compared, to verify that they are compatible and that the selected measures are actually attributable to the *soft* category, as understood in these systems. Based on the correspondences identified, a new mega-categorisation system is proposed, not in contrast but inclusive with respect to the others: its aim is not to statically group existing measures, but rather to clarify and explicate the principles and features that inspire the concept of UFT SPMs. Afterwards, UFT SPMs, identified according to this macro-categorisation, are extracted from the local mobility and freight plans and strategies of 37 European cities and regions, to assess the state of the art and check if their implementation is supported by a clear vision, envisaging the right mix of hard and soft measures. In this regard, three best European practices - London, Rotterdam, Turin - are presented.

Once identified the *criteria* - i) Voluntary-based, ii) Public sector-led, iii) Low investment - and *attributes* - ii) Additional services, rewards, incentives ii) Information and awareness raising - in the methodology (Chapter 3), here a comprehensive literature review of the main EU projects testing and investigating UFT SPMs is carried out to select the ones satisfying the criteria. The projects are: NOVELOG (review of 250 UFT measures), CITYLAB (Allen and Browne, 2016), C-LIEGE (Soft measures database), ENCLOSE (Soft measures for UFT implemented in 9 pilots), STRAIGHTSOL.

As described in the methodology, the C-LIEGE project investigated the nature of UFT measures from the perspective of MM, which aims at promoting sustainable transport and manage the demand for transport by changing travellers' attitudes and behaviour. C-LIEGE defined a simple system to identify UFT measures, which can be divided according to a combination of soft/hard & pull/push attributes:

1. Pull-soft: Encouraging operators to implement a good practice
2. Pull-hard: Encouraging operators to use infrastructure (equipment, etc.)
3. Push-soft: Imposed on operators to implement a good practice
4. Push-hard: Imposed on operators to use infrastructure (equipment, etc.)

This classification has been adopted by NOVELOG to characterise its *parameter measures'* *nature of implementation*, enhancing the NOVELOG Toolkit, a repository of UFT measures aimed at helping cities identify measures implemented in other similar cities and facilitating the

selection of the ones suitable for their local context⁶⁵. In particular, in the framework of the NOVELOG project, the author of this thesis contributed to an integrated inventory of UFT policies and measures, city typologies and impacts⁶⁶: partners participating in the project had to categorise UFT measures according to different categorisation systems provided by different previous initiatives, including the C-LIEGE one. A comprehensive review of UFT projects and specific UFT cases were reported: over 250 UFT cases from 60 (mainly) EU funded city logistics (and related) projects were drawn. This preliminary study served as content basis for the development of the NOVELOG Toolkit, built to be five-dimensional (Aditjandra, 2016):

1. **Why** are we doing this? What problems do we have, and what are our objectives?
2. **Where** are we doing this? What is the physical shape of the spatial area we are addressing in a city?
3. **Who** shall do this and to whom shall it be done? In an approach that defines actors by the nature of the supply chains they operate in, we aim to understand who is involved in this process.
4. **What** shall we do? What are the measures that we shall undertake? Will this be a mixture of hard and soft measures, or will soft measures be part of the next section?
5. **How** shall we do it? Will this be a process of regulation, of voluntary co-operation?

In this work, we only refer to the last dimension, *how*, determined by the parameter *measures' nature of implementation*. NOVELOG adapted this parameter from the C-LIEGE project (Aditjandra, 2016).

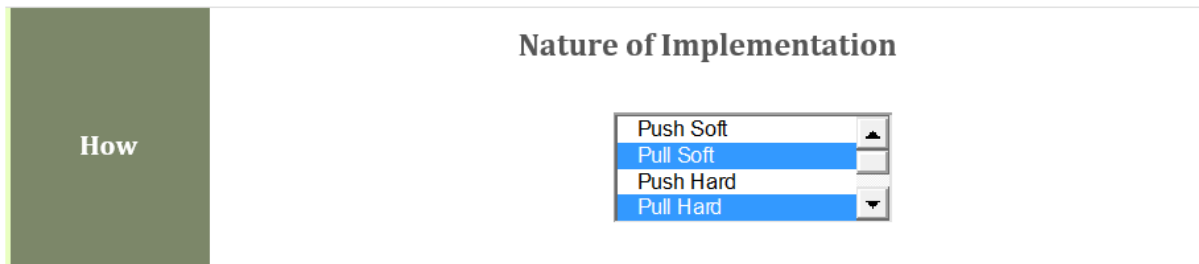
Pull-soft measures, as identified in C-LIEGE, “encourage behaviour change of operators, shippers, or receivers offering various additional services, facilities or incentives, and implying relatively low-cost investment (regulatory and governance interventions)” (C-LIEGE, 2013). This definition seems to be in line with the criteria we identified for defining UFT SPMs (see methodology, section 3.2.1.3). From a database of around 300 measures previously mapped in C-LIEGE and NOVELOG, we extrapolate the ones responding to the pull-soft and the pull-

⁶⁵ <http://novelog.eu/toolkit/>

⁶⁶ The author was directly involved in the pool of UFT experts that classified the measures (24 allocated, mainly from CIVITAS projects) of the NOVELOG Toolkit in terms of objectives, problems, city morphology, UFT logistics profile, UFT market, key stakeholders and measures' nature of implementation, and estimated their impact extrapolating quantitative and qualitative information from official reports and other sources.

hard attributes, since they both encourage (and don't impose) behaviour change. This step of the selection has been directly made via the NOVELOG Toolkit⁶⁷, by filtering the database according to the parameter *nature of implementation*:

Figure 12 - NOVELOG Toolkit: typology search filters



Source: <http://www.uct.imet.gr/Toolkit>

The filtered 62 measures + the additional 34 *soft measures* identified in C-LIEGE, are matched and confronted with the criteria and attributes defined in the methodology, determining a shortlist of 74 measures satisfying the criteria (Voluntary-based, Public sector-led, Low investment), which is reported in Table 22.

⁶⁷ <http://www.uct.imet.gr/Toolkit>

Table 22 - UFT measures, extrapolated from a database of around 300 measures, satisfying the 3 SPMs criteria

City(ies)	Good practice category (C-LIEGE)	Measures / Policies category (CIVITAS)	Project	Type	Attributes			Measure description
					Incentives, rewards & recognition	Info & awareness raising, training	Positive regulation & smart proc.	
Emilia-Romagna	Access Restrictions (AR)	Eco-logistics awareness raising	NOVELOG	Pull-soft		✓		Lorry routes for heavy goods vehicles with indication of road signs, tunnels, bridge, maximum size and weight
Barcelona, Spain	Access Restrictions (AR)	Regulatory measures	NOVELOG	Pull-soft		✓		Successful experiences on night delivery, mainly in supermarkets and shopping centres. The political support of Barcelona City Council has been of a relevant importance to set up night deliveries in the city.
Piacenza	Access Restrictions (AR)	Regulatory measures	NOVELOG	Pull-soft			✓	Regional harmonization of urban freight transport regulations: Time window restrictions and access restrictions for polluting freight vehicles
Amsterdam, Netherlands	Access Restrictions (AR)	Regulatory measures	C-LIEGE	Soft	✓			WORKSHOP: Broadening of time windows-Amsterdam, Netherlands
Ile de France, France	Access Restrictions (AR)	Regulatory measures	C-LIEGE	Soft		✓		Night and off hour deliveries , local legislation had to be adapted allowing night and off hour deliveries
Toulouse (France)	Access Restrictions (AR); Freight Quality Partnership (FQP)	Stakeholders' engagement	NOVELOG	Pull-soft	✓	✓		Partnership on Good practices - towards harmonisation of the regulations through City Logistics Charter (Freight Quality Partnership)
Norwich, UK	Access Restrictions (AR); Incentives (INC)	Regulatory measures	C-LIEGE	Soft	✓			PROJECT CIVITAS SMILE: Use of bus lanes by clean freight vehicles- Norwich, UK
Vitoria-Gasteiz, Spain	Access Restrictions (AR); Incentives (INC)	Regulatory measures	C-LIEGE	Soft	✓			PROJECT CIVITAS MODERN: new urban freight strategy part of the city's new mobility concept of superblocks that largely limit traffic to certain main roads and prioritise walking and cycling. The distribution from these centres can be realised during times of low traffic density during the day or at night with energy-efficient vehicles.

City(ies)	Good practice category (C-LIEGE)	Measures / Policies category (CIVITAS)	Project	Type	Attributes			Measure description
					Incentives, rewards & recognition	Info & awareness raising, training	Positive regulation & smart proc.	
Forli	Alternative delivery systems (ADS)	Eco-logistics awareness raising	NOVELOG	Pull-soft	✓			Introduction to the use of Urban Freight Terminal (UFT) supported with van and cargo-bike sharing services. Forli is trialling a sustainable business model for city logistics solutions. The process is at the stage of key stakeholder engagement to agree on the benefit of UFT adoption with support of EV vehicles for last mile deliveries.
Szczecin	Alternative delivery systems (ADS)	Eco-logistics awareness raising	NOVELOG	Pull-soft		✓		Development of unloading slots; Relocation of packstations; ITS application for re-routing; Promotion of eco-driving
Valencia	Alternative delivery systems (ADS)	Eco-logistics awareness raising	NOVELOG	Pull-soft	✓	✓		Marketing tool for efficient urban logistics: Green labelling scheme promoted by the Spanish Ministry of Environment affairs. The green labelling pilot focused in the calculation and the recognition of the carbon footprint of the urban freight transport operators.
Winchester (UK)	Alternative delivery systems (ADS)	Land use planning and infrastructure	NOVELOG	Pull-soft		✓		encouraging fleet efficiency and home delivery (C-Liege selected project)
Thessaloniki (Port)	Distribution micro-platforms in the inner city (DMP)	New technologies	NOVELOG	Pull-hard		✓		Upgrading of cargo monitoring system with control of entrance / exit main gates and vehicle routing based on data collection and compilation via an integrated internet based information platform visible by all stakeholders tailored on their needs.
Graz, Austria	Distribution plan-scheme (DP)	Eco-logistics awareness raising	NOVELOG	Pull-soft	✓			Bring mE: cargo bike service aimed at delivering goods for city shoppers supported by UFT (urban freight terminal) (temporary mobile hub)
Szczecin	Distribution plan-scheme (DP)	Eco-logistics awareness raising	C-LIEGE	Soft	✓			PILOT SITE :ADVANCE - Auditing and Certification Scheme to Increase the Quality of Sustainable Urban Mobility Plans in Cities-Szczecin. Note: CIVITAS sub-category 'Recognition schemes'
Barcelona, Spain	Distribution plan-scheme (DP)	Land use planning and infrastructure	NOVELOG	Pull-soft		✓		Demonstration of a hybrid consolidation centre concept. The idea was to convince retailers to change their shipping address to the Urban consolidation center of DHL, so that goods could be consolidated and sent in a more efficient way.

City(ies)	Good practice category (C-LIEGE)	Measures / Policies category (CIVITAS)	Project	Type	Attributes			Measure description
					Incentives, rewards & recognition	Info & awareness raising, training	Positive regulation & smart proc.	
Croydon, UK	Distribution plan-scheme (DP)	Land use planning and infrastructure	C-LIEGE	Soft			✓	PROJECT TRAILBLAZER: Delivery and Servicing Plan-Croydon, UK. Note: CIVITAS sub-category 'Nearby delivery areas'
Newcastle	Distribution plan-scheme (DP)	Land use planning and infrastructure	C-LIEGE	Soft			✓	PILOT SITE : Delivery and Service Plans-Newcastle. Note: CIVITAS sub-category 'Nearby delivery areas'
Sutton, UK	Distribution plan-scheme (DP)	Land use planning and infrastructure	C-LIEGE	Soft			✓	PROJECT TRAILBLAZER: Delivery and Servicing Plan-Sutton, UK. Note: CIVITAS sub-category 'Nearby delivery areas'
Bologna, Italy	Distribution plan-scheme (DP)	New technologies	NOVELOG	Pull-soft			✓	Testing tools (OptiRoute) and method for effective, low-cost and low impact waste collection plan (process management)
Craiova, Romania	Distribution plan-scheme (DP)	Regulatory measures	C-LIEGE	Soft	✓			PROJECT CIVITAS MODERN: Policy option for freight distribution scheme, based on benefits rather than on restrictions and charges, i.e. clean vehicles would benefit from a more flexible program for freights distribution.
European cities	Driver's Behaviour (DB)	Eco-logistics awareness raising	NOVELOG	Pull-soft	✓	✓		Recognition, guidance and advice to operators of vehicle fleets (ECOSTARS).
Barcelona, Spain	Driver's Behaviour (DB)	Land use planning and infrastructure	NOVELOG	Pull-soft	✓	✓		Measures to reduce noise level in the area of study: reduction of HGV, use of electric vehicles, traffic management and calming measures, promote human activities and accessibility instead of vehicles' movement.
Krakow	Driver's Behaviour (DB)	New technologies	NOVELOG	Pull-soft		✓		Energy efficiency optimised intersection control; and Enhanced 'green/eco driving' support;
Bristol, UK	Driver's Behaviour (DB), Freight Quality Partnership (FQP)	Stakeholders' engagement	C-LIEGE	Soft	✓	✓		PROJECT START: Promote and facilitate the efficient, economic, safe and sustainable distribution of freight-Bristol, UK

City(ies)	Good practice category (C-LIEGE)	Measures / Policies category (CIVITAS)	Project	Type	Attributes			Measure description
					Incentives, rewards & recognition	Info & awareness raising, training	Positive regulation & smart proc.	
Tyne and Wear	Freight Exchange (FE)	Eco-logistics awareness raising	C-LIEGE	Soft		✓		PROJECT CATALIST: determine the impact that utilising a online Freight Exchange on the effectiveness of their operations in the North East.
Gothenburg	Freight Quality Partnership (FQP)	Eco-logistics awareness raising	NOVELOG	Pull-soft			✓	Stadsleveransen (City UFT) extend to Feskeleveransen (Fresh fish and seafood delivery between the harbour and fish market) with micro UFT
Brighton & Hove, UK	Freight Quality Partnership (FQP)	Stakeholders' engagement	NOVELOG	Pull-soft		✓		efficient goods distribution through FQP
Iasi	Freight Quality Partnership (FQP)	Stakeholders' engagement	NOVELOG	Pull-soft		✓		efficient goods distribution through FQP
London (UK)	Freight Quality Partnership (FQP)	Stakeholders' engagement	NOVELOG	Pull-soft	✓			Fleet Operator Recognition Scheme
Newcastle	Freight Quality Partnership (FQP)	Stakeholders' engagement	NOVELOG	Pull-soft	✓	✓		Individual destination maps and Freight Quality Partnership; urban freight hubs: Tyne and Wear consolidation centre in Newcastle
Ploiesti	Freight Quality Partnership (FQP)	Stakeholders' engagement	NOVELOG	Pull-soft		✓		Freight partnership, planning and routing
Rome	Freight Quality Partnership (FQP)	Stakeholders' engagement	NOVELOG	Pull-soft	✓	✓		LOGeco - innovative approach to public private decision making process
San Sebastian (Donostia)	Freight Quality Partnership (FQP)	Stakeholders' engagement	NOVELOG	Pull-soft	✓			Freight distribution centre and Bikes for deliveries
Turin	Freight Quality Partnership (FQP)	Stakeholders' engagement	NOVELOG	Pull-soft	✓	✓		Data collection of freight vehicles used for goods distribution within the LTZ; Signing of Freight Quality Partnership (FQP) among the City of Turin, the Chamber of Commerce and

								17 associations for improving the efficiency of goods distribution within the LTZ; Implementation of a case study so as to assess the economic benefits for logistics operators
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City(ies)	Good practice category (C-LIEGE)	Measures / Policies category (CIVITAS)	Project	Type	Attributes			Measure description
					Incentives, rewards & recognition	Info & awareness raising, training	Positive regulation & smart proc.	
UK Cities	Freight Quality Partnership (FQP)	Stakeholders' engagement	NOVELOG	Pull-soft		✓		Freight Quality Partnership
Göteborg, Sweden	Freight Quality Partnership (FQP)	Stakeholders' engagement	C-LIEGE	Soft		✓		PROJECT START: Local Freight Network -Göteborg, Sweden
Ljubjana, Slovenia	Freight Quality Partnership (FQP)	Stakeholders' engagement	C-LIEGE	Soft		✓		The objective is to up set a network of representatives of local freight suppliers. The aim of the network meetings is to present local freight transport problems in Ljubljana and to receive critical feedback and opinions from stakeholders.
Norwich, UK	Freight Quality Partnership (FQP)	Stakeholders' engagement	C-LIEGE	Soft		✓		PROJECT CIVITAS SMILE: Developing a strategic freight holders club- Norwich, UK
United Kingdom	Freight Quality Partnership (FQP)	Stakeholders' engagement	C-LIEGE	Soft		✓		PROJECT ConnectedCities: Clear Zones Initiative - United Kingdom
Barcelona, Spain	Incentives (INC)	Regulatory measures	NOVELOG	Pull-soft	✓*			Regulation incentives broadening time windows depending on pollution category of the vehicles, allocation of additional freight parking spaces for clean vehicles, priority access lanes.
Ravenna, Italy	Incentives (INC)	Regulatory measures; market-based measures	C-LIEGE	Soft	✓*			PROJECT START: New system of incentives and access regulations has throughout the process been appraised in collaboration with the local freight network and the stakeholders responsible for the logistics platform.
Göteborg, Sweden	Incentives (INC)	Stakeholders' engagement; market-based measures	C-LIEGE	Soft	✓*			PROJECT START: Balance of incentives and access restrictions: develop logistics solutions that will be sustainable in the long run-Göteborg, Sweden

Berlin, Germany	Innovative financing models (IFM)	Market-based measures	C-LIEGE	Soft	√*			PROJECT CIVITAS TELLUS: New forms of financing-contracts for Natural Gas Vehicles-Berlin, Germany
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City(ies)	Good practice category (C-LIEGE)	Measures / Policies category (CIVITAS)	Project	Type	Attributes			Measure description
					Incentives, rewards & recognition	Info & awareness raising, training	Positive regulation & smart proc.	
Poitiers	Intelligent Transport Systems (ITS)	Land use planning and infrastructure	NOVELOG	Pull-hard		√*		Dynamic delivery areas: parking space for deliveries between 5-11am and other time for short term car park (10 minutes free)
Utrecht	Intelligent Transport Systems (ITS)	Land use planning and infrastructure	NOVELOG	Pull-hard		√		Clean route planning for freight transport: Utrecht (CIVITAS MIMOSA) aims to develop a system of route guidance that is based on real-time air quality measurement data, to adapt route planning based on real-time air quality conditions.
Bilbao	Intelligent Transport Systems (ITS)	New technologies	NOVELOG	Pull-hard		√		Intelligent truck Parking (Delivery Management Area/ space booking); Speed limiter; eco-driving support
Bremen	Intelligent Transport Systems (ITS)	New technologies	NOVELOG	Pull-hard	√	√		Lorry routes as part of the 'integrative transport planning' concept adopted by the City of Bremen. Some measures include: VMS and other routes related supportive measures (platform, highway sign, navigation system)
Helmond	Intelligent Transport Systems (ITS)	New technologies	NOVELOG	Pull-hard		√		Energy efficiency motivation via fuel saving and emission reduction (injection control, speed limiter and eco-driving support) - FREILOT
N/A	Intelligent Transport Systems (ITS)	New technologies	NOVELOG	Pull-hard				Energy efficient intersection (V2I cooperative system)
Thessaloniki	Intelligent Transport Systems (ITS)	New technologies	NOVELOG	Pull-hard	√	√		Speed advice along the main arterial of the city to some trucks passing by the city center
Thessaloniki	Intelligent Transport Systems (ITS)	New technologies	NOVELOG	Pull-hard		√		Eco-drive support plus CO2 footprint (3G/4G on-board mobile unit) + vehicle CANbus
Piraeus	Intelligent Transport Systems (ITS)	Regulatory measures	NOVELOG	Pull-hard				Automatic retractable bollards to provide delivery spaces for urban freight distribution

Thessaloniki	IT logistic tools (ITL)	N/A	NOVELOG	Pull-hard		✓		Cargo transport optimisation (proof of delivery)
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City(ies)	Good practice category (C-LIEGE)	Measures / Policies category (CIVITAS)	Project	Type	Attributes			Measure description
					Incentives, rewards & recognition	Info & awareness raising, training	Positive regulation & smart proc.	
Graz, Austria	Optimization of routes (OR)	Eco-logistics awareness raising	NOVELOG	Pull-soft		✓		MOP: software tool for optimised tours ATTENTION: software tool developed, tested, but still in trial phase - not implemented in the market
Padova	Optimization of routes (OR)	Eco-logistics awareness raising	NOVELOG	Pull-soft	✓			UFT located within the existing multimodal freight village Interporto Padova (Cityporto) extend to include deliveries of new goods such as parcels and controlled temperature goods (perishable food and medicines)
Paris	Optimization of routes (OR)	Eco-logistics awareness raising	NOVELOG	Pull-soft	✓			modal-shift from road to rail including feasibility study, renovation of railway terminal and incentives for 26 CNG trucks to deliver to 90 supermarkets in Paris
Stuttgart	Optimization of routes (OR)	Eco-logistics awareness raising	NOVELOG	Pull-soft		✓		Electric vehicle goods delivery – van sharing; Planning of optimum location of new lorry refueling station; Ad-hoc routes for freight traffic
Mexico City Metropolitan Area	Optimization of routes (OR)	Land use planning and infrastructure	NOVELOG	Pull-soft	✓			zero emission corridor (for all traffic) with alternative routes for heavy freight vehicles (>3.5t) to protect historic city centre; vehicle verification programme (every 6 months) is also in place
Leicester	Optimization of routes (OR)	New technologies	NOVELOG	Pull-soft		✓		Freight map for appropriate routes and vehicular restrictions; Sign posting freight routes to industrial estates; Establishment of an environmental zone
Lugano	Optimization of routes (OR)	New technologies	NOVELOG	Pull-soft		✓		MOSCA-SHORT: An algorithm which provides the shortest and the most robust path connecting two points. MOSCA-LINE: An improved and efficient set of routes (sequences of stops with distance and times) with respect to the sequence of online (urgent) orders which have been entered in the system by the user. MOSCA-SHOP: Tool for the assignment of parking spaces.

Padova	Optimization of routes (OR)	New technologies	NOVELOG	Pull-soft		✓		MOSCA-TOUR: Generation of an efficient set of routes (sequences of stops with distance and times). City access: To provide real-time information in order to optimize deliveries as well as to decrease congestion. MOSCA-SHORT: Most robust path.
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City(ies)	Good practice category (C-LIEGE)	Measures / Policies category (CIVITAS)	Project	Type	Attributes			Measure description
					Incentives, rewards & recognition	Info & awareness raising, training	Positive regulation & smart proc.	
Piraeus	Optimization of routes (OR)	New technologies	NOVELOG	Pull-soft			✓	Reorganisation of waste collection in the city centre
Talinn	Optimization of routes (OR)	New technologies	NOVELOG	Pull-soft		✓		marking routes for smooth freight and city logistics
New York	Optimization of routes (OR)	Regulatory measures	NOVELOG	Pull-soft	✓			Off hour delivery
Montana, Bulgaria	Promotional-incentive campaigns (CAMP)	Regulatory measures	NOVELOG	Pull-soft	✓	✓		Differentiated fees for loading/unloading & time windows restrictions; Freight map for appropriate routes
Ljubljana	Promotional-incentive campaigns (CAMP)	Stakeholders' engagement	NOVELOG	Pull-soft		✓		Ljubljana created a new logistics model for better freight transport in the city, available on web portal for sustainable delivery and established a local freight partnership. The aim is to promote sustainable city logistics.
Riga, Latvia	Promotional-incentive campaigns (CAMP)	Stakeholders' engagement	C-LIEGE	Soft			✓	PROJECT START: Freight delivery and waste removal-Riga, Latvia
Chemnitz, Germany	Urban Logistic Plans (ULP)	Land use planning and infrastructure	NOVELOG	Pull-soft		✓		MOSCA-FREIGHT (VISEVA-W): Set up of a detailed freight transport and business traffic demand model. Modelling of scenarios (e.g. priority to business vehicles) and estimation of effects on the transport network. Decision Support System For Integrated Door-To-Door Delivery: Planning and Control in Logistic Chains

Bologna, Italy	Urban Logistic Plans (ULP)	Land use planning and infrastructure	C-LIEGE	Soft			✓	PROJECT CIVITAS MIMOSA: Urban Freight Delivery Plan-Bologna, Italy
La Rochelle, France	Urban Logistic Plans (ULP)	Land use planning and infrastructure	C-LIEGE	Soft			✓	PROJECT CIVITAS SUCCESS: Urban Logistic Plan, Strategic extension of city logistics-La Rochelle, France

City(ies)	Good practice category (C-LIEGE)	Measures / Policies category (CIVITAS)	Project	Type	Attributes			Measure description
					Incentives, rewards & recognition	Info & awareness raising, training	Positive regulation & smart proc.	
Emilia-Romagna	Urban Logistic Plans (ULP)	Stakeholders' engagement	NOVELOG	Pull-soft			✓	Intercity coordination in urban logistics as part of the Sustainable mobility programme
Ruhr District (Germany)	Use of Intelligent Traffic Management (ITM)	New technologies	NOVELOG	Pull-hard		✓		Software-based urban truck navigation through designated urban truck routes
Genoa, Italy	Van-sharing service (VSS)	Land use planning and infrastructure	C-LIEGE	Soft	✓			rationalisation of vehicle use by traders through the introduction of a van-sharing service

Source: elaboration from NOVELOG and C-LIEGE measure databases

The measures are grouped in clusters of SPMs, in order to elaborate and propose a categorisation of UFT SPMs. Table 22 specifies their category (*column Good practice category - C-LIEGE*), according to the C-LIEGE classification scheme (C-LIEGE, 2012). This scheme is, in turn, confronted to the classification scheme of UFT initiatives elaborated in the CITYLAB project (Allen and Browne, 2016). This classification investigates three relevant aspects of UFT initiatives: i) *Investment*, ii) *Party that takes the lead (public/private)* and iii) *Regulatory, voluntary, advisory or infrastructural nature of public intervention*. These aspects generally correspond to the three criteria identified to define UFT SPMs. The UFT initiatives reported in the CITYLAB study have been screened, and only the ones satisfying all the aspects i) *low/medium investment*, ii) *public sector-led* iii) *voluntary/advisory characteristics* were included in the analysis. Table 23 shows how the selection of the C-LIEGE good practices is matched with the selection of CITYLAB good practices:

Table 23 - C-LIEGE good practices vs CITYLAB UF initiatives (selection)

C-LIEGE good practices - Soft measures	CITYLAB UF initiatives
Access Restrictions (AR)	Multi-use lanes for moving goods vehicles
Advance booking (AB)	Loading bay locating/reserving/booking technology
Alternative delivery systems (ADS)	Nearby Delivery Areas
Distribution plan-scheme (DP)	Delivery and Servicing Plans
	Changing procurement practices
Driver's Behaviour (DB)	Driver training programmes
Freight Exchange (FE)	Public-private sector partnerships
Van-sharing service (VSS)	
Freight Quality Partnership (FQP)	
Incentives (INC)	Urban freight transport accreditation schemes
Innovative financing models (IFM)	Vehicle grants and subsidies
Optimization of routes (OR)	Truck routes
	Signing and information about vehicle access
	Modal shift to non-road modes
Promotional-incentive campaigns (CAMP)	Good practice guidance
Urban Logistic Plans (ULP)	

Source: C-LIEGE, 2012 and Allen and Browne, 2016

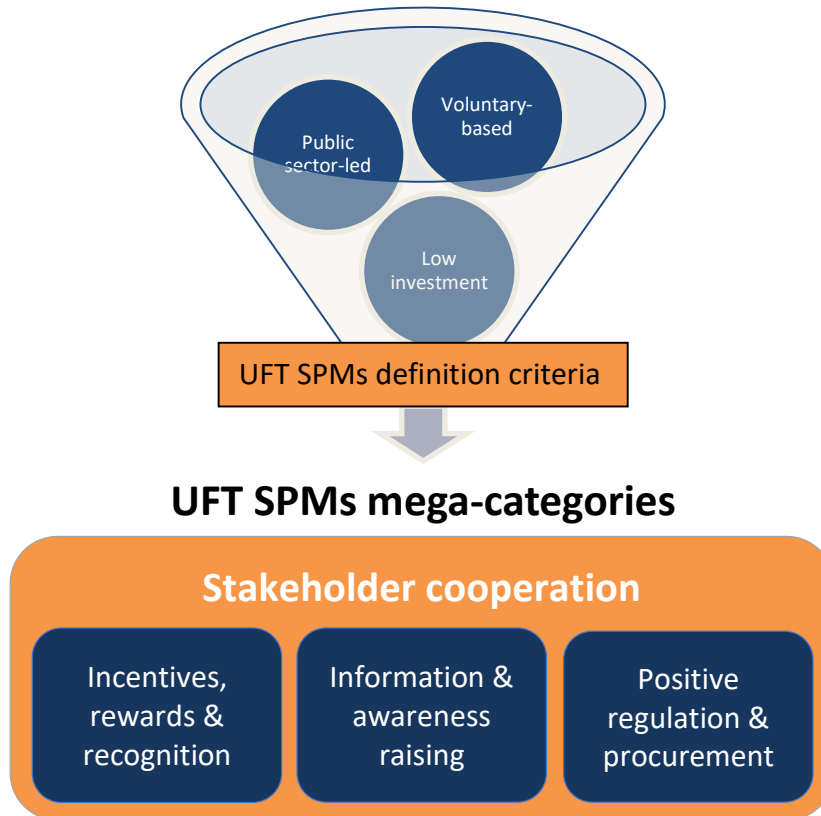
In right led, the categories that have been dismissed at a second stage, because not in line with the criteria defining SPMs. A first remark concerns the high degree of correspondence between the two categorisation systems: in fact, for all CITYLAB UFT types of initiatives selected, corresponding C-LIEGE good practices have been identified, and viceversa. Therefore, in the literature there is a marked common understanding about UFT SPMs. Although in CITYLAB there is no explicit reference to *soft* measures, the concept can be derived from the attributes of the investigated initiatives.

In some cases, in one of the categorisation systems (C-LIEGE and CITYLAB) some types of measures are defined only superficially, whereas in the other system they are defined in detail. This is the case of UFT accreditation/recognition schemes, widely considered in the literature as a clear example of SPM (Allen et al., 2016, Connolly et al. 2012, Cossu 2016, Marcucci et al. 2017b, among others), but not included in the C-LIEGE good practices categorisation. Such a comparative approach must take into account the possibility to face a certain degree of inconsistency and dissimilarity of experts' interpretations. Looking at Table 22, different approaches by the NOVELOG experts on how to classify UFT accreditation/recognition schemes can be noticed: they have been attributed to the *Driver's Behaviour (DB)* category, to *Alternative delivery systems (ADS)*, or to *Freight Quality Partnership (FQP)*. Furthermore, *Good practice guidance* in CITYLAB includes both *Promotional-incentive campaigns (CAMP)* and *Urban Logistic Plans (ULP)*, which refer to very different activities such as information and regulation.

In order to overcome these misleading interpretations, and considering the criteria defined in this work to identify SPMs and the comparative analysis of C-LIEGE, CITYLAB and NOVELOG categorisation systems, a new categorisation system is proposed. This does not aim to undermine the aforementioned methods, but it rather aims to group and simplify UFT SPMs in 1 + 3 mega-categories, where all types of measures in Table 22 find a place, through an inclusive approach.

This system directly takes over the criteria and attributes defined in Chapter 3, adding an overarching, horizontal category corresponding to *stakeholder cooperation*, considered to be the *sine qua non* condition to make any SPM effective, as discussed in section 6.1.

Figure 13 - UFT SPMs definition criteria and mega-categories



Here the 3 mega-categories are explained:

Incentives, rewards and recognition

This category includes all measures assuming a rewarding and recognition element, conferred by the public sector, in response to specific actions and signals by the private sector. This requires an active participation of the actors, motivated by positive and non (direct) financial incentives aimed to stimulate a virtuous attitude and sustainable practices. This category finds legitimation in the incentive theory, which argues that decision-makers should work on the non-intrinsic features of a good to make it appealing to users (Brewer et al. 1995), so that they recognise a rewarding system associated with a number of sustainable practices rather than develop a negative attitude deriving from punishment or restriction.

This category includes measures such as urban freight transport accreditation / recognition schemes, public-private sector partnerships, van-sharing services, access permissions, use of reserved infrastructures, such as bus lanes, extended time windows to access restricted traffic

areas, free training courses. In return, companies are often requested to commit to meet the minimum requirements set and even to share data and information, to be used for better planning.

Information and awareness raising

This category includes all the measures aiming at informing, supporting and training the UFT stakeholders. Unlike incentive and rewards, they do not expect a prompt response to a signal, but they attempt to reach the widest number of stakeholders to raise awareness and improve their skills as regards innovative and sustainable UFT practices. This type of measures also aims to build consensus around the initiatives of the LA, facilitating the work of the actors via added value information without imposing any restrictions.

Classical economic theory, which is not dismissed, but integrated by BE, asserts that sub-optimal choices adopted by the rational agent (*homo oeconomicus*) are caused by incomplete or asymmetric information. Therefore, the more the users are informed about UFT best practices and the local context, the more they are able to make efficient choices.

A good communication strategy facilitates the acceptance of new measures, as well as their better understanding, and consequently a smoother implementation. It includes user-friendly brochures and guidance on innovative urban logistics practices and new regulations for certain areas (construction, procurement, re-timing, safety), internet-based information platforms, campaigns, trainings for drivers and workshop for planners, participation in networking activities, sharing knowledge and best practices, freight routes and signage, freight maps.

Positive regulation and smart procurement - ‘practice what you preach’

In some cases, regulatory interventions can be considered as SPMs. This is the case of regulation aiming to create a reward, recognition or incentive-based scheme, or defining a harmonised regulatory framework, for example in terms of existing access restrictions, to facilitate the operations of UFT actors. The essential aspect here is that this type of regulation should not introduce any additional burdens, but simply create a favourable context for cooperation, innovation and more sustainable practices and operations.

Moreover, PAs can set internal rules to procure external services according to certain ‘green’ standards. The purchase of zero-emission vehicles, services and supplies is a virtuous example, according to the ‘practice what you preach’ principle, but also a leverage to influence the

demand for goods and services, and therefore the related mode of transport, inducing a behaviour change of suppliers and logistics operators, asked to improve their sustainability standards in order to participate in public tenders. This category includes measures such as adopting green procurement practices, Delivery and Servicing Plans (DSPs) and Construction Logistics Plans (CLPs) and safe lorry schemes.

As can be seen in the descriptions provided above, and in particular in the next section, where real measures are mapped according to these mega-categories, lines between the categories proposed are very blurred and flexible: an UFT SPMs could fall within one, two or even three categories at the same time. This is considered as an added value: these categories are derived from the attributes identified in the methodology, therefore the more they are intertwined, the more effectively they are expected to perform. This is also the reason why a taxonomy of the types of measures falling within each category is not provided; the aim of this work is to provide an open system, to inspire decision-makers, planners and experts in the elaboration and proposition of new and combined (packages of) measures, on the basis of the principles hereby explicated.

To make an example, a fleet recognition scheme seems mainly ascribable to the category *Incentives, rewards and recognition*, because it provides added value services and benefits to the operators joining it. However, this set of incentives and rewards is often agreed within established FQP (category *Stakeholders cooperation*), and, in order to be effective, needs to be adopted by a large number of operators: in this sense, *Information and awareness raising* measures are needed. Finally, the PA can decide to admit to specific public tenders only those companies belonging to the recognition scheme: this is a practice falling into the *Positive regulation and smart procurement* section.

On the basis of the findings of this section, a definition of UFT SPMs is provided:

UFT SPMs are designed to motivate freight stakeholders to voluntarily change their behaviour towards more sustainable and efficient transport modes and practices, by providing (tailored) information and services, raising awareness on innovative and sustainable UFT options, and using positive incentives, such as rewarding and recognition, and marketing techniques.

Section 6.2.1 reports the results of a Delphi survey, used to gather expert opinions on some open questions on urban freight planning and SPMs in EU cities, and to validate the approach proposed to identify and assess SPMs.

In section 6.3, UFT SPMs planned and implemented in 37 European cities and regions are mapped and reported on the basis of the mega-categories identified above.

6.2.1 Validation and consensus-building: Delphi analysis

6.2.1.1 Approach

The identification of SPMs applicable to the UFT sector began with an analysis of the literature concerning the concept of soft measures in general (Chapter 2) and continued with the analysis of the interaction of the different levels of governance that can facilitate their implementation (Chapter 5). In Chapter 6, we narrow down the scope of the research to identify, evaluate and validate SPMs that, in the framework of broader planning vision and cooperation mechanisms, can effectively promote sustainable behaviour in the field of UFT.

According to the combined literature review on BE and SPMs in the transport sector and on UFT, three criteria to define UFT SPMs have been identified:

- A. *Voluntary-based*
- B. *Public sector-led*
- C. *Low investment*

In section 6.2, many measures tested in different European contexts and classification schemes have been considered, contributing to group and simplify UFT SPMs in 1 + 3 mega-categories:

- 0) *Stakeholder cooperation*
- 1) *Incentives, rewards & recognition*
- 2) *Information & awareness raising*
- 3) *Positive regulation & smart procurement*

However, despite the analysis carried out at different levels, some crucial aspects to better define the scope and therefore the potential effectiveness of SPMs still need to be clarified. First of all, given the lack of complete and systematic *ex-post* reports on the effectiveness of tested measures, there is a lack of information and data on the associated drivers for behaviour change.

Who are the actors most likely to change their behaviour in response to the introduction of this type of measures? As found in the literature review on SPMs for transport, long-term effects of SPMs are uncertain (Bartle et al., 2016, Michalek, 2016). It is important to understand for which type of measures behaviour change is more likely to persist, as well as to assess how relevant a certain potential impact of a UFT measure (efficiency of the operations, economic savings, environmental improvement, visibility, information) is to ensure its longer-term effects.

Another element to be investigated is the existence and type of correlation between hard e soft measures: SPMs, although they have a direct, significant impact on UFT actors' behaviour, should be combined with HPMs – e.g. infrastructure improvements, binding regulation, monetary incentives. It is essential to construct a useful and complementary mix of both hard and soft measures for UFT. But what is the correlation between SPMs and HPMs? Although it seems that they are complementary and the SPMs are often designed to support and strengthen the effectiveness of HPM (Sanjust et al., 2015), some (Richter et al., 2011) argue that it remains unclear if and how SPMs impact on the effectiveness of HPMs, as well as possible effects exist in the reverse direction.

Chapter 5 investigates aspects related to planning and multi-level governance. The diffusion of the SUMP concept, which insists on shifting the subject of the planning process from traffic to people, supports the introduction of soft measures for behaviour change giving responsibility and promoting awareness among citizens and business. However, it is important to consider if SPMs can support the integration of sustainable freight transport issues into urban policies, in particular in the framework of the SUMP concept, or if they are rather marginal sub-measures representing the corollary of bold, hard measures envisaged in planning documents.

Moreover, it is clear that different levels of planning to be effective should talk to each other and be coordinated with each other. From a LA's perspective, horizontal cooperation among municipality departments, and with UFT local actors, such as private sector, researchers, other cities (e.g. stakeholder platforms, networks, etc.), as well vertical cooperation with other governance levels (EU, national, regional), can have positive effects on the definition of general UFT policies at local level. But what are the issues that should be addressed by multi-level governance mechanisms? How to do it?

Given that clear and unambiguous answers to these questions are not found in literature, it is deemed appropriate to open a consultation addressed to experts of the sector, in particular those involved in research and development of sustainable policy measures for urban freight distribution. A Delphi survey approach has been used to gather expert opinions on the open questions on UFT planning and SPMs in EU cities. The Delphi method is a technique for collecting information that allows obtaining the opinion of a panel of experts. This technique, qualitative in nature, is advisable when there is not enough information available for decision-making or it is necessary, for the research, to collect consensus and representative opinions from a group of individuals. The methodology with which the research was carried out is explained in detail in Chapter 3.

6.2.1.2 Findings

A Delphi survey approach was used to gather expert opinions to answer the questions still open after the literature review (Chapter 2) and the systematic analysis of the SPMs proposed and tested in different European contexts (section 6.2).

27 experts, mainly researchers focussing on sustainable measures and policies for urban freight transport, were asked you to join this expert panel, to broaden the scientific knowledge on SPMs applied to the UFT sector. The survey aimed to converge the opinions of experts, who remained anonymous to each other throughout the survey, regarding some key aspects: effectiveness of SPMs, in which contexts they have been/should be applied, their interaction with HPMS, where they are positioned with respect to the levels of multi-governance characterising urban mobility policies.

From the list of invited participants, 16 took part in the first round of the study (listed in ANNEX I), corresponding to 59%, a satisfactory response rate allowing to have a sufficient number of respondents according to the literature (Kauko and Palmroos, 2014; Loo, 2002).

The questions addressed to the experts directly derive from the open questions raising from the literature review and the analysis of the SPMs of the previous paragraphs. The questionnaire was divided into four sections: *General information*, to define the respondent's profile; *Soft policy measures and urban freight transport*, including questions related to the UFT actors, the effectiveness and the impacts of SPMs for UFT; *Cooperation mechanisms*, to identify the type of interaction between stakeholders, both vertical and horizontal, to better plan and implement

measures and policies on the UFT; '*Urban freight transport*' vs. '*Urban logistics*', to clarify the existence of a different semantic interpretation of two expressions considered synonymous in EU documents. The full version of the questionnaire is available in ANNEX II.

Respondents were asked to first read a short explanation⁶⁸ on what is intended in this study for SPMs, and successively answer the questions.

Regarding the experts profile, the 16 respondents work in 8 different countries: Italy (6), the Netherlands (3), Norway (2), Germany, Greece Belgium, Poland, the United Kingdom, and almost all identify themselves as researchers (15), while only one declares to be a consultant.

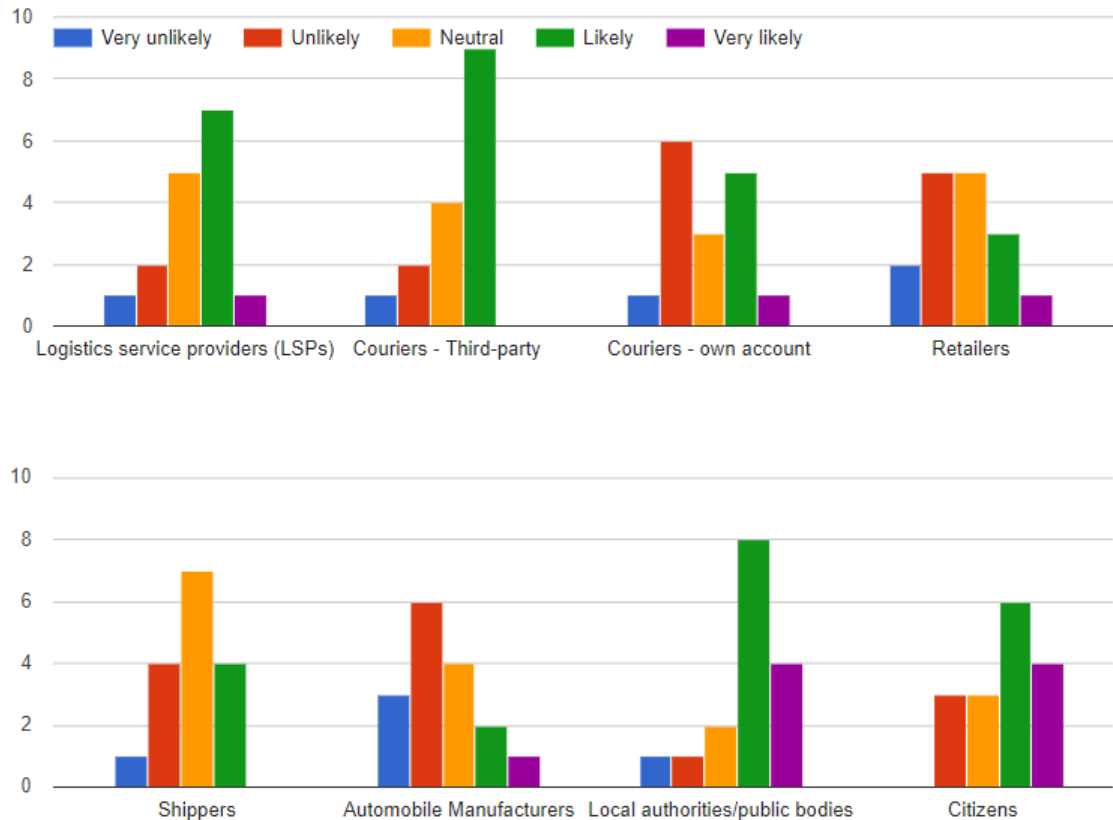
In section two, *Soft policy measures and urban freight transport*, regarding the possibility that different types of actors adapt their behaviour in response to the introduction of SPMs, the most widespread opinion is that the LAs themselves are the most sensitive (12 *very likely* + *likely responses*)⁶⁹, followed by Citizens (10), Couriers - Third-party (9) and Logistics service providers (8). It seems very unlikely that Own account couriers, Retailers, Shippers and Automobile Manufacturers would change their behaviour in response to the introduction of SPMs as identified in this study.

⁶⁸ Available at: <https://goo.gl/Gbybz8>

⁶⁹ Methodological notes: in case of equivalence or slight difference (+/- 1) in terms of votes for each question, the one featuring the higher number of 'very' (important, likely, relevant, etc.) prevails.

Figure 14 - Delphi question 1

All actors involved in the UFT sector should be included in the planning process and implementation of measures. How likely is that each of the following actors changes behaviour in response to soft policy measures (SPMs) implementation ?

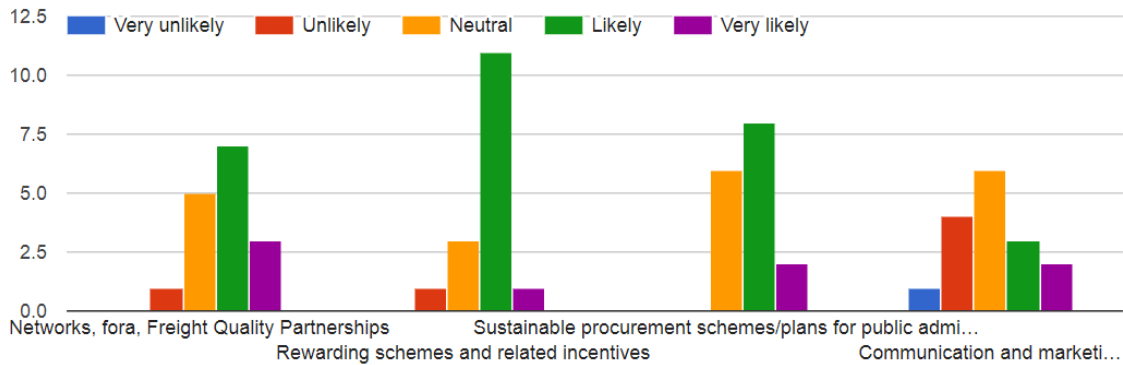


Source: Delphi survey on urban freight planning and soft policy measures in EU cities

As pointed out before, long-term effects and impacts of SPMs are still uncertain. Experts were asked for which types of behaviour change measures it is more likely to persist, and which type of potential impact of a UFT measure can help ensure its longer-term effects. Rewarding and recognition schemes and related incentives (1 *very likely* + 11 *likely* responses) seem to be the kind of measure more likely to lasting over time, closely followed by Stakeholder cooperation schemes, such as networks, fora, FQPs (3 + 7), and Sustainable Procurement Schemes and Plans for Public Administrations (2 + 8). Communication and marketing measures (3 + 2) remain quite distanced.

Figure 15 - Delphi question 2

Long-term effects of SPMs are uncertain. In your opinion, for which of the following types of measures behaviour change is more likely to persist?

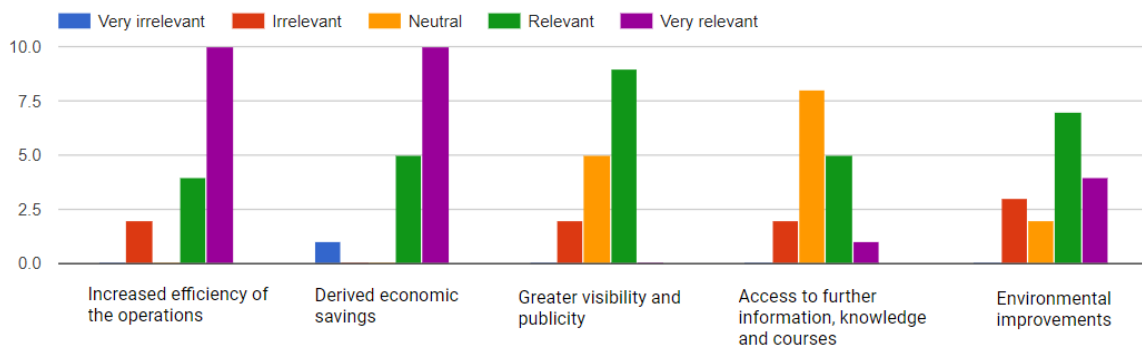


Source: Delphi survey on urban freight planning and soft policy measures in EU cities

Regarding the potential impact suitable for a longer-term effect, Derived economic savings (10 very relevant + 5 relevant responses) and Increased efficiency of the operations (10+4) are those considered as most crucial. It is interesting to note that these aspects are of direct interest of couriers and LSPs, while Environmental improvements, which brings benefits especially to the community, came third (4+7), far distant from the first two.

Figure 16 - Delphi question 3

How relevant is each of the following potential impact of a UFT measure to ensure its longer-term effects?



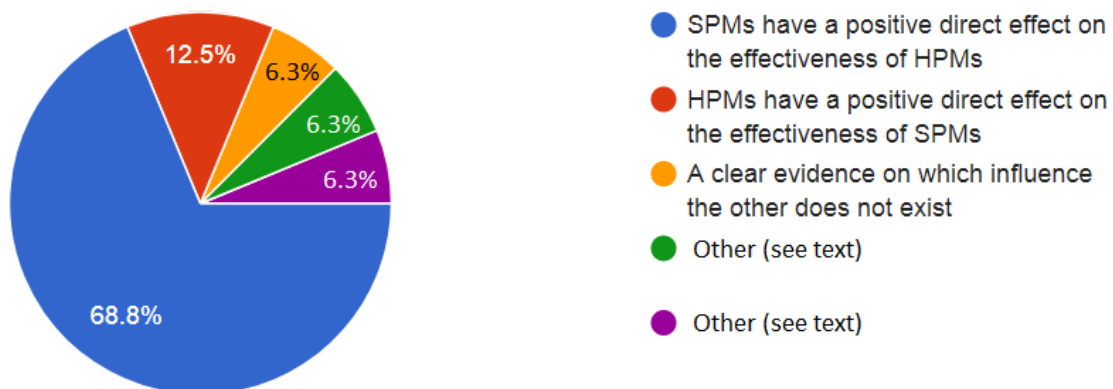
Source: Delphi survey on urban freight planning and soft policy measures in EU cities

Regarding the correlation between SPMs and HPMs, whose combination is essential to construct a useful and complementary mix of measures for UFT, the majority of the experts identifies a positive direct effect of SPMs on the effectiveness of HPMs (11), only two suggested the existence of the reverse effect, whereas three of them stated that a clear evidence on which one influences the other does not exist. In particular, it is argued that all measures can have benefits, individually or in combinations, however no mix has proven to be better than another. Moreover, although a link definitely exists, there is no straightforward relationship, but it is rather to be assessed case by case, and can also be a negative effect.

Figure 17 - Delphi question 4

Soft & hard policy measures

16 responses



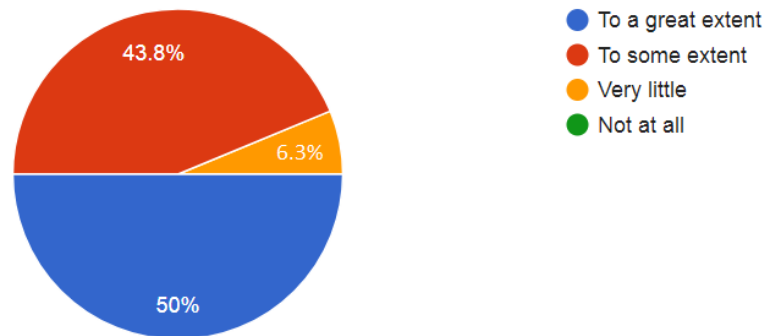
Source: Delphi survey on urban freight planning and soft policy measures in EU cities

At a second stage, the focus is shifted towards the relevance of SPMs in the overall planning process for freight in cities. Experts seem to consider them relevant for the integration of sustainable freight transport issues into urban policies and in the framework of the SUMP concept (50% to a great extent, 43.8% to some extent). They were also asked to provide examples of measures they are aware of, and most of the suggested initiatives had already been taken into consideration in the analysis carried out in section 6.2.

Figure 18 - Delphi question 5

How relevant SPMs are for the integration of sustainable freight transport issues into urban policies, in particular in the framework of the Sustainable Urban Mobility Plan (SUMP) concept?

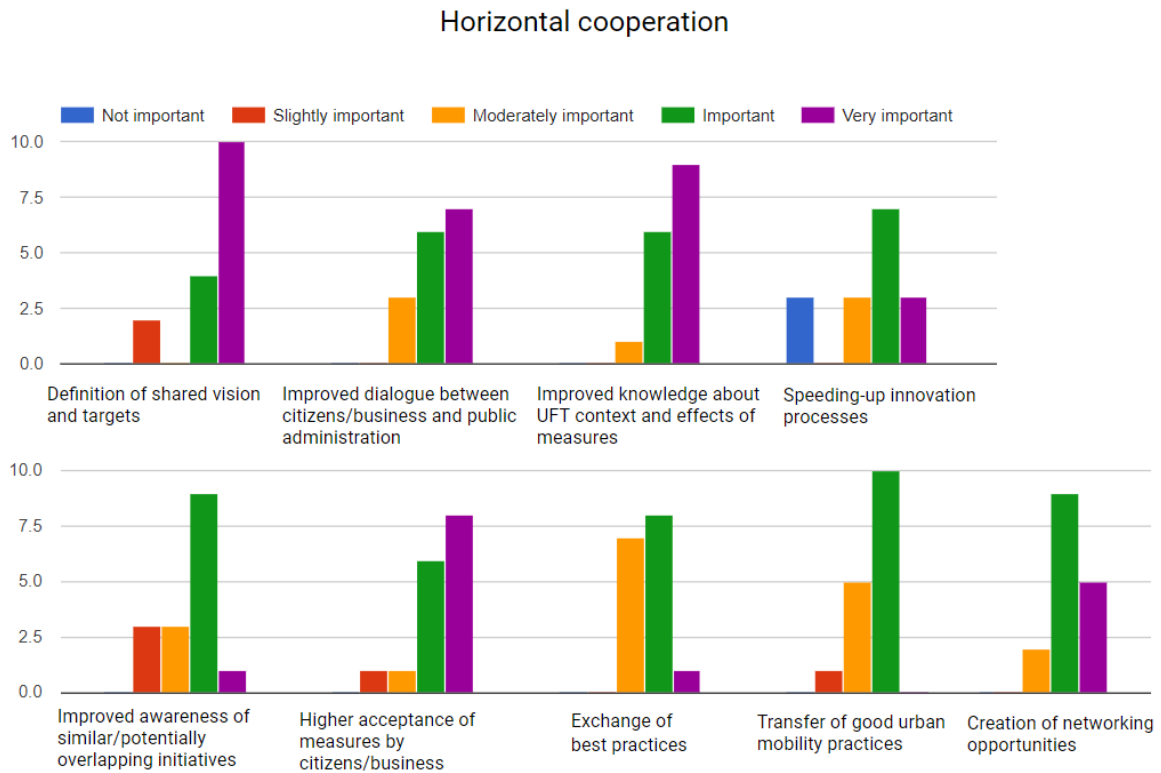
16 responses



Source: Delphi survey on urban freight planning and soft policy measures in EU cities

The third section of the survey investigates the potential benefits of vertical and horizontal cooperation mechanisms for a more effective design, implementation and adaptation of SPMs to different local contexts. From a LA's perspective, horizontal cooperation among municipality departments, and with UFT local actors, such as private sector, researchers, other cities (e.g. stakeholder platforms, networks, etc.) and vertical cooperation with other governance levels (EU, national, regional), can have positive effects on the definition of general UFT policies at local level. Experts were asked to assess their importance. As for horizontal cooperation, many of the proposed options were rated high and considered more or less having the same degree of importance. The first one is the Definition of shared vision and targets (10 *very important* + 4 *important*), followed by Improved knowledge about UFT context and effects of measures (9+6), Higher acceptance of measures by citizens/business (8+6), Improved dialogue between citizens/business and public administration (7+6), Creation of networking opportunities (5+9).

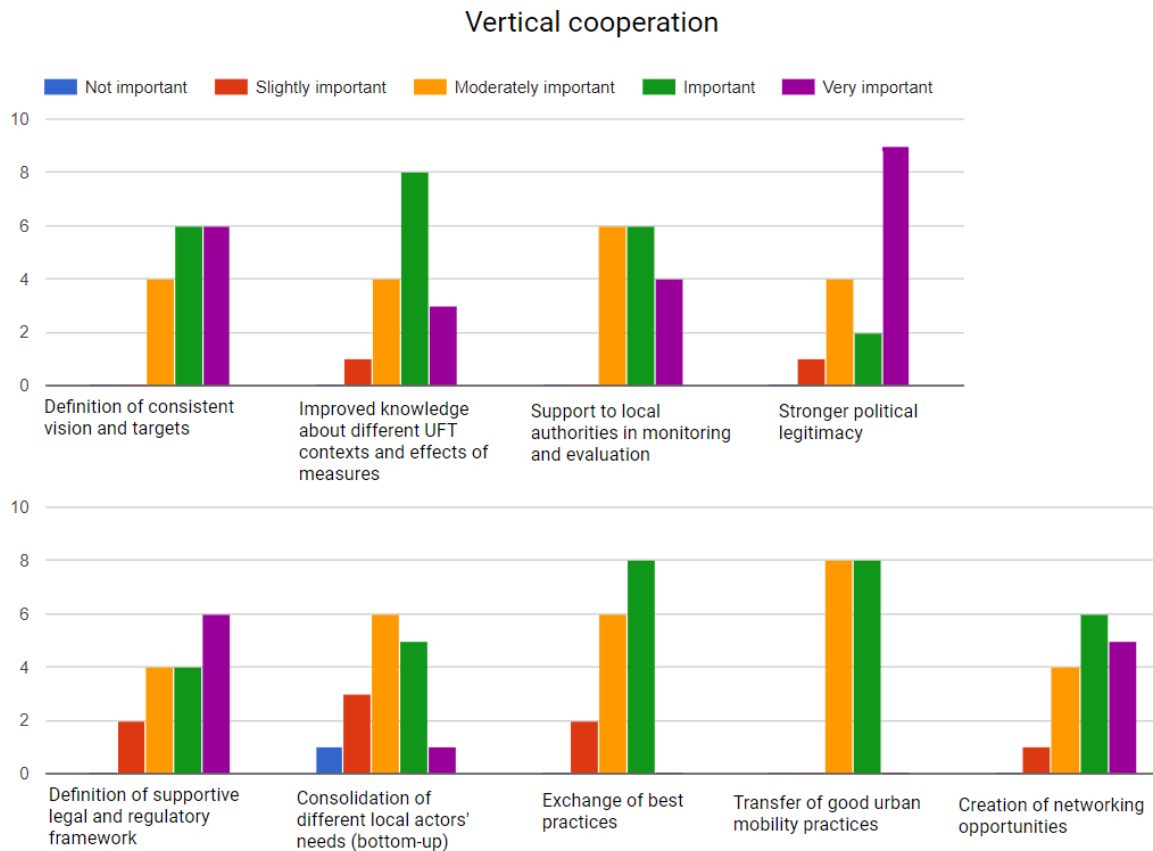
Figure 19 - Delphi question 6



Source: Delphi survey on urban freight planning and soft policy measures in EU cities

Beneficial effects of vertical cooperation seem to be less evident: none of them got more than 12 of combined responses *very important* + *important*, whereas this was the case for five effects of horizontal cooperation. Stronger political legitimacy (9 *very important* + 2 *important*) is considered as the most important benefit from vertical cooperation, followed by Definition of consistent vision and targets (6+6) and Supportive legal and regulatory framework (6+3).

Figure 20 - Delphi question 7



Source: Delphi survey on urban freight planning and soft policy measures in EU cities

6.2.1.3 Implications

The Delphi analysis involved a group of experts to try to develop a shared understanding of some unclear aspects of the SPMs applied to the UFT sector. In fact, as seen in 6.2, although SPMs have been broadly applied in different contexts, their *ex-post* analysis has not been systematized, especially as regards their long-term effectiveness nor their correlation with respect to HPMs. In addition, the survey has been elaborated to provide more elements to the new concept of CAC⁷⁰ in the (urban mobility) public policy sector. The experts involved are all researchers, with a proven knowledge of various UFT measures tested all over the world, and a direct experience in collaboration with LAs for their implementation.

⁷⁰ CAC considers vertical and horizontal cooperation from the European to the local level: each upper level of the chain has the power to nudge the lower, significantly influencing the final choices of citizens and companies, at the bottom of the chain

According to the experts, LAs are the most sensitive actors to the introduction of SPMs. This on the one hand means that great importance is given to Positive regulation and smart procurement, which look at LAs as a target of behaviour change policies, to influence in turn the behaviour of individuals and citizens, according to the logic of ‘practice what you preach’. On the other hand, it also stresses the importance of stakeholder cooperation platforms: if LAs set up a permanent system of consultation and collaboration with local stakeholders, they are more aware of the needs of UFT actors and therefore are able to apply more effective policies. This means that this type of measures must be agreed with all the stakeholders, but eventually introduced by LAs (in line with criterion B, *Public-sector led*). The other actors considered to be very sensitive are the LSPs and the Third-party couriers, i.e. the actors having the following characteristics: i) a complex and centralized structure, which allows them to respond efficiently to changes and also to influence them; ii) local policy measures have a direct impact on their daily operations. On the contrary, it seems more difficult to involve Own account couriers and Retailers, which are often individual companies with little adaptability and little time available to make their distribution and deliveries-taking processes more efficient, and Shippers and Automobile manufacturers, not touched by urban mobility policies at a direct operational level.

Rewarding and recognition schemes are considered the behaviour change measures that are more likely to persist. In line with the consideration that LAs are the most sensitive actors to SPMs, Stakeholder cooperation schemes and Sustainable Procurement Schemes and Plans for Public Administrations are considered measures that are successful and are effective in the long run, while trust in the Communication and marketing measures is not at the same level. A possible interpretation is the absence of incentives in this type of measures, that could be less impacting when it comes to involving the business sector, that is very reactive to immediate and direct benefits, such as Derived economic savings and Increased efficiency of the operations (considered very relevant by the experts), and less interested in services such as Access to further information, knowledge and courses.

SPMs are mainly considered support measures for HPMs, but are often decisive for the success of the latter, so much so that they are recommended to be included in urban mobility planning tools (SUMP) to support the overall planning process for freight in cities.

When it comes to the assessment of the positive effects of horizontal and vertical cooperation, some deductions in terms of overall objectives on both sides can be drawn. For horizontal

cooperation, except for the first positive effect, i.e. the possibility for LAs to convey the different visions of the actors into a shared strategy, the tendency seems to privilege the ones generating awareness and dialogue among the UFT actors, rather than the ones supporting concrete actions (Speeding-up innovation processes), which are probably considered less feasible in such a context, and Transfer of good urban mobility practices, which should be done between different cities rather than between stakeholders belonging to the same local environment. For vertical cooperation the most important effects seem anchored to the concrete definition of common objectives and frameworks, supported and endorsed by the political decision maker, to establish firm and consistent points between all levels of governance (Gudmundsson, 2013).

These findings are in line with the approach proposed in this thesis, considering vertical cooperation as a tool at the disposal of the different levels of governance to influence each other and collaborate in the definition of coherent planning frameworks, and horizontal cooperation as a tool to facilitate and improve the dialogue between actors involved in the same sector (see Chapter 5).

6.3 UFT SPMs planned and applied in EU cities

Section 6.2 investigates 96 measures that could be potentially considered as UFT SPMs as intended in this research, collected from European research projects and selected from an initial pool of around 300 UFT measures. They have been harmonised on the basis of a common denominator, i.e. they *encourage*, without imposing, *a behaviour change* – in line with the key message of *libertarian paternalism*. Therefore, both pull-soft and pull-hard measures have been considered. Consequently, a further selection has been made on the basis of the criteria and attributes illustrated in the methodology (Chapter 3). This has led to a decrease of the measures considered to 74. Then, we have performed an analysis of the degree of correspondence between two UFT measures' categorisation systems (from the C-LIEGE and CITYLAB projects), limited to the categories embedding those 74 soft measures. This exercise has enabled the elaboration of a new categorisation system, not in contrast with the aforementioned methods, but aiming to group and simplify UFT SPMs in 1 + 3 mega-categories (Figure 13).

On the basis of this new categorisation system, section 6.3 maps the UFT SPMs already in place and under development in some selected European cities. In particular, we investigate whether

the local SUMP, or dedicated urban freight plans and strategies, envisage the implementation of UFT SPMs, as intended in this study. Therefore, we analyse the strategies, the plans and other relevant documents of 37 selected European cities and regions, from all four SUMP country categories (see section 5.2.3), in order to:

- Check whether European cities have adopted a package of UFT SPMs. In 6.1, we started from a database of randomly collected measures, useful for elaborating a categorisation based on real experiences. Here we invert the process: now that we have a simplified and validated categorisation system, we investigate the presence of the UFT SPMs accordingly.
- Map the types of UFT SPMs actually implemented, or under development, in European cities. Categories are now defined, but it is essential to understand how the concept of soft policy is concretely deployed and put in practice in the different local contexts.
- Investigate the correlation between the presence of a locally implemented SUMP/freight plan, and the implementation or planning of UFT SPMs. Does an urban mobility planning framework, developed according to the EU SUMP principles, facilitate the enlargement of the scope of the UFT initiatives proposed, including not only the traditional and hard ones, but also the participatory, voluntary-based ones?

Table 24 provides an overview of the situation in the 37 cities and regions, regarding the presence of a SUMP, and/or dedicated urban freight plans and strategies, stakeholder cooperation and involvement mechanisms, incentives, rewards and recognition, information and awareness raising initiatives, positive regulation and smart procurement. The column on the implementation of plans features a simple ‘✓’ in case of a dedicated SULP is in place, and ‘✓ (in SUMP)’ in case specific UFT strategies are embedded in the general SUMP.

Table 24 - Overview of UFT SPMs implementation in EU cities

City	SUMP /SULP in place	Stakeholder cooperation	Incentives, rewards and recognition	Information and awareness raising	Positive regulation and smart procurement
Amsterdam (NL)	X	✓ Build a platform: Front runners “Sustainable 020”	Privileges for EV trucks (e.g. parking on sidewalks)	See ‘stakeholder cooperation’	Hogeschool van Amsterdam (HvA) en de Universiteit van Amsterdam (UvA) Municipality of Amsterdam use procurement power to push suppliers to deliver via hub/zero emission
Antwerp (BE)	✓ (in SUMP)	X			DSP (in prep), UCC (in prep) Procurement approach called the “Marketplace for Mobility”, partnerships with mobility providers
Barcelona (ES)	✓ (in SUMP)	X	Off-peak hours programme Develop privileged policy framework	Demo for consolidation best practices (retailers) UFT information by territorial districts	Micro-platform as a concession of public spaces (zero cost to the last mile operators) – in exchange data and interoperability
Brussels (BE) - Region	✓	✓ (Mobility Committee on UFT)	Recognition scheme (in prep) Off-peak hours programme pedestrian area incentive for alternative delivery modes	guide to harmonize L/B bays regulations ⁷¹ raising awareness on UCC, EVs ⁷² and logistics best practices for small companies ⁷³ .	DSP (BuyZET) Sustainable tendering process ⁷⁴
Budapest (HU)	✓ (in SUMP)	✓ (Communication platform)		Online information / communication system to harmonize and connect demands and free capacity of trucks ⁷⁵	
Copenhagen (DK)	✓ (in SUMP)	✓ (Freight network)	PPPs Formalized freight network for defining incentives to improve demand management	Meet-an-EV program, 12-days test period for 4 different EFVs for companies Eco-driving trainings Guidance/ info on best practices	DSP (BuyZET)

⁷¹ The Brussels Capital Region is made of 19 municipalities

⁷² LaMiLo project

⁷³ In collaboration with the association Groupe One, best practices on freight are promoted among very small companies, focusing on people willing to launch their enterprise. The idea of the project is to avoid the behaviour change problem thanks to the implementation of sustainable providing from the beginning and to help small companies to be more efficient. Being aware of the possibility to subcontract the storage for instance can avoid them important fixed charges putting a strain on their business plan. Moreover, in the framework of the new Brussels Plan for Circular Economy, Brussels Mobility promoted freight as a key element. This includes the promotion of reverse logistics.

⁷⁴ Tender for “local delivery area” for then new pedestrian area

⁷⁵ Urbanwise, project

City	SUMP /SULP in place	Stakeholder cooperation	Incentives, rewards and recognition	Information and awareness raising	Positive regulation and smart procurement
Delft (NL)	X (under development)	✓ Nudging strategy & Logistics Protocol. Supported by group of stakeholders (companies, residents, logistical representatives)			
Emilia-Romagna Region (IT)	✓ Regional Integrated Transport Plan	✓ (Multi-stakeholder platform - NOVELOG)			Harmonization of access regulation / permission procedures on a regional basis
Flanders (BE) - Region	✓ (policy memorandum)	✓ Smart Flanders-program Coordination of stakeholder platforms in six Flemish cities		PIEK 2-project –off-hour deliveries & urban freight dialogue (guidance, workshops, etc) Vlaanderen.Multimodaal platform, to optimise logistics chains	
Frankfurt (DE)	X	X			
Gdynia (PL)	X	X			
Gothenburg	X	✓ (Freight network)	UFT scheme ‘Stadsleveransen’: consolidation services & fully electric last mile delivery to businesses in the inner city. Regulatory and incentivizing scheme for the promotion of UCC and of ultra-low emission vehicles for last mile deliveries		‘Lindholmsleveransen’ – consolidation for public attractors
Graz (AT)	X	✓ (Multi-stakeholder platform - NOVELOG)	Supporting home deliveries system for small shops		
Jerusalem (IE)	X	X			
La Rochelle (FR)	X	X	Electric goods deliveries ‘favoured’ by a municipal decree		
Lisbon (PT)	X	X			
London (UK)	✓	✓ (Freight Forum)	Recognition scheme (FORS, CLOCS). UCC.	portal to inform and communicate with stakeholders (https://tfl.gov.uk/freight) Guidance/ info (DSP, CLP, safer lorry scheme) Retimed deliveries (guidance)	

City	SUMP /SULP in place	Stakeholder cooperation	Incentives, rewards and recognition	Information and awareness raising	Positive regulation and smart procurement
Lyon (FR)	X (under development)	X			
Madrid (ES)	✓ (in SUMP)	PPPs (under development)	regulatory incentives for clean vehicles		Procurement: EVs in the municipality fleet.
(Greater) Manchester (UK)	✓	✓ (Freight Forum) ✓ (cooperation with with neighbouring authorities and with neighbouring and other UK city regions)	Recognition scheme (FORS, CLOCS, ECOSTARS).	Cyclist and HGV driver safety toolkits and training Retimed deliveries (study) Guidance/ info (CLP). Freight routes and signage, freight maps.	DSP (BuyZET)
Mechelen (BE)	✓ (in SUMP)	✓ (Multi-stakeholder platform - NOVELOG)			Procurement: the City use cargo bikes supplier to deliver goods to two departments of the Municipality
Milan (IT)	✓ (in SUMP)				technologies for UF simplification of procedures for UCCs
Oslo (NO)	X	✓ (Freight Forum)			DSP (BuyZET)
Paris (FR)	✓	✓ (Freight Forum)	Certification for low-noise night deliveries ⁷⁶	'toolbox' to assist the creation of logistics hotels (under preparation)	Favouring micro urban logistics spaces through bid for tenders.
Pisa (IT)	X (under development)	X	parking sensors for freight vehicles, to alert on the availability of parking slots 5 EVs available to be booked online to access the LTZ. EVs van sharing scheme (planned)		
Prague (CZ)	X	X			
Piatra Neamt	✓ (in SUMP)	X	Positive incentives for clear FVs	Off-peak deliveries Encouraging use of bike infrastructure for cargo-bikes deliveries	

⁷⁶ Certibruit

City	SUMP /SULP in place	Stakeholder cooperation	Incentives, rewards and recognition	Information and awareness raising	Positive regulation and smart procurement
Rogaland (NO) – Region	X	✓ Stakeholder workshops & working groups, to develop specific measures they would like to implement (NORSULP)			
Rome (IT)	In preparation	X	van-sharing policy promotion rewarding scheme for clean vehicles (under preparation)		
Rotterdam (NL)	✓	✓ (Freight network)	Recognition scheme (ECOSTARS) positive incentives for zero-emission vehicles Driver behavioural: feedback on performance in game form ⁷⁷ . Off-peak deliveries programme ⁷⁸ Develop privileged policy framework (emission free is restriction free) ⁷⁹	Rotterdam city dashboard portal to inform and communicate with stakeholders (www.010greendeal.nl) Workshops with logistics service providers, transport companies, and city authorities	DSP (BuyZET) Sustainability plan for specific areas, to develop way of working – in which ordering behaviour is geared for and with local companies.
Skedsmo (NO)	X	X			
Southampton (UK)	✓ (South Hampshire)	X		dynamic routing is to guide HGV drivers onto optimal routes for deliveries and access ⁸⁰	DSP Joint procurement and consolidation for large public institutions
Stockholm (SE)	✓	✓ (Freight network)	off-peak delivery project (Study) on the use of PT lanes	L/U bays info: zones are mapped and awareness campaign freight handbook for planners Mobility Index for freight	

⁷⁷ Develop the drivers’ game to support efficient driving, i.e. the most efficient driver of Rotterdam (CGI, based on DHL project together with the city of Rotterdam and the Dutch Topsector for Logistics)

⁷⁸ ‘Beter Benutten’ program together with the VerkeersOnderneming (VO) and van drivers and companies using vans.

⁷⁹ <https://frevue.eu/cities/rotterdam/>

⁸⁰ SCC’s UF strategy/policy is also reflected in its Local Transport Plan 3 (Strategy + Implementation Plan documents). It includes an “Urban Freight Strategy – a pilot system for ‘Freight Traffic Control’ where dynamic routing is used to guide HGV drivers onto optimal routes for deliveries and access.”

Suceava (RO)	✓ (in SUMP)				Plans for purchasing 15 EVs for Suceava Municipality fleet
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City	SUMP /SULP in place	Stakeholder cooperation	Incentives, rewards and recognition	Information and awareness raising	Positive regulation and smart procurement
Turin	✓ (in SUMP)	✓ (FQP Task Force)	Incentives system: <ul style="list-style-type: none"> • FQP • Recognition scheme • Privileged policy framework 		
West Midlands (UK) - Region	✓	✓ (with 7 LAs)	Off-peak deliveries programme freight priority measures on the public transport routes (planned)		
Zaragoza (ES)	✗	✗			

This survey does not have a statistical purpose, since the sample of cities considered is not weighted. It rather aims to gain some qualitative insights on the current situation from a pool of EU cities particularly active in sustainable urban mobility.

The findings of this detailed research are encouraging about the presence of SPMs in European cities. In particular, dedicated freight networks and for a are progressively becoming the ideal platforms to gather UFT key stakeholders on a structural and regular basis, to engage and inform them about new urban strategies and measures. Initiatives such as rewarding and recognition schemes, off-peak distribution, van sharing and other added value services are submitted to the opinion, agreed or even developed together with stakeholders in these platforms, often via FQPs and PPP. LAs have also realised that good communication facilitates the acceptance of new measures, as well as their better understanding, and consequently a smoother implementation. In addition, user-friendly brochures, guiding actors in learning about UFT innovative practices in certain specific areas (construction, procurement, retiming, safety) and meant to support stakeholders follow the procedures correctly, begin to spread on even-more complete websites of local mobility agencies. Trainings for drivers and other professional logistics figures are often offered within the recognition schemes mentioned above. LAs begin to systematically procure zero or low emission vehicles for their own and PT fleet, but also services and supplies requiring low or zero emission deliveries, on the one hand to give a good example ('practice what you preach'), on the other hand, to influence demand for goods and services, and thus for the associated transport mode, inducing a behaviour change of suppliers and logistic operators.

In general, planning schemes and tools, as well as stakeholder cooperation mechanisms already in place seem to facilitate the introduction of UFT SPMs. In addition, in the cities investigated there is usually an articulated package of more than one measure at the same time. This seems to support the idea that a CAC implemented from the top (European) strategic planning level can positively influence the introduction of SPMs, and hence 'gently' induce a behaviour change, but also that the knowledge gathered from the best practices of measures implemented at local level contribute to the definition of more effective and complete EU planning guidance (*bottom-up*).

6.3.1 Three successful case studies: SPMs applied in London, Rotterdam and Turin

This investigation draws on cases studies of three European cities which implemented their own SUMP/planning scheme, and located within countries belonging to different MSs categories (1 and 2) identified in 5.3.

6.3.1.1 London

London is a city in full growth and expansion, both in terms of population (approximately 9.5 million citizens foreseen in 2020) and jobs (over 5 million in 2020). Consequently, the growing demand for services and goods which derives presents crucial challenges in terms of management and regulation of urban logistics.

Besides the traditional HPMs, such as the almost completed Roads Modernisation Plan, London aims to counteract the impacts of UFT via TDM and a behaviour change programme.

Transport for London (TfL) is the local government body responsible for the transport system in Greater London. In order to develop its vision and implement its strategies, it work in constant cooperation with the London boroughs, the freight industry and their customers.

Planning and strategy

- The **London Freight Plan** is the key strategic document⁸¹, which defines UFT development in London and coordinates the role of freight in London's growth. The London Freight Plan is regional in its scope and covers a height-year period. A revised plan is currently being developed.
- The **Olympic Legacy report**⁸² monitors the impact of policies that were successfully tested and applied during the London Olympics in 2012. It contains the *Delivering a road freight legacy*⁸³, a programme in collaboration with the freight industry that focuses on joint priorities around safety, reliability and efficiency.
- The **London Mayor's Transport Strategy** also contains information on freight transport in London. The strategy sets out the Mayor's transport vision for London over the next 20 years.

⁸¹ <https://www.tfl.gov.uk/info-for/freight/planning/london-freight-plan>

⁸² <http://content.tfl.gov.uk/olympic-legacy-freight-report.pdf>

⁸³ <https://www.polisnetwork.eu/uploads/Modules/PublicDocuments/tfl-delivering-a-road-freight-legacy.pdf>

Stakeholder cooperation platforms

There is a constant interaction between different groups of UFT stakeholders in London, which are formalised within the following frameworks:

- The **London Freight Forum**, coordinated by TfL, brings together about 160 actors of the logistics sector in London. It gives those involved in making and receiving deliveries in London a chance to discuss key issues, network and ensure that their industry has a voice⁸⁴. It envisages *raise awareness* activities, such as an advice programme, workshops, advertising and emails.
- The **Central London Freight Quality Partnership (CLFQP)**⁸⁵ is a public/private partnership, set up to develop a shared vision and encourage innovation for deliveries and servicing activity in central London.
- The **Retiming Deliveries Consortium**⁸⁶ brings together freight industry representatives, retailers, London boroughs to change perceptions about the best times to make and receive deliveries, and increasing uptake and promoting retiming.

Soft policy measures in place

Transport for London (TfL) has put in place different measures aiming to achieve behaviour change of the actors involved, based on a voluntary engagement approach.

- The **Fleet Operator Recognition Scheme (FORS)**⁸⁷, born in 2006, is now recognised as the main industry benchmark for safe and efficient fleets, so to become a national accreditation scheme in 2015. FORS is a membership scheme providing operators with practical advice and guidance to help reduce fuel consumption, CO2 emissions, vehicle collisions, and penalty charges. The programme is delivered through company training, workshops and electronic guides and tools. Companies are accredited according to three levels: bronze, silver and gold. BESTFACT (2015) reports that “a 6% improvement in fuel efficiency was measured on average for freight operators. In the first year, greater reductions in fuel use were recorded but it has been assumed that there is a continuous annual saving of 6% in fuel use, fuel cost and CO2 emissions compared to before

⁸⁴ <https://tfl.gov.uk/info-for/deliveries-in-london/training-and-events/freight-forum>

⁸⁵ <https://www.centallondonfqp.org/>

⁸⁶ <https://tfl.gov.uk/info-for/deliveries-in-london/delivering-efficiently/retiming-deliveries?intcmp=37935#on-this-page-5>

⁸⁷ <https://www.fors-online.org.uk/cms/>

becoming a FORS member. FORS members recorded a reduction of 13% in the number of accidents. The operator benefits from FORS membership through public recognition and a better image.”

- The **Construction Logistics and Cyclist Safety scheme (CLOCS)**⁸⁸ set the standard for Construction Logistics, and it is directly developed by industry. It provides guidance documents, a toolkit and envisages the organisation of events and workshops.
- The **London alternative consolidation approaches** promote upstream consolidation, encouraging collaboration between suppliers, as well as centralised and intensified procurement.
- The **Engagement Programme**: the information and awareness raising activities are a central element of the overall TfL freight strategy, including Freight Forum meetings, weekly Road Freight Bulletin, events and expanded website: www.tfl.gov.uk/freight.

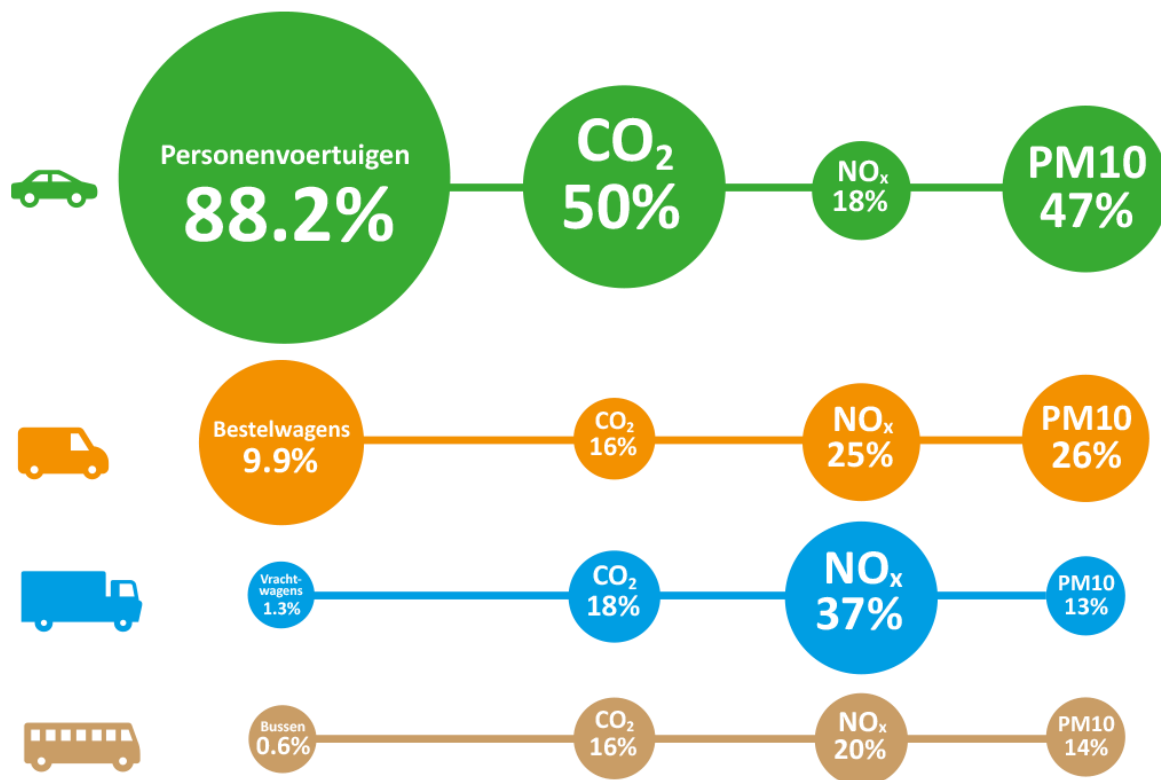
6.3.1.2 Rotterdam

Planning and strategy

Rotterdam is a modern city, its economy is growing and it presents a well organised and accessible network, also for freight distribution. However, Rotterdam faces issues in air quality, and among the main contributors in terms of pollutant emissions there are vans and trucks, ascribable to UFT, accounting for almost half the emission of harmful substances in the local transport sector, as reported in the figure below.

⁸⁸ <https://www.clocs.org.uk/>

Figure 21 - Composition of vehicles fleet and corresponding emissions in Rotterdam



Source: Green Deal 010 Zero Emission City Logistics Rotterdam (presentation at Polis Urban Freight Working Group)

In the Netherlands, at the national level, agreements – called **Green Deals**⁸⁹ - are made between the national government and other partners (e.g. companies, other authorities, NGOs, etc.) in order to reduce energy consumption and improve sustainability. Rotterdam aims at zero emission urban freight system for its city centre by 2020. In order to meet this objective, in October 2014, the municipality of Rotterdam, the Dutch research institute TNO and six transport companies in the Rotterdam region signed an agreement, called **Green Deal 010 Zero Emission City Logistics** (GD010ZES). This ambition is in line with the long- term **Rotterdam Urban Vision**⁹⁰, which emphasises the need for a liveable city, implying good air quality and also no major nuisance from traffic.

⁸⁹ <http://www.greendeals.nl/english/>

⁹⁰ http://ec.europa.eu/regional_policy/sources/conferences/udn_seville_2016/rotterdam_south_bank.pdf

Stakeholder cooperation platforms

The municipality of Rotterdam, TNO and the six transport companies work together in a **City Logistics Living Laboratory (CLLL)** approach (Quak et al., 2016). The objective of this freight partnership is to develop, test and run urban logistics solutions identified in a **non-binding Roadmap**, defined in the framework of the GD010ZES. Other partnerships under development envisage a close cooperation with shippers and large freight attractors (public offices, hospitals, schools, big private companies) to influence logistics by altering the demand of services and goods via smart and sustainable procurement practices. Cooperation with interest groups and other Dutch and European cities will also be encouraged.

Figure 22 - Visualisation of the Roadmap - Green Deal 010 Zero Emission City Logistics Rotterdam



Source: http://www.citylab-project.eu/presentations/180308_Amsterdam/Quak.pdf

Soft policy measures in place

The four action lines of the above-mentioned Roadmap are the following, many of them featuring elements ascribable to SPMs:

1. **Technology:** aiming at collectively buying electric (zero emission) trucks, developing the necessary charging infrastructure, and improving the development of vehicles with manufacturers.
2. **Smart Logistics:** active cooperation with logistics organisations to change their perception on times of deliveries and develop new solutions to reduce logistics-derived traffic in the centre.
3. **Driver behaviour:** emphasis on fuel-efficient driving and monitor vehicles and drivers and establish feedback on performance in game form.
4. **Regulation and stimulation:** LAs together with front-runners look at positive incentives for zero-emission vehicles and regulatory measures like further developing low emission zones.

Thanks to the active support of the industry, Rotterdam is developing an approach based on positive incentives to encourage private companies' behaviour change.

The measures taken by Rotterdam, next to the action lines above, also include the extension of the environmental zone, procurement initiatives, street/district-based approaches, a city dashboard enabling real-time traffic insights, traffic history detailed information on urban logistics for all city centre entry points, communication and platform building activities, and the **ECOSTARS programme** (Nesterova et al., 2016). ECOSTARS is a fleet recognition scheme for transport companies, aiming to improve air quality in Rotterdam and to help transport companies reduce the use of fuel. In 2016, more than 10,000 vehicles had a ECOSTARS certificate⁹¹. The ECOSTARS programme in Rotterdam is a legacy of the EU project of the same name, implemented between 2011 and 2014 in 8 European cities (including Rotterdam). The objective of such a scheme was to increase the energy efficiency of freight distribution and passenger transport by giving recognition and publicity to those transport operators using cleaner vehicles and sustainable operational management practices. The project helped to encourage the faster introduction of vehicles using clean fuel technologies, as well as the take up of fuel efficient driving schemes. The project was established to replicate the successes of the South Yorkshire (UK) ECOSTARS fleet recognition scheme, which was originally developed in 2009, in new and different locations in Europe, adapting it to different local contexts in order to demonstrate its replicability and transferability. LAs were accompanied in

⁹¹ see for more information: <http://ecostars-rotterdam.nl/> (in Dutch)

the process of developing, implementing their own local scheme, and promote it towards local fleet operators. The ECOSTARS evaluation activities identified a combined carbon dioxide saving in the final year of the project of 59,858t CO₂. The scheme was widely accepted by operators, and 5 out of the 8 pilot sites (including Rotterdam) decided to continue the scheme and convert it into a permanent programme (Fell et al., 2015).

Rotterdam is currently involved in the **BuyZET project**, a partnership of cities aiming to achieve zero emission urban delivery of goods and services through smart procurement. In the last year, Rotterdam mapped its the transportation footprint to identify and include all its activities that involve transportation, and has selected ‘construction material transportation’ as procurement area having the potential, through improved processes and supplier solutions, to impact upon the transportation footprint of the LA⁹².

6.3.1.3 Turin

Planning and strategy

Turin is one of the main Italian cities, counting around 900,000 inhabitants in the inner city and at heart of a metropolitan area with almost 2,000,000 inhabitants on an surface of approximately 2,300 km². Turin faces significant challenges in terms of air pollution (Legambiente, 2018), therefore the municipality decided to address this issue also by reducing the negative externalities caused by UFT, evolving towards environmentally, socially and economically sustainable practices.

The SUMP of the city of Turin, in line with the plans issued at the Regional level, has been developed in a flexible format, which can be integrated with new actions and measures, and features a medium-long term strategy. Turin wishes to become a ‘Smart City’, and it is also committed to elaborate an Action Plan for Energy in order to reduce its CO₂ emissions of more than 20% by 2020. A dedicated freight plan for last mile delivery inside the Low Emission Zone (LEZ), following the SUMP Guidelines, is currently under preparation.

The Mobility Department of the City of Torino aims at the gradual replacement of polluting freight vehicles and the rationalization of delivery trips. In 2014, the City of Turin signed an Agreement with the Ministry of Transport aimed at testing innovative solutions in the last-mile delivery. The protocol foresees the involvement of all interested players, the adoption of

⁹² see for more information: <http://www.buyzet.eu/>

measurable objectives in terms of freight delivery, energy efficiency, CO₂ reduction, traffic reduction, and most importantly, the voluntary adhesion of logistics operators to innovative pilot tests and the adoption of a rewarding scheme, based on operational incentives rather than restrictions, via soft-pull rather than push measures (Marcucci et al., 2017b).

Stakeholder cooperation platforms

A FQP has been signed by the City, Chamber of Commerce and all interested associations. This represents a new governance model for UFT, aiming to reward all users who implement some required measures (green vehicles, full load, on board units - see below) in order to make freight distribution more efficient and sustainable.

The city of Turin wants the private sector to be active part of the decision-making process. Every three months there is a meeting on different topics with UFT stakeholders, including associations and all the main companies and logistics operators. In December 2017, the city opened 4-5 roundtables with several stakeholders, including delivery operators, mobility services, retailers, politicians, to discuss the policy implications of the introduction of the LEZ for freight (Lozzi et al., 2018).

Soft policy measures in place

The Mobility Department of the City of Turin has engaged in the NOVELOG project⁹³. The Living Lab set up for the NOVELOG project pilot involves different companies for a total of 50 vehicles. A pilot has been implemented to test the impacts of the proposed new governance model. A special permit was introduced for vehicles of companies joining the recognition scheme of the municipality. They can access the city centre during extended time windows and can use bus lanes. In exchange, vehicles have to respect high emission standards, install an on-board unit connected with the central traffic management system and anonymously share some data, useful to plan for the last mile and to define new policies for the future, i.e. congestion charging. Data is also used for research, in particular by the polytechnic institute of Turin.

Preliminary results demonstrate that the logistics operators appreciated the proactive and effective policy measures introduced, and they accepted to improve their freight vehicles in favour of new and more eco-friendly ones in change of more flexibility in the use of bus lanes and access into the LTZ (Dondi, 2017a). Furthermore, a permanent dialog between operators,

⁹³ <http://novelog.eu/>

associations and public authorities has been set up. All the main national and international logistics operators have been involved, whereas own account operators have been excluded from this 1st phase. A good participation to the project has been registered (48 vehicles = 80% of the totals) and very strong stakeholder participation (high participation to meetings, availability to share data and needs, feedback on the policy measures). The estimation of the impacts reports a significant reduction of CO₂, and other pollutants' emissions (especially PM) and reduction of traffic – see Table 25. In terms of operators' preferences, the possibility of reserve a freight parking slot is not considered a priority, but they are much in favour of using buses reserved lanes and having a wider time window to access into the LEZ, with gains in terms of delivery and pick up flexibility (Marcucci et al., 2017b). This is in line with the preferences of operators highlighted by the experts in the Delphi survey.

Table 25 - Turin rewarding scheme ex-post evaluation. Methods applied and KPIs

Module	Impact Area	KPI	IA Method applied	KPI data/ units	KPI values		Impact
					Before	After	
Impact Assessment	Mobility	Customer satisfaction	Questionnaire survey	Likert scale	2	4	✓
		Traffic throughput	Average distance run x number of vehicle trips per day	Veh-km/day	107,8	98,2	✓
		Vehicle utilisation factor	Number of load/unload stops per day x average time of drive	%	65,3	49	✓
	Environment	Total CO2 emissions	CO2 emissions evaluated with mathematic formulas considering type of vehicle, distances, fuel type, average emission produced	kg	27,4	24,9	✓
	Safety	Accidents	Questionnaire survey	Number / veh-km	4	0,5	✓
		Violations	Questionnaire survey	%	10	0	✓

Source: <https://www.mettrans.org/sites/default/files/Track%201%206%20Marciani.pdf>

Next steps will also consider other types of measures, such as new mobility pricing schemes and discount policies, access to restricted zones, also integrating different transport modes, and

the continuation of the flexible use of public infrastructures thanks to ITS and the successful recognition scheme.

6.4 Assessment of the effectiveness of the selected SPMs

This section assesses the actual effectiveness of selected SPMs, as identified in 6.2 according to the criteria described in the methodology (Chapter 3).

In section 6.3, we already presented the successful cases of three European cities, providing for a preliminary assessment of some positive combinations of UFT SPMs. In this section, we elaborate and aggregate the results of the impact assessment performed in the framework of the already mentioned inventory of UFT policies and measures, city typologies and impacts (Aditjandra, 2016), based on an impacts categorisation adopted by CIVITAS.

In section 6.3, we already presented the successful cases of three European cities, providing for a preliminary assessment of some positive combinations of UFT SPMs. To assess and validate those results, another survey involves, through interviews in the form of questionnaire, public officers and researchers of these three LAs planning in the field of UFT, who have considered and introduced UFT, to check whether their evaluation and feedback correspond to the theoretical findings of 6.2 and the review of 6.3.1.

CIVITAS (CIVITAS WIKI consortium, 2015) acknowledges the high level of complexity of planning for UFT, implying economic, environmental and social consequences. These consequences are known as *impacts* that CIVITAS divides into 4 categories:

- Economic (road congestion, inefficiency, and waste of resources);
- Environmental (pollutant emissions, use of non-renewable fossil-fuel, land and aggregates, and waste production);
- Social (physical consequences of pollutant emissions on public health, traffic accidents, noise, visual intrusion, and other quality of life issues);
- Impacts of scale (few resources, lack of co-operations, fewer policy considerations, few logistics providers based in cities, and little infrastructure).

NOVELOG has adopted some of these typologies to determine the relative success or failure of UFT interventions and measures collected in the NOVELOG Toolkit, using sustainability

impact indicators (economic, environment and social) and the level of implementation (of each UFT case).






Table 26 - NOVELOG City logistics cases impact typology

Impacts	Unit measured
Environmental	CO ₂ emissions
	Noise pollution
Economic and Energy	Costs
	Energy consumption
Social	Number of accidents
	Service level
Transport and mobility	Traffic reduction
	Vehicle kms
	Load factor

Source: Aditjandra et al., 2016 - D4.1 NOVELOG

As illustrated in Aditjandra et al. (2016), the impact assessments of all selected measures have been extrapolated from the available evaluation reports of the related projects. However, in many cases impacts information have not been recorded or estimated during the projects. It was therefore decided to ask responsible partners of NOVELOG, who were closely linked to a case, to validate its impact variables, using a qualitative assessment. A *five-point Likert scale* was established, from negative to positive, using smiley face emoticons (see Table 27) in order to measure the impacts variables.

Table 27 - Ordinal scale with smiley face emoticons for measuring reported impacts

Impact					
Category	Very good	Good	Neutral	Bad	Very bad

Source: Aditjandra et al., 2016 - D4.1 NOVELOG

With reference to the 74 SPMs selected in 6.2 (Table 22), we can therefore extrapolate and aggregate the impact assessments provided by the NOVELOG Toolkit, and present them in Table 28, reporting in Figure 23 their distribution per unit measured. The analysis is limited to

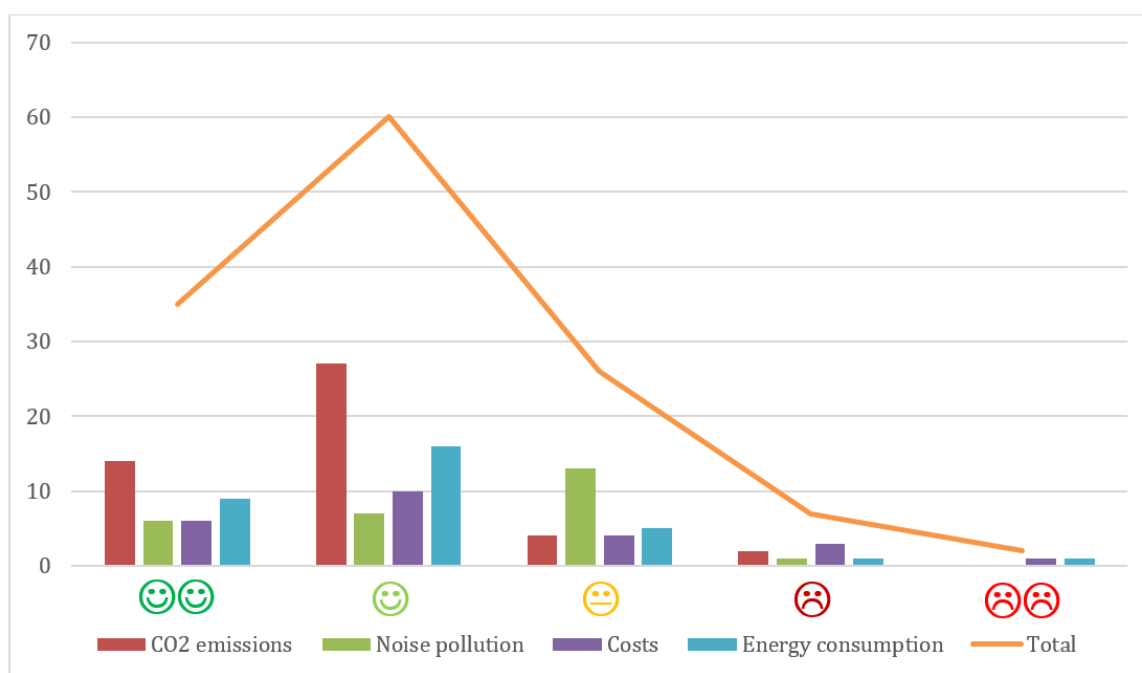
the Environmental and Economic and Energy impact areas, since for the others poor data quantity has been observed.

Table 28 - Selected UFT SPMs: impact assessment

Impacts	Unit measured					
		😊😊	😊	😐	😞	😞😞
Environmental	CO ₂ emissions	14	27	4	2	0
	Noise pollution	6	7	13	1	0
Economic and Energy	Costs	6	10	4	3	1
	Energy consumption	9	16	5	1	1
Total		35	60	26	7	2

Source: elaboration from NOVELOG Toolkit

Figure 23 - Distribution of the qualitative impact assessment values per unit measured



Source: elaboration from NOVELOG Toolkit

Albeit with a few limitations, the aggregated results show a general positive impact of the UFT SPMs, especially in terms of CO₂ savings and reduction of energy consumption. The

consideration of this combined quali-quantitative impact assessment, together with the presentation of three successful cases in 6.3, aims to give a general insight of the potential positive impacts of UFT SPMs. Nevertheless, in order to validate these preliminary findings, future endeavours could imply extending the analysis to other impact assessment methodologies:

- Literature review of measures evaluation studies and works and their comparative analysis, enabling to assess whether their results are consistent, i.e. they estimate the same (positive/negative) impact for each measure assessed.
- Validation: interviews with LAs that actually implemented the (same type of) measures identified in 6.2 and 6.3, according to the principle of participation and stakeholder engagement as illustrated in paragraph 6.1, to verify if their evaluation and feedback correspond to the research findings of this sessions and of step 1.

As for the 2nd point, these interviews have been carried out with public officers and researchers having implemented SPMs in the three cities investigated, i.e. London, Rotterdam and Turin, and reported in the next section.

6.4.1 Interviews with European local authorities and implementation researchers

After describing the SPMs applied in London, Rotterdam and Turin in section 6.3.1, at a second stage the survey involves, through interviews in the form of questionnaire, public officers and researchers of these three LAs planning in the field of UFT, who have considered and introduced UFT SPMs (as identified in this research), to check whether their evaluation and feedback correspond to the theoretical findings of 6.2 and the review of 6.3.1.

We chose to carry out qualitative interviews expressly dedicated to SPMs. However, a wider dialogue with these cities constantly takes place in the Polis Network working group⁹⁴ and within the CITYLAB project⁹⁵, therefore the implications deriving from the analysis of their UFT policies take into account an overall vision and knowledge of their local situation that goes beyond these interviews focused on the topic of the thesis.

⁹⁴ <https://www.polisnetwork.eu/topics/32/40/Urban-Freight-Delivery-and-City-Logistics?topic=true&topics=32>

⁹⁵ <http://www.citylab-project.eu/>

In general, with regard to the methodology used for the interviews, it is noted that the questions regarding the involvement of the UFT actors that did not specify the type of incentives or the type of SPMs are those that generated the most divergent responses between the two experts in each city. This means that those variables are essential to determine the impact of a certain measure on different types of actors.

6.4.1.1 London

To get a first-hand feedback on the SPMs introduced in London, we consulted two experts who were involved in the implementation and evaluation of some of these measures, covering two different perspectives: a public officer, Tim Ward, the former Freight and Fleet Communications and Engagement Manager at Transport for London, and a researcher, Dr. Julian Allen, Senior Research Fellow in the Transport Studies Department at the University of Westminster.

The interviews were aimed at verifying the correspondence of the information collected on the UFT 'soft' policies of the city of London, verifying the potential success and positive impacts generated by the identified SPMs, understanding which actor has introduced them and the reaction of the others, and other strategic aspects related to the city's transport policies.

The experts confirmed the presence of many types of behaviour change initiatives conducted in London to improve sustainable mobility in general, such as education, persuasion, coercion, restrictions, training, incentivisation, enablement and modelling (the last three identified by only one of them).

On the possibility that the city of London is interested in offering incentives and rewards to the actors of the UFT, the opinions of experts converge on the neutrality of the municipality, except for LSPs and couriers: from the point of view of the researcher is likely, while for the official it is unlikely they would receive any incentives from the municipality.

Once they confirmed the presence of planning instruments for sustainable planning in London and the SPMs previously identified in 6.3.1.1, the experts were asked to evaluate their overall success. Stakeholder cooperation platforms, FORS and CLOCS schemes and Engagement programme have been considered successful and very successful, while London alternative consolidation approaches seem less convincing. More in details, they have been asked to assess the overall impacts of each measure, in terms of environment protection, economic savings,

social benefits and network & delivery efficiency⁹⁶. For none of the measures a negative impact was spotted. Confirming the findings in 6.3.1.1, FORS seems to have the most significant impacts regarding economic savings and social benefits, which is a win-win outcome for both the business and the society, and which is probably the key to its success. The assessment of the positive impacts of CLOCS is less obvious, even though the measure undoubtedly brought benefits to society in terms of public health improvement and accidents reduction. Finally, the Engagement program seems to have had very positive impacts from all points of view, according to both experts.

These measures have all been introduced by the LA, both independently and within the London stakeholder forum, and are framed and supported within a broader planning vision, namely the Mayor's Transport Strategy and the London Freight Plan. These SPMs have been designed to support and improve users acceptance of HPMs. Some of these are infrastructural, such as new cycling infrastructure and the disruption needed to build them, changes to junctions, road works and events needing road closures. Others are various regulations on vehicle access, vehicle loading/unloading, vehicle operations at night, Congestion Charging Scheme, Low Emission Zone, and others.

Shifting the focus on multi-level governance cooperation mechanisms, and the top-down support for the introduction of these measures, regional and national funding schemes as well as EU networks and projects are in place, however national framework agreements and national planning guidelines do not envisage SPMs, nor there is a mechanism in place at regional/national/EU level to aggregate and consolidate the contributions and findings developed at local level through stakeholder consultations and platforms (*bottom-up* approach).

On the importance of SPMs to increase the participatory attitude of local UFT actors, to some extent all actors seem influenced, however there is a diverging opinion on the retailers (*very little / to a great extent*). This divergence probably depends on the type of SPM the respondent is referring to (some of the directly addressing retailers whereas the majority focussing on the operators), since the question does not specify it.

In London, there is a moderate level of awareness at the political level of the success and positive impact of the SPMs implemented, whereas among citizens and micro/small companies,

⁹⁶ These are the impact categories identified in the NOVELOG project and explained in section 6.4

including own-account operators, the level of awareness about the opportunities provided by the SPMs seems to be quite low. This result is in line with the assessment of the expert panel in section 6.2: small companies and own account are not particularly responsive to the introduction of SPMs.

6.4.1.2 Rotterdam

To get a first-hand feedback on the SPMs introduced in Rotterdam, we consulted two experts who were involved in the implementation and evaluation of some of these measures, covering two different perspectives: a public officer, Richard van der Wulp, Urban Traffic Planner at Municipality of Rotterdam & Project Manager Europe for traffic and transportation, and a researcher, Dr. Hans Quak, Senior Scientist at TNO – Sustainable Transport and Logistics Department.

The interviews were aimed at verifying the correspondence of the information collected on the UFT ‘soft’ policies of the city of Rotterdam, verifying the possible success and positive impacts generated by the identified SPMs, understanding which actor has introduced them and the reaction of the others, and other strategic aspects related to the city's transport policies.

The experts confirmed the presence of many types of behaviour change initiatives conducted in Rotterdam to improve sustainable mobility in general, such as education, persuasion, modelling, restrictions, incentivisation, enablement and coercion (the last two identified by only one of them).

On the possibility that the city of Rotterdam is interested in offering incentives and rewards to the actors of the UFT, the opinions of experts converge on the LSPs and couriers as main target, while they diverge on the others.

Once they confirmed the presence of planning instruments for sustainable planning in Rotterdam and the SPMs previously identified in 6.3.1.2, the experts were asked to evaluate their overall success. The Fleet Recognition Scheme ECOSTARS and the introduction of Smart procurement to encourage zero emission (ZE) transport have been considered successful and very successful, while Driver behaviour change initiatives, based on gamification mechanisms (Deterding et al., 2011, Buningh et al., 2014, Marcucci et al., 2016), seem less convincing. More in details, they have been asked to assess the overall impacts of each measure, in terms of

environment protection, economic savings, social benefits and network & delivery efficiency⁹⁷. For none of the measures a negative impact was spotted. ECOSTARS seems to have the most significant impacts regarding environment protection and economic savings, which is a win-win outcome for both the business and the community, although from a research point of view the impacts do not seem to be particularly significant. It is important to notice that ECOSTARS has as its main objective the reduction of emissions and the improvement of air quality, whereas FORS, the UK recognition scheme, mainly aims to improve road safety. The positive impacts of smart procurement practices are principally improving environment protection and economic savings. Finally, the Driver behaviour change programme seems to have had no impacts from all points of view, according to both experts.

Regarding the implementation process of the measures, they have all been initiated by the LA, except for the Driver behaviour change programme, agreed with the industry, and are framed and supported within a broader planning vision, namely the Rotterdam Green Deal on Zero Emission City Logistics (GD010ZES). These SPMs have been designed to support and improve user acceptance of HPMs, such as environmental zone for cars, vans and trucks: the UFT governance model of Rotterdam envisages the combination of the introduction of a LEZ, privileges and supportive recognition and procurement schemes ('carrot and stick').

Shifting the focus on multi-level governance cooperation mechanisms, and the top-down support for the introduction of these measures, on a national level, agreements were made between the national government and other partners (e.g. companies, other authorities, NGOs, etc.) in order to enhance sustainability. However national planning guidelines do not envisage SPMs. The GD010ZES is considered a good example of covenant and consolidating best practices at local level (*bottom-up* approach), as well as the participation in EU projects and the exchange of best practices with other cities in networks as Polis⁹⁸.

On the importance of SPMs to increase the participatory attitude of local UFT actors, there is a diverging opinion on the LSPs, the couriers and retailers (very little / to a great extent). This divergence probably depends on the type of SPM the respondent is referring to, since the

⁹⁷ These are the impact categories identified in the NOVELOG project and explained in section 6.4

⁹⁸ <http://www.polisnetwork.eu/freight>

question did not specify it. However, in line with the findings of the Delphi survey (section 6.2), shippers and automobile manufacturers seem not to represent a target group.

In Rotterdam, there is a low/moderate level of awareness at the political level of the success and positive impact of the SPMs implemented, as well as among citizens and micro/small companies, including own-account operators, regarding the level of awareness about the opportunities provided by the SPMs.

The current trend of the Rotterdam UFT policy is to introduce more regulation, to better balance restrictions and supportive measures, and to intensify relation and exchange between governments, businesses and knowledge institutes.

6.4.1.3 Turin

As for the city of Turin, it was not possible to carry out interviews with the experts identified. However, as part of the CITYLAB project, the author of this work has supported the city of Turin in the study on the possible adoption of new measures tested in CITYLAB. As part of this activity, an interview was held with Giuseppe Estivo, in charge of the European Smart Mobility Projects & Assistant to the Director of the Infrastructure and Transport and Mobility Manager Division, touching many points in common with this research. Moreover, on several occasions it has been possible to directly interact with Massimo Marciani, pilot leader of the rewarding scheme of Turin illustrated in 6.3.1.3, to clarify some aspects related to the research topics of this work.

The city of Turin involves the main UFT stakeholders in the discussion about its urban logistics policies, with an innovative system of rewards and incentives that have given an excellent result in the pilot phase (Marciani, 2017). Turin has given incentives in particular to LSPs and Couriers (Third-party), while the Own-account couriers have not been included in the scheme. A potential area of improvement could be the direct involvement of small businesses and Own-account couriers, which until now seem not to have actively participated in the discussion tables, nor took part in the NOVELOG pilot, despite they account for almost half of the daily accesses in the LTZ (Marcucci et al., 2017b).

Given the high position of freight in the political agenda, and the imminent revision of the local SUMP, the freight department should take the opportunity to give more emphasis to freight and related SPMs in the new SUMP. Following the success of the NOVELOG pilot, it is important

to take advantage of the momentum and upscale the measure, as well as encourage data sharing and on board unit installation among operators (Lozzi et al., 2018).

Regarding the implementation process of the measures, they have all been initiated by the LA. The set of push and pull measures dealing with restrictions and incentives for logistics operators were developed and introduced by the municipality in accordance with the FQP Agreement signed in 2013. These SPMs have been designed to support and improve user acceptance of HPMs, such as the introduction of the LTZ, 2,58 km² with 37 gateways monitored by cameras.

Shifting the focus on multi-level governance cooperation mechanisms, and the top-down support for the introduction of these measures, on a national level, in 2014 the city of Turin signed an Agreement with the Ministry of Transport aimed at testing innovative solutions for last-mile delivery (see 6.3.1.3). As for mechanism in place to aggregate and consolidate the contributions and findings developed at local level (bottom-up approach), it is important to mention that the model of Turin has been included in the list of best practices to be adopted by 15 Italian cities, drafted by the Italian Government Transport Planning Framework (Marciani, 2017). Moreover, the participation in EU projects such as NOVELOG, SOLEZ, PUMAS and the exchange of best practices with other cities in CITYLAB is considered an added value at the city level.

In Turin, there is a high level of awareness at the political level of the success and positive impact of the SPMs implemented, whereas among micro/small companies, especially own-account operators, the level of awareness about the opportunities provided by the SPMs seems to be quite low. Again, this result is in line with the assessment of the expert panel in section 6.2: small companies and own account are not particularly responsive to the introduction of SPMs.

6.4.2 Implications

Although SPMs have been broadly applied in different contexts, their *ex-post* analysis has not been systematized, especially as regards their long-term effectiveness nor their correlation with respect to HPMs. This study aims to partially overcome this lack of data with consultation of European experts and local public officers. However, except in some cases, even the interviewees do not have quantitative data on the *ex-post* evaluation of the measures implemented in their city. In particular, data collection and modelling are essential to observe

and analyse the movements of goods in urban areas in a reliable and comparable way, and, consequently, to plan and implement solutions based on the real needs of each context (Bernardino et al., 2016).

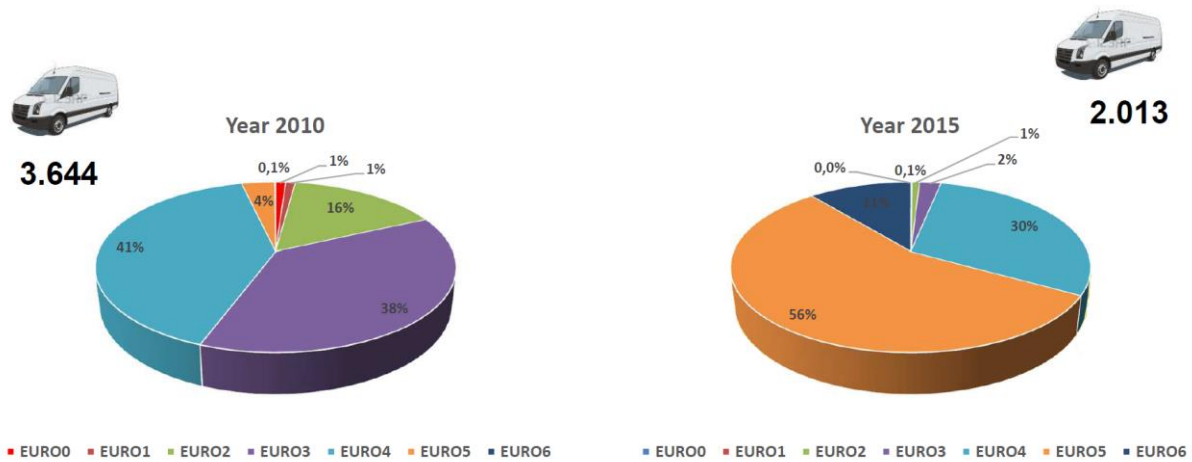
Nevertheless, albeit with a few limitations, the aggregated results of evaluation show a general positive impact of the UFT SPMs. In order to validate these preliminary findings, future endeavours could imply extending the analysis to other impact assessment methodologies, including literature review of measures evaluation studies and works and their comparative analysis. Since the SPMs must be considered in combination with HPMs, it is important to evaluate them within a policy package rather than standalone (Givoni, 2014): in fact, the impact on the environment, traffic, etc., of measures such as smart procurement or information campaigns may not be significant in absolute terms, but may prove decisive for triggering a change in mentality and behaviour over the medium to long term.

6.5 SPMs applied in Rome

This paragraph investigates the presence of UFT SPMs applied or planned in Rome, as identified above and in line with the evaluation criteria (Chapter 3), and considered effective according to section 6.4. Chapter 5 has already identified the regulation and planning tools in place in Rome. This section presents research and innovative initiatives on UFT the city is involved in.

In line with one of the SPMs mega-categories proposed in this study - Positive regulation & smart procurement -, the city of Rome has consistently reduced the number of vehicles composing its own fleet, from 3,644 in 2010 to 2,013 in 2015, and has also increased the percentage of vehicles with lower emissions (Fuschiotto, 2016). However, there are no electric or gas-powered vehicles in the figures reported.

Figure 24 - Renewal of the Rome city fleet (2010-2015)



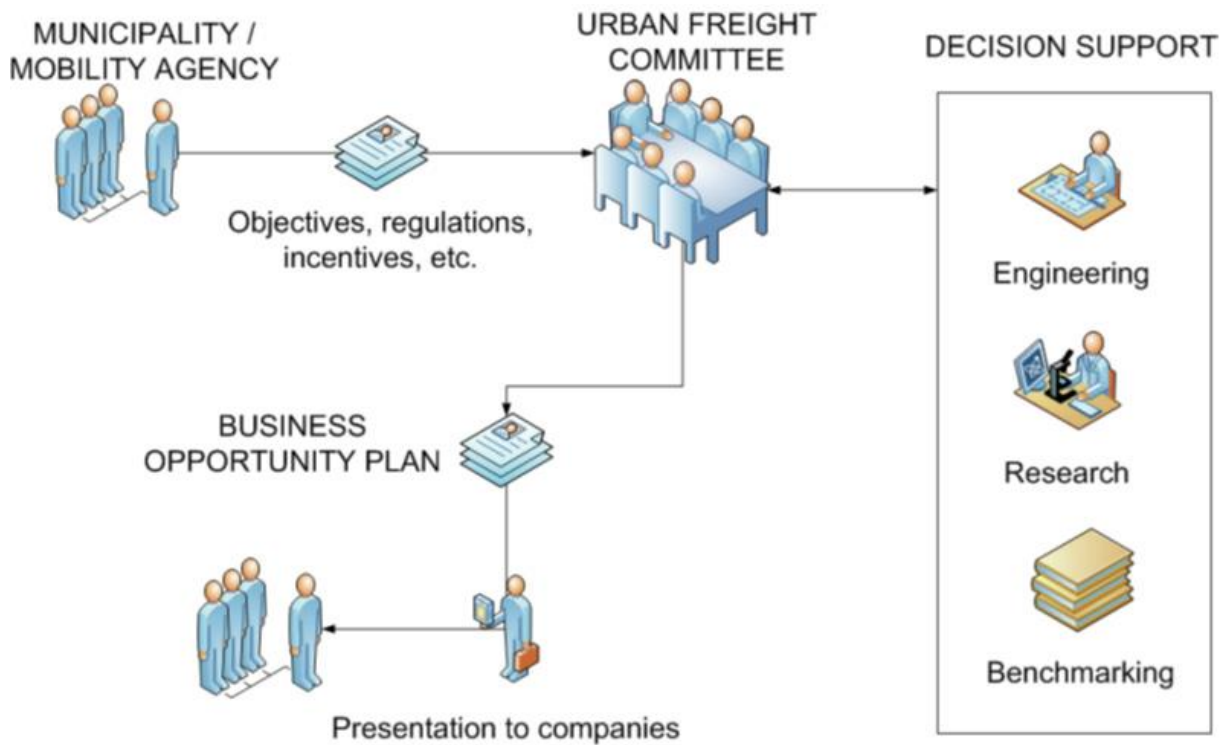
Source: Fuschiotto, 2016

As regards transit freight platforms, the LOGeco project⁹⁹, co-ordinated by Unindustria, aims to define a new economically viable business model for urban freight distribution in Rome: in fact, city logistics experiments usually rely on public subsidies, but they cannot turn into self-sustaining services once the funds are over. The experimentation involves a transit platform, located near the Trident area¹⁰⁰, where an intermediate reloading occurs; goods are consolidated with the support of innovative telematics systems (ITS) and distributed by dedicated EVs. The project can be useful to both the Municipality, which will have data to support regulation, as well as for private operators, that will possibly have a sustainable business model that is environmentally and economically tested on the field.

⁹⁹ <http://www.logeco.it/>

¹⁰⁰ Trident is the road complex made up of three straight streets of Rome (via Ripetta, via del Corso, via del Babuino), starting from the Piazza del Popolo and diverging in the south direction, assuming the shape of a trident. It is located in the historical center and it is one of the main commercial and touristic areas of the city.

Figure 25 - LOGECO business model



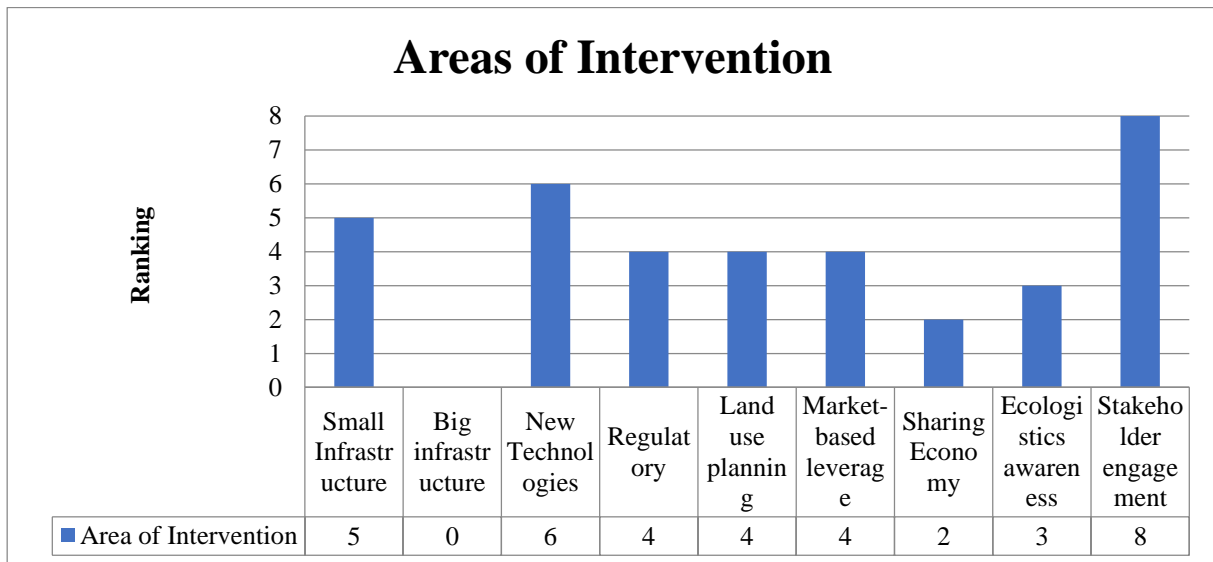
Source: LOGECO project

The EU-funded SMARTSET project, aiming to develop examples of good practice for UFT, came to an end in 2016. The city of Rome was among the project partners. The project reports success stories and limitations of different regulation experience in Europe (RSM, 2014). Concerning Rome, the UFP is considered a step in the right direction for a better regulation of the sector, and the participation in the project and the establishment of working groups with stakeholder representations positively indicate the will of the LA to engage in the search for UFT innovative solutions.

In NOVELOG, the Rome implementation aims to develop a decision support system (DSS) for city logistics measures definition and recognition scheme incorporated into the regulatory framework. This should enable the municipality to produce recommendations for the reorganization of the freight delivery system, for the location of facilities, for specific innovative vehicles (Dondi et al., 2017a). One of the activities performed so far, supported by the project, has been the development of sustainable urban logistics scenarios for 2020 and 2030 (Dondi et al., 2017b). The Rome local partner organised round tables with several local stakeholders to identify the factors influencing UFT situation in Rome and the potential areas

of interventions, as well as to evaluate the constraints in terms of relevance and difficulty of relaxation. The most important area of intervention identified is *stakeholder engagement*, which received the maximum score (Figure 26).

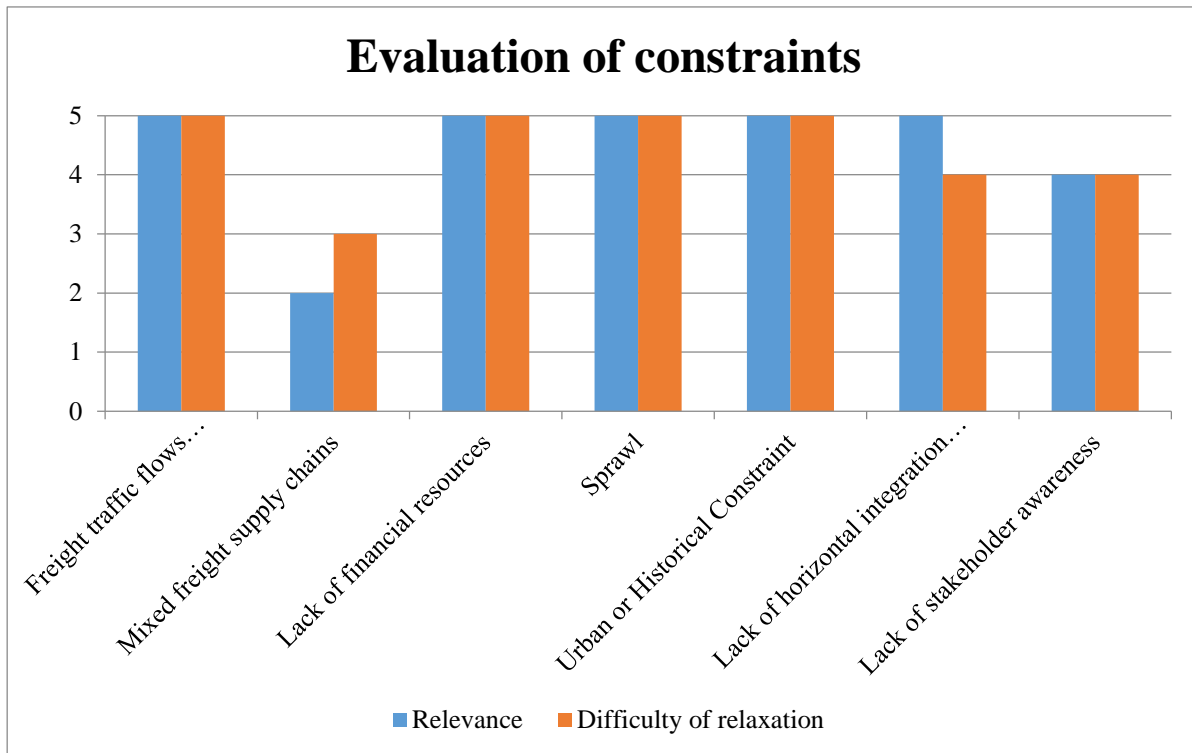
Figure 26 - Rome Areas of Intervention



Source: NOVELOG project

The figure below shows the evaluation the city of Rome made considering the relevance and the difficulty of relaxation of each constraint. Among others, *lack of horizontal integration of PA's competences* and *lack of stakeholder awareness* are difficult constraints to relax, although according to this survey almost all the constraints in Rome seem very difficult to address.

Figure 27 - Evaluation of constraints in terms of relevance and difficulty of relaxation (Rome)



Source: NOVELOG project

The CITYLAB project uses seven European cities, including Rome, as dynamic, real-world test environments where different public and private freight transport measures can be evaluated, adapted and improved in a cyclical way. In this framework, the municipality wants to create a *test-case* to showcase all the benefits derivable from the adoption of this approach, where stakeholders (e.g. companies, public bodies, universities) collaborate¹⁰¹. The CITYLAB Rome implementation¹⁰² tackles and evaluates increased recycling and reduced transport negative externalities by improving and optimizing waste collection and reverse logistics. These topics provide a further contribution to finalise the work in progress for the planning tools under implementation (PGTU) and under definition (SUMP). The preliminary analysis of the *status quo* highlights that in Rome there is no structured and formalised approach to address and tackle UFT challenges in cooperation with local stakeholders (Nesterova et al., 2016). Moreover, during the last 2 years, the City Administration Department of Transport and the Mobility

¹⁰¹ <http://www.citylab-project.eu>

¹⁰² <http://www.citylab-project.eu/Rome.php>

Agency of Rome haven't met on a regular basis, nor have organised any roundtables with stakeholders, due to the instability of local political government. In order to overcome these challenges, the LL approach is defining a new stakeholder collaboration process, building a community of multiple actors, working together towards shared solutions, and it could represent a first step to (re-)launch an innovative concept of stakeholders' active participation (Fossheim et al., 2017).

6.5.1 Implications

The implementation of pilot projects (LOGeco) and the participation in qualified research projects focusing on best practices and shared solutions at the European level (SMARTSET, CITYLAB, NOVELOG) are a positive change compared to the past. Some kind of UFT SPMs are proposed, although not implemented yet, such freight stakeholder platforms, recognition schemes, van-sharing initiatives.

However, in order to effectively do so, a realistic and coherent UFP needs to be implemented and supported by a bold *ex-ante* and *ex-post* evaluation scheme, involving all relevant stakeholders, as well as a concrete monitoring activity. The instruments for measuring the effects of policies should be introduced and defined in detail already in the context of the SUMP and/or the UFP, as they must be consistent from the beginning with the planned measures, and the targets should be (quantitatively) clarified. However, in none of the (draft) plans or guidelines currently in place this aspect is properly addressed.

The municipality recently published new guidelines for the realisation of the SUMP (Roma Capitale, 2017), and hopefully this process will support the LA in the development of a long-term vision and robust strategy envisaging clear and consistent intervention on the short-medium-long period. The process aligns with the EU SUMP Guidelines, and develops according to the provisions contained in the decree of the Italian Ministry of Transport and Infrastructures (see section 5.2.5), which is also published as a fundamental document on the Roman SUMP website. Moreover, in order to foster participation in the conception of the plan, an open consultation among citizens and stakeholders, who could submit their suggestions and proposals for the SUMP directly online, was open until January 2018. The Scientific Technical Committee is currently evaluating all the proposals received. However, as stressed above, both NOVELOG and CITYLAB, currently ongoing and promoting new methods for collaborative

planning and supporting the development of MSPs at local level, report the lack of an effective and broad UFT stakeholder engagement system. Findings demonstrate that, although there is a growing awareness of the importance of SPMs within the transport public authorities in Rome, the absence of well-defined stakeholder, credible and empowered involvement strategy and instrument, which is considered in this research as an essential mechanism to spread and reinforce the introduction of SPMs at local level, hinders the adoption of shared and widely accepted measures.

7 Policy implications and recommendations

In chapter 7, we investigate how the implementation and standardisation of UFT SPMs can be boosted: horizontal influences have been acknowledged to be effective in transferring good urban mobility practices (see section 7.1). We investigate how city-to-city networks and joint research are important in motivating cities to adopt SPMs and improving their transport performances.

7.1 Boosting the implementation of UFT SPMs: policy and measures transfer

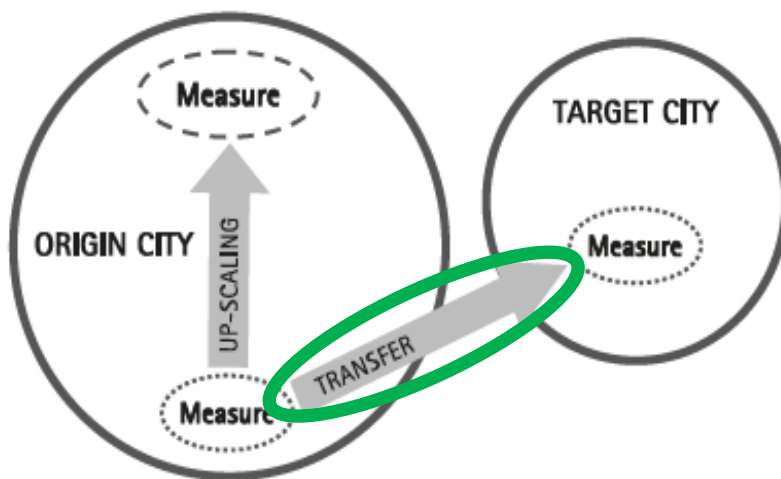
Once it is clear the nature, the type and (potential) effectiveness of available UFT SPMs, LAs should find the best ways to test and implement them at local level. Therefore, they have to select the most suitable for their context. Most European cities want to be innovative, but there are risks associated to be the first to implement a new measure (Hüging et al., 2014):

- Financial: refers to the economic and financial resources available to properly afford the introduction of the measure.
- Political: refers to the support by the political level, and the acceptance by citizens – would they vote in favour of it?
- Effectiveness: refers to the appropriateness of a new measure for the specific context, i.e. if the measure would solve the problems it is meant to solve.
- Implementation: refers to the ability of the LA to introduce the measure smoothly, without delays or extra cost.

Therefore, there is the need to understand the context conditions for innovation. A detailed transferability analysis is able to overcome these challenges: *transferability* refers to the degree to which the positive effects of a successful solution can be transferred to other contexts or settings. Transferability implies a transfer of a measure or a measure bundle from one city to another: horizontal influences have proven to be an effective, relatively low-cost and direct tool to transfer good urban mobility practices (Dziekan et al., 2013). Moreover, SPMs are more easily transferable, since they are more linked to intrinsic behaviour than to local context's unique characteristics and infrastructure, usually addressed via HPMs.

There are two types of policy transfer, vertical and horizontal, according to the number of cities interested and the scale of implementation: *up-scaling* refers to the estimation of the effects of a measure(s) if it/they was/were applied at a larger scale in the same city, whereas *transferability* refers to the degree to which the tested effects of a measure can be transferred to other contexts or settings (Dziekan et al., 2013).

Figure 28 - Upscaling and Transferability



Source: Dziekan et al., 2013

In this section, we only discuss horizontal transferability. Therefore, we try to identify measures which could be implemented successfully in other cities, and establish under which circumstances this would be likely to take place. It is important to carefully assess whether a specific solution, successfully implemented in a city, might be suitable for another local context: as said, transferability is about understanding the context conditions for innovation.

In the last ten years, many scholars have investigated the theory and practice concerning the transfer of transport policies (Macário et al., 2008, Stead et al., 2008, Attard and Enoch, 2011, Bray et al., 2011, Timms, 2011, Lucas and Currie, 2012, Marsden et al., 2012, Lah et al., 2015).

However, literature findings on the actual effectiveness of policy transfer are still in an embryonic phase (Gyergyay and Boehler-Baedeker, 2014). A review of policy transfer literature in the field of transport and planning policy was performed by Marsden and Stead in 2011 on three innovations: i) congestion charging, ii) compact growth and transport planning, and iii) car sharing. The authors identified some conditions appearing to support effective

learning, such as personal and professional skills of staff involved, multiple-sites investigation, and financial and institutional support. The study led to four key recommendations: i) improving cities' policy learning; ii) investing in policy networks; iii) developing more concise policy focused literature which deals with transferability issues; iv) developing better techniques for information searching. Nevertheless, they stressed that their review has strong limitations, in terms of typologies of cities analysed and staff interviewed, extent and of the solutions and criteria for their choice. Accordingly, Marsh and Sharman (2009) assert that it is difficult to assess the effectiveness of a transferred policy, as well as to measure the success of the transfer process, because it is too strictly dependent on the circumstances and individuals involved over time (O'Dolan and Rye, 2012).

In order to overcome the possible negative impacts of policy transfer, a *light* approach to policy transfer has been tested in Cariacica (Brazil). This simply provides a means, focused on workshops, for adding information to inspire the policy-making process (Timms, 2014). The light approach is cost-effective, pragmatic, and avoids many of the risks associated with policy transfer. However, it does not provide bold insights on the elaboration of a forceful transferability methodology.

Gyergyay and Boehler-Baedeker (2014) argue that not only the measure or a package of measures must be considered when taking up practices from other cities, but in particular the local decision-making processes have a decisive role, in terms of context in which the original plan was conceived, the possible long-standing tradition of public engagement mechanisms and national legislation in place. In this sense, it seems that the standardisation of the freight planning process, as investigated in section 5.2.6, generates a potential for transfer of a successful planning structure already implemented in other contexts (Fosheim and Andersen 2016).

These last considerations seem in line with the approach of this work, which frames the identification and promotion of UFT SPMs within the broader multi-level governance model of the CAC: in this sense, a transferability approach addressing not only single or combined measures, but also the higher, strategic, planning process and considering multi-level governance aspects seems more likely to succeed.

Many EU research projects categorise and present on-line information in a user-friendly format for dissemination purposes, however they do not always focus on transferability. In Europe, there is a policy transfer methodology which has been refined since 2004, in the framework of the NICHES and NICHES+ project¹⁰³, and continued and improved in a successive project, called TIDE (Transport Innovation Deployment in Europe). TIDE was a EU-funded project, which ran from 2012 until 2015. It provides a specific methodology for the take-up of sustainable urban mobility measures. The CITYLAB project has taken over this methodology, and has adapted it to the UFT sector as for the transferability analysis of the tested UFT solutions. However, in order to overcome the limitations of such a pure theoretical approach, a boarder Transferability Plan for selected follower cities have been conceived, to enlarge and diversify the scope of the transferability activities (Lozzi et al., 2018). The author is directly involved in this activity, having defined the plan and coordinating the different actions.

7.2 From theory to practice: the case of Rome

The main problems and weaknesses affecting the city in terms of UFT are identified by the Rome SUMP guidelines (Roma Capitale, 2017) and other studies are reported in section 5.3.1.1. This study has grouped them on the basis of four typologies: i) *General issues*, ii) *Non-compliance*, iii) *Lack of stakeholder cooperation*, iv) *Vehicles technology issues*.

This information, combined with the findings of this research project, provide sufficient elements to propose a Dedicated UFT soft strategy for Rome, improving UFT via SPMs and supporting the new SUMP, and the associated UFP. The strategy aims to involve the LA, the Mobility Agency and the UFT local stakeholders to promote the replication of successful - and conveniently adapted - SPMs in the Roman context, supporting the comprehensive approach to sustainable urban mobility planning recently expressed by the municipality in the guidelines for the drafting of a SUMP for Rome¹⁰⁴.

In the context of the preparation of the SUMP, in 2017 an online public consultation was open on the official website of the SUMP¹⁰⁵, ending in January 2018: through a participatory approach in line with the EU SUMP Guidelines principles (see 5.2.2), the Rome Mobility Agency successfully engaged with the citizens mainly through the portal which has gathered,

¹⁰³ http://cordis.europa.eu/result/rcn/53559_en.html

¹⁰⁴ https://www.pumsroma.it/download/Linee-Guida-PUMS_versione-finale.pdf

¹⁰⁵ www.pumsroma.it/

in less than 4 months, over 30,000 users and received more the 2,500 proposals which are now under scrutiny.

Given the clear connection between this work and the elaboration of the Rome SUMP, it was decided to send through the platform some proposals of SPMs for the UFT in Rome¹⁰⁶. There are 25 contributions released on the platform concerning Urban Freight and Logistics (including this contribution). Given the small number, RSM has decided to involve industry operators to better understand critical issues and solutions related to urban freight distribution. Thanks to the coordination of the Polis Network Urban Freight Working Group, of which the city of Rome is a member, a direct contact has been established with the officials dealing with UFT at RSM. This proposal and the other 24 will be evaluated by the UFT Scientific Technical Committee, coordinated by prof. Edoardo Marcucci, tutor of this thesis, who invited the author to participate in the activities of the committee.

7.2.1 A strategy for Rome: improving UFT via SPMs

Foreword

The strategy takes into account the context and problems related to UFT in Rome and the planning tools analysed in 5.3.1, the review of the SPMs already applied in Rome and the derived implications. Furthermore, the recommendations are based on the research questions and the findings developed in the context of this work, exploring the opportunity to influence behaviour of all types of UFT actors through SPMs, i.e. avoiding coercion and enhancing voluntary, multi-level governance cooperation mechanisms.

The measures to be implemented in the UFP, accompanying the new SUMP, and other actions under development (Roma Capitale, 2015, 2017; Fuschiotto, 2016) can be grouped according the CIVITAS WIKI (2015) categorisation system.

¹⁰⁶ <https://www.pumsroma.it/partecipa/proposte-cittadini/premialita-partecipazione-e-informazione-per-la-logistica-urbana-soluzioni-a-costo-zero-o-quasi/>

Table 29 - UFT measures under development in Rome grouped according the CIVITAS WIKI (2015) categorisation system

CIVITAS WIKI (2015) categories	UFT measures under development in Rome
Regulatory measures	- Revise/update the loaded and unloaded freight plan in the city centre - Revised rules to limit private traffic according increasing Euro categories in the inner rail ring zone (500,000 inhabitants);
Market-based measures	- Timetable and pricing policy evaluation, based on vehicle models and commodities
Land use planning & infrastructure	- Increasing the vehicles load capacity and reducing unloaded trips, through new transit points; - New freight L/U bays, to be identified in 20 neighbourhoods in the city centre, as well as logistics operation areas for new Urban Freight Terminals (UFTs) in the North of the city
New technologies	- Planned new booking service to optimize parking areas; New LEZ concept: installation of e-gates for enforcement
Eco-logistics awareness raising	- Van-sharing policy promotion; - Promotion of sharing and electric mobility in a multi-modal approach
Stakeholders' engagement	- Rewarding scheme for non-pollutant drivers with pollution charging concept

Source: CIVITAS WIKI (2015)

Obviously, the allocation of the measures among the various categories cannot be interpreted in a univocal way: some of them could undoubtedly be part of several categories, however for simplicity we decided to simplify this exercise.

Since we aim to propose a practical approach and a realistic set of measures, which do not conflict with the strategies already outlined in the SUMP guidelines, the SPMs recommended are designed as interventions that improve the effectiveness of the planned HPMs, in line with the theoretical findings of this work. In the case of measures belonging to the *Eco-logistics awareness raising* and *Stakeholders' engagement* categories, ascribable to the concept of SPMs¹⁰⁷, we provide recommendations to decline them in the most effective way possible, given the evidences found in this work.

¹⁰⁷ measures designed to motivate freight stakeholders to voluntarily change their logistics behaviour towards more sustainable and efficient transport modes and practices, by providing (tailored) information and services, raising awareness on innovative and sustainable UFT options, and using positive incentives and regulation, as well as marketing techniques

Stakeholder cooperation

According to what emerged from the analysis of the SPMs adopted in Rome, some kind of UFT SPMs have already been considered, although not implemented or fully deployed yet, such freight stakeholder platforms, recognition schemes, van-sharing initiatives¹⁰⁸.

The preliminary analysis of the *status quo* highlights that in Rome there is no structured and formalised approach to address and tackle UFT challenges in cooperation with local stakeholders (CITYLAB project). The most important area of intervention identified by the NOVELOG project is *stakeholder engagement*, which also considers *lack of horizontal integration of PA's competences* and *lack of stakeholder awareness* as main issues to be addressed. These findings are in line with the UFT SPMs definition criteria and mega-categories identified in this work, as illustrated in Figure 13.

Everything starts from the creation of structured and formalised approach to address and tackle UFT challenges in cooperation with local stakeholders. Networks, fora, FQPs, PPP are the ideal platforms available to cities to involve urban logistics key stakeholders (operators, retailers, wholesalers, citizens, other city departments, etc.), to consult and inform them in a structured and regular way on new strategies and measures.

The types of stakeholder platforms differ according to the objective, the size, the frequency of the meetings, the level of involvement of the actors. The city of Rome has a vital need to involve and inform the highest possible number and types of stakeholders, particularly in this crucial phase of defining the SUMP and the related UFP. If open consultation has been a fundamental step, proposing a very innovative participatory approach, it is also important to maintain a constant dialogue with all the actors, but also simply to inform them of new policies in definition or adopted (see Table 29, *Regulatory measures, Market-based measures, Land use planning & infrastructure*). For this reason, a model similar to the one in London is suggested¹⁰⁹. However, it may be useful in some cases to establish a partnership dedicated to the deployment or testing of a specific measure. In this case, it is suggested to consider the

¹⁰⁸ especially in the context of pilot national and European projects (LOGeco, SMARTSET, CITYLAB, NOVELOG)

¹⁰⁹ The London Freight Forum, coordinated by TfL, brings together about 160 actors of the logistics sector in London. It gives those involved in making and receiving deliveries in London a chance to discuss key issues, network and ensure that their industry has a voice¹⁰⁹. It envisages raise awareness activities, such as an advice programme, workshops, advertising and emails

Living Lab approach, already adopted in Rome as part of the CITYLAB Rome implementation¹¹⁰, or sign a PPP or FQP between the municipality and the private (and possibly research) sector, limited to a particular action, as partially tested in the LOGECO project, or as it happened in Copenhagen, where in the context of the Freight Network implemented within the NOVELOG project, two PPP agreements have been successfully established to implement pilot actions, and more are coming up during the last period of the project.

Incentives, rewards & recognition schemes

The goal is to identify and support virtuous companies with rewarding and recognition mechanisms. A *Rewarding scheme for non-pollutant drivers with pollution charging concept* is already foreseen by the municipality. However, rather than including a charging element, always perceived as a negative signal by stakeholders, it is advisable to implement a voluntary scheme based on rewarding mechanisms, similar to the one introduced in Turin which has achieved excellent results (see 6.3 and 6.4), envisaging a dedicated FQP signed by the City, Chamber of Commerce and all interested associations (in line with the Stakeholder cooperation approach presented above). This type of scheme envisages the use of reserved infrastructures, such as bus lanes, extended time windows to access restricted traffic areas, free training courses for drivers and other professional logistics figures. In return, companies commit to meet the minimum requirements set and share data and information, to be used for better planning. Such a data-collection system with onboard units was already tested in the context of the project LOGeco in 2012 (Filippi, 2014), when two Renault Kangoo ZE electric vehicles were used for a pilot aiming to deliver goods in the centre of Rome starting from a Transit Point. However, this model was never upscaled.

This scheme, as implemented in Turin, involves only Third-party couriers, leaving out the Own-account sector. As rightly pointed out in previous research about Rome (Danielis et al., 2011), the idea of introducing policies to favour the transfer of deliveries from the Own-account to the Third-party sector seems not effective, since often the shift is simply not feasible. In these cases, decision-makers should focus on policies making Own-account more efficient from a private and social point of view. In this regard, the rewarding and recognition scheme should be attractive and enlarged to the Own-account sector, possibly coupled with initiatives already proposed, such as *van-sharing promotion* (probably of less interest for Third-party couriers)

¹¹⁰ <http://www.citylab-project.eu/Rome.php>

and *promotion of sharing and electric mobility in a multi-modal approach*. This always to be done in conjunction with HPMs, such as access regulation against polluting vehicles, financial incentives for the purchase of vehicles with environmental impact, construction of new L / U bays.

Positive regulation & smart procurement for public administrations

The purchase of zero-emission vehicles, services and supplies by the public administration is a virtuous example, but also a leverage to influence the demand for goods and services, and therefore the related mode of transport, inducing a behaviour change of suppliers and logistics operators. In line with this approach, the city of Rome has consistently reduced the number of vehicles composing its own fleet, from 3,644 in 2010 to 2,013 in 2015, and has also increased the percentage of vehicles with lower emissions (Fuschiotto, 2016). However, it is not only about procurement of vehicles: the BuyZET project¹¹¹ and the cities partner of the consortium, namely Copenhagen, Oslo and Rotterdam, have studied the transportation impacts of different types of procurement activities following different methodologies developed within the project. The rationalisation of some priorities areas, such as maintenance and repair service contracts, waste collection trucks, supply logistics, construction materials, has been identified as a way to reduce the transportation footprint of the municipality.

Roma Capitale and RSM could perform the same mapping exercise, to identify the sectors more suitable to have the higher and more visible impact, both to include a sustainability element in its tendering process, as well as acting according to the ‘practice what you preach’ principle, to set a good example and improve their reputation in the eyes of citizens and mobility actors. In line with the CAC approach, it is necessary to establish a vertical dialogue with the Italian Ministry of economy and finance: in Italy, CONSIP¹¹² acts as central purchasing body for PAs, therefore a dialogue needs to be established to successfully adopt the most effective procurement criteria identified at local level.

Communication, awareness raising and marketing campaigns

In Rome, according to SRM (Roma Capitale, 2017), limited and ineffective advertising campaigns are one the main weaknesses of the UFT strategy of the city. A good communication strategy facilitates the acceptance of new measures, as well as their better understanding, and

¹¹¹ www.buyzet.eu

¹¹² <http://www.consip.it/en/>

consequently a smoother implementation. As a matter of example, the *London Engagement Programme* was rated as the most successful SPM implemented in London by the local experts consulted (see 6.4.1.1): information and awareness raising activities are a central element of the overall Transport for London Freight Strategy, including Freight Forum meetings, weekly Road Freight Bulletin, events and expanded website: www.tfl.gov.uk/freight.

User-friendly brochures and guidance on innovative urban logistics practices and new regulations for certain areas (construction, procurement, re-timing, safety) could be advertised and made available on the municipality's and RSM's websites. This type of measures is directly linked to those that imply a greater involvement of the actors, who want their voice to be heard, but also simply to have easy access to information, studies and guidance. If the element of joint policy-making is of special interest for large logistics operators, the information element is crucial for small operators and retailers, whose choices can be directed towards sustainable practices.

The CAC approach for a UFT all-level strategy

The conceptual structure CAC identifies multi-level governance cooperation mechanisms to establish a dialogue and undertake joint actions, both vertically (with different levels of governance, from the EU to local communities) and horizontally (peer-to-peer, at all levels). Each governance level is supposed to carry out different and complementary actions, satisfying the principles of subsidiarity and proportionality, in order to create the best conditions to spread and implement the EU common sustainable mobility planning principles. A CAC implemented from the top (European) strategic planning level can positively influence the introduction of SPMs, and hence 'gently' induce a behaviour change.

In this regard, a positive aspect of the model introduced in Turin is the Agreement signed with the Ministry of Transport aimed at testing innovative solutions in the last-mile delivery. The model of Turin has been included in the list of best practices to be adopted by 15 Italian cities, drafted by the Italian Government Transport Planning Framework (Marciani, 2017).

Moreover, in 2016, the Ministry of Infrastructure and Transport has set up the *Italian Urban Logistics Working Group*, involving all metropolitan areas and institutional stakeholders of the sector, discussing UFT rewarding policies supported by new technologies. The Ministry leads the process, providing non-binding guidelines and support, in full respect of local autonomy,

with a soft-law approach. However, after the 1st meeting (April 2016) there seems to be no public material available about the next steps of Working Group.

It is recommended that the city of Rome, as far as possible, put the effort to reactivate this dialogue: it would be essential to have an active platform, which reinforces both horizontal dialogue between Italian cities and UFT actors, and vertical dialogue between the national and local governance levels, in line with the CAC approach proposed in this work. In particular, it would be important to take advantage of this moment to draw up national guidelines on SULPs, in line with those just published on SUMP - despite the Ministry's change in management due to the March 4, 2018 parliamentary elections could slow down this process.

Regarding horizontal cooperation, as repeatedly highlighted in this work, the exchange of best practices is considered by LA one of the best ways to be inspired and learn from other cities¹¹³. Rome is already part of many European city networks, such as the EU-funded CIVITAS Initiative¹¹⁴ and Polis¹¹⁵, supporting the exchange of experiences and the transfer of knowledge between European local and regional authorities, and the dialogue with the industry, research centres and NGOs at EU level. Moreover, the application of a transferability analysis to the case of Rome, for example adapted from CITYLAB project methodology¹¹⁶, performing a systematic analysis of potential replication in Rome of successful SPMs identified in this work, can represent a further step.

Finally, and most importantly, these measures represent open proposals: in line with the philosophy behind this work, these measures should be discussed and agreed with the interested actors, to empower them with a sense of responsibility and ownership of the solutions to be implemented. The *choice architect*, in this case Roma Capitale and SRM, should set the ground to guide stakeholders, to encourage the adoption of virtuous behaviour and voluntary cooperation mechanisms, and position the city in the CAC multi-level governance environment.

¹¹³ Non-public presentation about the results of an evaluation survey carried out on CIVITAS Thematic Group activities and recommendations for the future

¹¹⁴ www.civitas.eu

¹¹⁵ www.polisnetwork.eu

¹¹⁶ CITYLAB performs a transferability analysis focusing on the potential for rolling out the UFT solutions to other cities. A chart overview is developed to show to which extent an applied solution has the potential for a successful roll-out in other cities.

8 Discussion and conclusions

In chapter 6, we provided a definition of UFT SPMs:

UFT SPMs are designed to motivate freight stakeholders to voluntarily change their behaviour towards more sustainable and efficient transport modes and practices, by providing (tailored) information and services, raising awareness on innovative and sustainable UFT options, and using positive incentives, such as rewarding and recognition, and marketing techniques.

UFT SPMs typologies and categories are identified according to the criteria derived from the literature review on UFT, incentive theory, BE and SPMs carried out in Chapter 2, matched with the review of around 300 UFT in Chapter 6. UFT SPMs already in place and under development in 37 European cities and regions are analysed, investigating whether their local SUMP, or dedicated urban freight plans and strategies, envisage their implementation. A Delphi survey approach has been used to gather expert opinions on the open questions on UFT planning and SPMs in EU cities. A preliminary assessment of the actual effectiveness of the selected SPMs, for a more sustainable urban freight distribution sector, is carried out, via comparative analysis and interviews with public officers and researchers. To frame the adoption of SPMs in a broader policy system, i.e. voluntary, multi-level governance cooperation mechanisms, the concept of CAC, deriving from *libertarian paternalism*, is explored and defined in Chapter 5. Each governance level is supposed to carry out different and complementary actions, satisfying the principles of subsidiarity and proportionality, to create the best conditions to spread and implement the EU common sustainable mobility planning principles. This Chapter 8 discuss and responds positively to all research questions posed at the beginning of the work.

SPMs are mapped according to 1+3 mega-categories. Lines between the categories proposed are very blurred and flexible: a UFT SPMs could fall within one, two or even three categories at the same time. This is considered as an added value: the more they are intertwined, the more effectively they are expected to perform. This work aims to provide an open system, to inspire

decision-makers, planners and experts in the elaboration and proposition of new and combined (packages of) measures, on the basis of the participatory and voluntary principles.

Findings are encouraging about the presence and the effectiveness of SPMs in European cities, and also about the potential for their further transfer and diffusion to other cities. Dedicated freight networks and fora are progressively becoming the ideal platforms to gather UFT key stakeholders on a structural and regular basis, to engage and inform them about new urban strategies and measures. In general, coordinated policies, planning schemes and tools, as well as stakeholder cooperation mechanisms, seem to facilitate the introduction of UFT SPMs. The ones already in place, especially when combined in policy packages, proved to be effective and to create a positive cycle: where dialogue and collaboration increases, as well as common understanding among stakeholders, the introduction of new, better-tailored and inclusive measures is facilitated. However, SPMs, although have direct, significant impact on UFT actors' behaviour, should support, or be combined with, HPMs, since both, with different roles and targets, contribute to the same objective. As matter of example, the current trend of the Rotterdam UFT policy is on the one hand to introduce more regulation besides the promotion of positive incentives, to better balance restrictions and supportive measures ('carrot and stick'), and on the other hand to intensify relation and exchange between governments, businesses and knowledge institutes.

According to the CAC approach, non-binding collaborative planning frameworks and policies implemented from the top (European) strategic governance level can positively influence the introduction of SPMs, and hence 'gently' induce behaviour change. The other way around, the knowledge gathered from best practices implemented at local level contributes to the definition of more effective and complete EU planning guidance (*bottom-up*). In this regard, it is encouraging that the UFT measures categorisation system proposed by the EU CIVITAS Initiative (see section 2.1.3) includes two categories directly ascribable to the SPM definition as proposed in this work. The development of EU policies, as also observed in the analysis of section 5.1, seems to evolve conferring a growing interest in principles such as participation, exchange of good practices, information and awareness raising and positive incentives. Moreover, this work proposes an innovative approach for the assessment of the coherence and consistency between EU policy priorities and funds allocated to corresponding research activities (see section 5.1). It provides a systematic (living) *matching tool*, capable of constantly

monitoring the parallel evolution of policies and projects. Thanks to this tool, it was discovered that ‘soft’ solutions like *UFT demand management* policies, *Eco-labels* and *Public procurement* could be considered cost-effective solutions, not requiring a significant financial investment. According to these findings, future research should identify the most promising UFT SPMs in the above-mentioned fields, implying a behaviour changing approach, and consequently test their potential for rolling out to different local environments.

In reviewing the development of guidance on SUMP, May (2015) has observed seven main barriers to effective planning: conflicting institutional roles, hesitant political commitment, poor integration of policies, inappropriate financing, limited skills, limited stakeholder involvement, and poor data and lack of evidence of solutions performance. The role of national government is key to create a supportive policy and regulatory framework, to devolve powers and funds and to provide guidance for effective local mobility planning (May, 2013). Consequently, the EC should help MSs establish such a national policy framework, improve institutional cooperation and coordination – horizontally, at all level, via national and transnational municipal networks (Kern, 2009) and at local level with all interested stakeholders, and vertically, via collaboration among different governance level of public authorities – and support LAs in monitoring and evaluation, encouraging public participation (May, 2017). The theoretical foundations of this work, and the choice of the criteria to assess the development of guidance on SUMP, address these considerations and promote a cooperative model based on the principles enounced in the EU SUMP Guidelines. In section 5.2, the detailed inspection of various national planning schemes indicates a significant compliance with the EU SUMP Guidelines of selected national frameworks. However, results show that only few measures put forward in EU SUMP Guidelines have been formally implemented in MSs procedures. To overcome these challenges, a new *comparative tool for policy-makers* is proposed: at European level, it helps monitor the overall state of art of SUMP in Europe; at national level, it enables to self-positioning with respect to other countries, raising awareness among MSs about diverse initiatives in other countries, creating a positive competition and nudging in order to reach a cohesive improvement.

In order for a change of behaviour towards a sustainable transport approach to occur, SUMP principles and actions must spread among the population (May, 2017). There is, therefore, need for action on education and awareness raising, by creating consensus around the theme,

otherwise, local policy-makers are not strong enough to introduce effective measures for sustainable mobility. This is where the national authority plays a role as *choice architect*, according to the theory of *libertarian paternalism*: the state must create a favourable decision-making context, that is, national guidelines and regulatory/legislative schemes, to facilitate the adoption of SUMP at the local level, and in turn to nudge and encourage local decision-makers to adopt a participatory and awareness-raising approach, facilitating the introduction of SPMs oriented to citizens and local stakeholders. According to the results of the Delphi analysis, reported in section 6.2.1, for vertical cooperation the most important effects seem anchored to the concrete definition of common objectives and frameworks, supported and endorsed by the political decision-maker, to establish firm and consistent points between all levels of governance. A good example in this sense is the city of Turin, which in 2014 signed an Agreement with the Italian Ministry of Transport aimed at testing innovative solutions for last-mile delivery (see 6.3.1.3). The model of Turin has been included in the list of best practices to be adopted by 15 Italian cities, drafted by the Italian Government Transport Planning Framework (Marciani, 2017). If the national level enabled the introduction of a new participative governance model (*top-down*), the other way around the LA contributed with improved knowledge by sharing findings developed at local level (*bottom-up*).

The EU is not required to legislate for the urban mobility sector: however, creating awareness, providing (non-financial) incentives, resources and know-how, exchanging experiences, and thus encouraging cities to learn from each other, can ensure that, locally, public authorities have additional tools available to design modern planning systems, focused on sustainability and attentive to the needs of citizens and business. This awareness is created through stakeholder engagement and cooperation systems, representing the prerequisite for supporting UFT SPMs implementation, as widely demonstrated in the literature (see section 6.1). This is particularly true for UFT, which affects several typologies of stakeholders with very different, and often conflicting, interests (Gatta et al., 2017). Providing platforms and tools for participatory planning, as strongly advised in the EU SUMP Guidelines, means paving the way for the introduction of SPMs, based on voluntary and aware adherence. Findings of the analysis of SPMs in European cities show that a participative approach is already well used when it comes to their implementation: dedicated freight networks and fora are progressively becoming the ideal platforms to gather UFT key stakeholders on a structural and regular basis, to engage and

inform them about new urban strategies and measures, often submitted to the opinion, agreed or even developed together with stakeholders in these platforms, via FQPs and PPP.

The EU should stress the concept of the importance of the innovative shift of its approach in planning for urban mobility: from a traditional transport planning, focusing on traffic, to a sustainable mobility planning, focusing on people. Besides traffic regulation, local/national policy-makers and urban planners should consider that the final objective of sustainable urban mobility planning is the implementation of best solutions to ensure an accessible, liveable and healthy city. The criteria outlined in this work support this vision. The EC is responsible for the creation of a strategic reference framework and information and awareness-raising¹¹⁷, that can help MSs develop specific planning tools in line with the proposed approach, and cities to be empowered via the adoption of a learning culture, the exchange of best practices, including policy transfer, and a more confident role both as receiver and as contributor, in the multi-level governance cycle (i.e., the CAC). However, the EU should refrain from attempting to impose standardisation of solutions or harmonisation of regulation: each urban environment is different and should be guided to understand its problems and consequently to autonomously identify the most suitable solutions.

UFT policy documents and the EU SUMP Guidelines encourage the balanced and integrated development of all modes, including both passengers and freight and specifically mentioning the need to “satisfy the mobility needs of (...) businesses”. Nevertheless, findings show that, even in the countries with a well-established transport planning sector, urban freight policies are often neglected. Both the EC and MSs should stress the connection between this sector and the implications on citizens and, in general, on the liveability of the city. Including a strong freight component in the SUMPs, or consistently integrating it with a Sulp, provides an incentive for LAs to improve their staff-related skills, identified as one of the main barriers to the development of innovative and effective solutions for freight in the city (Lindholm, 2013). However, the type of UFT SPMs put in place in the 37 cities and regions investigated, and especially in the case of the 3 best practices presented, encourage a direct and constant dialogue

¹¹⁷ As a matter of example, the SUMP award, assigned by the EC, rewards local authorities which have developed a sustainable mobility plan. Each year, the award highlights a different aspect of mobility planning. In 2016 it was focused on UFT, and Brussels won it.

with all the stakeholders of the sector, and therefore seems to positively affect the awareness and skills of policy-makers and planners when it comes to address UFT challenges.

A few important areas that need specific attention in future research endeavours can be outlined. From the review of the types of measures identified in section 6.2 and those adopted in 37 European cities and regions (section 6.3), it is evident that the SPMs implemented to date are mainly addressed to LSPs and large couriers. This impression seems to be confirmed by the Delphi analysis. However, local planners and decision-makers should consider that operators in the freight distribution sector operate in an (almost) perfect competitive system: they can not afford to change the price of their services since for competitive firms the marginal revenue is equal to the market price, nor the timing of their deliveries. As a consequence, in some cases it may be more effective to introduce behaviour change policies influencing the demand of distribution services, addressing receivers, in particular retailers, shopping centers, supermarkets and local public attractors. Many scholars have investigated the potential effectiveness of these policies, especially aiming at off-peak hour deliveries, with encouraging results (Marcucci and Gatta, 2016, 2017, Holgìn Veras et al., 2014, 2017, Mommens et al., 2018, Vallino et al., 2018, Dondi et al., 2017a). If, at the public level, through procurement, this approach has already been introduced, at the level of private receivers it has not yet been possible to elaborate a package of effective and successful measures, apart from some limited experiences (Holgìn Veras et al., 2014, Bertazzo et al., 2016). Also, the involvement of own account operators (so-called ‘white vans’, including maintenance and service trips) is not easy and deserves an in-depth analysis especially in cities where it represents a substantial share of logistics operations.

We have already discussed the importance of collecting and processing *ex-post* data for the evaluation of the effectiveness of UFT measures (section 6.4). However, *ex-ante* data collection and modelling are also essential to observe and analyse the movements of goods in urban areas in a reliable and comparable way, and, consequently, to plan and implement solutions based on the real needs of each context, including the types of actors to be addressed. Looking at the list of the ten priorities identified in the policy documents (section 4.2), there is an absence of provisions for data collection and modelling for UFT. The need to place greater emphasis on research in this sector is also highlighted in the ALICE/ERTRAC Urban Freight Roadmap (2014). Therefore, further effort is still needed to develop a clearer and stronger strategy

regarding research on new indicators, methods and practices for data collection and modelling for UFT, for the LAs to perceive it as a fundamental aspect of the policy-making process.

Regarding the CAC, three levels of vertical cooperation have been considered in this work, i.e. European, national and local. The latter also includes the regional level, but from the analysis of local policies and from consultations with regional public officers it emerged that this level of governance is often neglected. Nevertheless, it represents an important link in the governance chain: many municipalities are too small to develop adequate policies and skills, and could be supported by the region. Positive examples are the Emilia-Romagna Region (Italy), which has started a process of harmonization of local access regulation and permission procedures on a regional basis, and the Flanders Region (Belgium), that has released a UFT policy memorandum for Flemish municipalities and coordinates UFT stakeholder platforms in six Flemish cities. Moreover, the European structural funds are conveyed at the regional level through the Regional Operational Programmes¹¹⁸: consequently, it is essential that regional authorities develop visions and strategies, in conjunction with local authorities, to allocate funding in a structured and coherent manner. Future research might collect and analyse best practices and develop recommendations on the regional planning framework for UFT.

Finally, on the basis of the findings of this work, and considering the current UFT local situation, an assessment of the most suitable UFT SPMs for Rome is performed, and a strategy for Rome, *Improving UFT via SPMs - supporting the new SUMP*, is developed. It aims to involve the LA and the UFT local stakeholders to promote the replication of successful - and conveniently adapted - SPMs in the Roman context, supporting the comprehensive approach to sustainable urban mobility planning recently expressed by the municipality in the Guidelines for the drafting of a SUMP for Rome (Roma Capitale, 2017). In line with the philosophy behind this work, these measures represent open proposals to be discussed and agreed with the interested actors, to empower them with a sense of responsibility and ownership of the solutions to be implemented. The *choice architect*, in this case Roma Capitale and SRM, should validate them in the framework of the current works of the Scientific Technical Committee and in Focus Groups with Rome local stakeholders.

¹¹⁸ http://ec.europa.eu/regional_policy/en/atlas/programmes/2014-2020/romania/2014ro16rfop002

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ANNEX I – Delphi questionnaire – list of experts

Name	Organisation	Country
Edoardo Marcucci	University of Roma Tre	Italy
Andrea Campagna	Sapienza University of Rome	Italy
Michela Le Pira	University of Catania	Italy
Stanisław Iwan	Maritime University of Szczecin	Poland
Maria Rodrigues	Panteia	The Netherlands
Karin Fossheim	Institute of Transport Economics, Norway	Norway
Tharsis Teoh	Panteia	The Netherlands
Elena Maggi	University of Insubria	Italy
Stefano Dondi	Fondazione ITL (Istituto Trasporti e Logistica)	Italy
Sara Verlinde	Vrije Universiteit Brussel	Belgium
Giuseppe Luppino	Fondazione ITL (Istituto Trasporti e Logistica)	Italy
Jens Klauenberg	DLR Institute of Transport Research	Germany
Jardar Andersen	Institute of Transport Economics, Norway	Norway
Jacques Leonardi	University of Westminster	UK
Nina Nesterova	TNO - Netherlands Organisation for Applied Scientific Research	The Netherlands
Ioannis Karakikes	University of Thessaly	Greece

ANNEX II – Delphi questionnaire – form



The image shows a screenshot of a survey form interface. At the top, there is a navigation bar with 'QUESTIONS' and 'RESPONSES 16'. Below this, a blue header indicates 'Section 1 of 5'. The main title of the survey is 'Delphi survey on urban freight planning and soft policy measures in EU cities'. Underneath the title, there is a 'Form description' section which is currently empty. Below the description, there is an 'Image title' section, also empty, with a three-dot menu icon above it. The image itself shows a white van driving on a city street with the Colosseum in the background. At the bottom of the form, there is a section titled 'How this survey works' with a three-dot menu icon to its right. The text below this section reads: 'This is a Delphi survey addressed to urban freight transport (UFT) experts. The Delphi method is a technique for collecting'.

QUESTIONS RESPONSES 16

Section 1 of 5

Delphi survey on urban freight planning and soft policy measures in EU cities

Form description

Image title



How this survey works

This is a Delphi survey addressed to urban freight transport (UFT) experts. The Delphi method is a technique for collecting

General information

Description (optional)

Name *

Short-answer text

Organisation *

Short-answer text

Municipality/region of activity *

Short-answer text

Country *

Short-answer text

E-mail address *

Short-answer text

You are *

- Mobility professional
- Urban planner
- Decision maker
- National/regional authority
- Consultant
- Researcher
- Other...

Soft policy measures and urban freight transport

Description (optional)

⋮

All actors involved in the UFT sector should be included in the planning process and implementation of measures. How likely is that each of the following actors changes behaviour in response to soft policy measures (SPMs) implementation (as described here: <https://goo.gl/Gbybz8>)? *

	Very unlikely	Unlikely	Neutral	Likely	Very likely
Logistics service providers (LSPs)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Couriers - Third-party	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Couriers - own account	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Retailers	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Shippers	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Automobile Manufacturers	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Local authorities/public bodies	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Citizens	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

How relevant is each of the following potential impact of a UFT measure to ensure its longer-term effects? *

	Very irrelevant	Irrelevant	Neutral	Relevant	Very relevant
Increased efficiency of the operations	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Derived economic savings	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Greater visibility and publicity	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Access to further information, knowledge and courses	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Environmental improvements	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Long-term effects of SPMs are uncertain. In your opinion, for which of the following types of measures behaviour change is more likely to persist? *

	Very unlikely	Unlikely	Neutral	Likely	Very likely
Networks, fora, Freight Quality Partnerships	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Rewarding schemes and related incentives	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Sustainable procurement schemes/plans for public administrations	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Communication and marketing (User-friendly brochures and guidance on innovative urban logistics practices)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Soft & hard policy measures *

SPMs, although they have a direct, significant impact on UFT actors' behaviour, should be combined with hard policy measures (HPMs – e.g. infrastructure improvements, binding regulation, monetary incentives). It is essential to construct a useful and complementary mix of both hard and soft measures for UFT. In your opinion, what is the correlation between SPMs and HPMs?

- SPMs have a positive direct effect on the effectiveness of HPMs
- HPMs have a positive direct effect on the effectiveness of SPMs
- A clear evidence on which influence the other does not exist
- Other...

How relevant SPMs are for the integration of sustainable freight transport issues into urban policies, in particular in the framework of the Sustainable Urban Mobility Plan (SUMP) concept? *

See more at: <http://www.eltis.org/mobility-plans/sump-concept>

- To a great extent
- To some extent
- Very little
- Not at all

Are you aware of any SUMP implemented in European cities envisaging the introduction of (UFT) SPMs? If yes, please describe the measure(s) and provide the link to the plan (if available)

Long-answer text

Cooperation mechanisms and SPMs

Description (optional)

Horizontal cooperation *

From a local authority's perspective, horizontal cooperation among municipality departments, and with UFT local actors, such as private sector, researchers, other cities (e.g. stakeholder platforms, networks, etc.), can have the following positive effects on the definition of general UFT policies at local level. Please assess their importance.

	Not important	Slightly important	Moderately important	Important	Very important
Definition of shared vision and targets	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Improved dialogue between citizens/business and public administration	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Improved knowledge about UFT context and effects of measures	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Speeding-up innovation processes	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Improved awareness of similar/potentially overlapping initiatives	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Higher acceptance of measures by citizens/business	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Exchange of best practices	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Transfer of good urban mobility practices	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Creation of networking opportunities	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Vertical cooperation *

From a local authority's perspective, vertical cooperation with other governance levels (EU, national, regional) can have the following positive effects on the definition of general UFT policies at local level. Please assess their importance.

	Not important	Slightly important	Moderately important	Important	Very important
Definition of consistent vision and targets	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Improved knowledge about different UFT contexts and effects of measures	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Support to local authorities in monitoring and evaluation	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Stronger political legitimacy	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Definition of supportive legal and regulatory framework	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Consolidation of different local actors' needs (bottom-up)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Exchange of best practices	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Transfer of good urban mobility practices	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Creation of networking opportunities	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

'Urban freight transport' vs 'urban logistics'

Description (optional)

EC defines 'urban freight transport' as "the movement of freight vehicles whose primary purpose is to carry goods into, out of and within urban areas". But the EC also provides a very similar definition of 'urban logistics': "[...] the movement of goods, equipment and waste into, out, from, within or through an urban area". Do you agree on the correspondence of these two definitions? *

Commission (DG MOVE). Available at: <http://ec.europa.eu/transport/themes/urban/studies/doc/2012-04-urban-freight-transport.pdf>. Definition of UL: European Commission (2013a) "A call to action on urban logistics", SWD(2013) 524 final. Available at: <https://ec.europa.eu/transport/sites/transport/files/themes/urban/doc/ump/swd%282013%29524-communication.pdf>

- Agree
- Undecided
- Disagree

If disagree, please share your view on the difference between the two

Long-answer text

ANNEX III – Cities questionnaires – list of experts

Name	Role and organisation	Country
Tim Ward	former Freight and Fleet Communications and Engagement Manager at Transport for London	UK
Julian Allen	Senior Research Fellow in the Transport Studies Department at the University of Westminster	UK
Richard van der Wulp	Urban Traffic Planner at Municipality of Rotterdam & Project Manager Europe for traffic and transportation	The Netherlands
Hans Quak	Hans Quak, Senior Scientist at TNO – Sustainable Transport and Logistics Department	The Netherlands

ANNEX IV – Cities questionnaires – forms

London

QUESTIONS RESPONSES 2

Section 1 of 7

Survey on best practices and application of soft policy measures in LONDON

Form description

⋮

How this survey works

This is a survey addressed to urban freight transport (UFT) experts (city officers, consultants, researchers), who have implemented soft policy measures (SPMs) in their local context.

SPMs encourage citizens and businesses to voluntarily change their transport behaviour, exploiting motivational drivers based on social, environmental and (indirect) economic mechanisms, limiting coercive actions. SPMs can take the shape of rewarding schemes, (motivational) incentives, information campaigns and 'gamification'.

We kindly ask you to fill this survey, to broaden the knowledge on SPMs applied to the urban freight sector in European cities.

Please read a short summary of soft policy measures identified in LONDON (here: https://drive.google.com/open?id=1drTVPFOxZzXICVXSf-kVOn_M0aFWcDIL) and successively answer the questions in this form.

This survey will only take around 15 MINUTES of your time.

Your input is vital to our study. We guarantee that your data and answers will only be used for the purposes of this research and will not be shared with other entities.

Foy any questions and further clarification you may need, please do not hesitate to contact me (giacomo.lozzi@uniroma3.it).

Thank you for your kind cooperation.

General information

Description (optional)

Name *

Short-answer text

Organisation *

Short-answer text

Municipality/region of activity *

Short-answer text

Country *

Short-answer text

E-mail address *

Short-answer text

You are *

Urban freight planning and behaviour change initiatives in LONDON

Description (optional)

⋮

What types of behaviour change initiatives are conducted in LONDON to improve sustainable mobility? (multiple answers possible) *

- Education (increasing knowledge or understanding)
- Persuasion (using communication to induce feelings or stimulate action)
- Incentivisation (using rewards)
- Coercion (using punishments or costs)
- Training (imparting skills)
- Enablement (increasing means/reducing barriers)
- Modelling (providing an inspiring example)
- Restrictions (using rules)
- Other...

How likely is it that your municipality would be interested in giving incentives & rewards to: *

	Very unlikely	Unlikely	Neutral	Likely	Very likely
Logistics service providers (LSPs)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Couriers - Third-party	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Couriers - own account	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Retailers	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Shippers	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Automobile Manufacturers	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Local authorities/public bodies	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Citizens	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

The planning instruments of your municipality include (multiple answers possible) *

- A Sustainable Urban Mobility Plan (SUMP)
- A Sustainable Urban Logistics Plan (SULP)
- No proactive planning, mobility policy is on a case-by-case basis
- Other...

Which type(s) of urban freight soft policy measures (SPMs) are envisaged in the SUMP/SULP of your city? (multiple answers possible) *

- Networks, fora, Freight Quality Partnerships
- Rewarding schemes and related incentives
- Sustainable procurement schemes/plans for public administrations
- Communication and marketing (User-friendly brochures and guidance on innovative urban logistics practices)

Introduction of soft policy measures in London

Description (optional)

We have identified some SPMs introduced in LONDON (here: https://drive.google.com/open?id=1drTVPFOxZzXICVXSf-kVOn_M0aFWcDIL). Please rate the overall success of the measures on scale from 1 to 5 (1 = not successful, 5 = very successful) *

	1	2	3	4	5
Stakeholder cooperation platforms (Freight Forum, Retiming Deliveries Consortium, CLFQP)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Fleet Operator Recognition Scheme (FORS)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Construction Logistics and Cyclist Safety scheme (CLOCS)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Engagement Programme	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
London alternative consolidation approaches	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Row 6	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Please assess the overall impacts of the Fleet Operator Recognition Scheme (FORS), in terms of: *

	Very bad	Bad	Neutral	Good	Very good
Environment protection (emissions, noise)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Economic savings (costs, fuel/energy consumption)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Social benefits (health, accidents)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Network and delivery efficiency (congestion, km driven, load factor)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Please assess the overall impacts of the Construction Logistics and Cyclist Safety scheme (CLOCS), in terms of: *

	Very bad	Bad	Neutral	Good	Very good
Environment protection (emissions, noise)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Economic savings (costs, fuel/energy consumption)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Social benefits (health, accidents)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Network and delivery efficiency (congestion, km driven, load factor)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Please assess the overall impacts of the Engagement Programme, in terms of: *

	Very bad	Bad	Neutral	Good	Very good
Environment protection (emissions, noise)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Economic savings (costs, fuel/energy consumption)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Social benefits (health, accidents)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Network and delivery efficiency (congestion, km driven, load factor)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Do you have quantitative, ex-post evaluation data to support this evaluation? (Please provide link / document)

Long-answer text

Implementation process of the measures

Description (optional)

...

Who was the initiator of the measures? *

	The local authority	The private sector	Initiated in the stakeholder forum
Fleet Operator Recognition Scheme (FORS)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Construction Logistics and Cyclist Safety scheme (CLOCS)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Engagement Programme	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
London alternative consolidation approaches	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Are these measures framed in and supported within a broader planning vision, such as the local SUMP/SULP? *

- Yes, in the local SUMP
- Yes, in the local SULP
- No
- Other...

Are these 'soft' measures accompanying 'hard' measures (HPMs), such as infrastructure improvements, binding regulation, enforcement, monetary incentives, etc.? *

- Yes
- No

If yes, please specify which hard measure(s):

Long-answer text
.....

...

Regarding the measures discussed, have the upper governance levels put in place any favourable conditions for its/their introduction (top-down)? *

- National framework agreement
- EU/national planning guidelines (for SUMP/SULP)
- Regional/national funding schemes
- EU networks and projects
- Other...

The other way around, is there a mechanism in place at regional/national/EU level to aggregate and consolidate the contributions and findings you develop at local level through your stakeholder consultations and platforms (bottom-up)? *

Long-answer text
.....

Cooperation mechanisms in your city

Description (optional)

...

Horizontal cooperation *

From a local authority's perspective, horizontal cooperation among municipality departments, and with UFT local actors, such as private sector, researchers, other cities (e.g. stakeholder platforms, networks, etc.), can have the following positive effects on the definition of general UFT policies at local level. Please assess their importance.

	Not important	Slightly important	Moderately important	Important	Very important
Definition of shared vision and targets	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Improved dialogue between citizens/business and public administration	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Improved knowledge about UFT context and effects of measures	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Speeding-up innovation processes	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Improved awareness of similar/potentially overlapping initiatives	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Higher acceptance of measures by citizens/business	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Exchange of best practices	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Transfer of good urban mobility practices	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Creation of networking opportunities	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Vertical cooperation *

From a local authority's perspective, vertical cooperation with other governance levels (EU, national, regional) can have the following positive effects on the definition of general UFT policies at local level. Please assess their importance.

	Not important	Slightly important	Moderately important	Important	Very important
Definition of consistent vision and targets	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Improved knowledge about different UFT contexts and effects of measures	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Support to local authorities in monitoring and evaluation	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Stronger political legitimacy	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Definition of supportive legal and regulatory framework	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Consolidation of different local actors' needs (bottom-up)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Exchange of best practices	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Transfer of good urban mobility practices	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Creation of networking opportunities	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Awareness and upscaling/transfer

Description (optional)

Are SPMs crucial to increase the participatory attitude of local UFT actors? *

	Not at all	Very little	To some extent	To a great extent
Logistics service providers (LSPs)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Couriers - Third-party	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Couriers - own account	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Retailers	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Shippers	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Automobile Manufacturers	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Local authorities/public bodies	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Citizens	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

...

In LONDON, how do you judge the level of awareness at the political level of the success and positive impact of the SPM(s) implemented? *

- None
- Low
- Moderate
- High

...

Among citizens and micro/small companies, including own-account operators, how do you judge the level of awareness about the opportunities provided by the SPM(s)? *

- None
- Low
- Moderate
- High

Do you have plans to upscale the measures, and/or transfer them to other sectors? *

- Yes
- No
- Maybe

If yes, please provide more details:

.....
Long-answer text

Rotterdam

Sections different from London form only.

Section 1 of 7



Survey on best practices and application of soft policy measures in ROTTERDAM

Form description



How this survey works

This is a survey addressed to urban freight transport (UFT) experts (city officers, consultants, researchers), who have implemented soft policy measures (SPMs) in their local context.

SPMs encourage citizens and businesses to voluntarily change their transport behaviour, exploiting motivational drivers based on social, environmental and (indirect) economic mechanisms, limiting coercive actions. SPMs can take the shape of rewarding schemes, (motivational) incentives, information campaigns and 'gamification'.

We kindly ask you to fill this survey, to broaden the knowledge on SPMs applied to the urban freight sector in European cities.

Please read a short summary of soft policy measures identified in ROTTERDAM (here: https://drive.google.com/open?id=13cNApS0_1X3xE0ErmXrbkBfpWvyhy_G) and successively answer the questions in this form.

This survey will only take around 15 MINUTES of your time.

Your input is vital to our study. We guarantee that your data and answers will only be used for the purposes of this research and will not be shared with other entities.

For any questions and further clarification you may need, please do not hesitate to contact me (giacomo.lozzi@uniroma3.it).

Thank you for your kind cooperation.

Introduction of soft policy measures in ROTTERDAM

Description (optional)

⋮

We have identified some SPMs introduced in ROTTERDAM (here: https://drive.google.com/open?id=13cNAPs0_1X3xE0ErmXrrbkBfpWvyhy_G). Please rate the overall success of the measures on scale from 1 to 5 (1 = not successful, 5 = very successful) *

	1	2	3	4	5
City Logistics Living Laboratory (CLLL)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Fleet Recognition Scheme (ECOSTARS)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Smart procurement practices (BuyZET)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Drivers behaviour change initiatives	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Please assess the overall impacts of ECOSTARS, in terms of: *

	Very bad	Bad	Neutral	Good	Very good
Environment protection (emissions, noise)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Economic savings (costs, fuel/energy consumption)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Social benefits (health, accidents)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Network and delivery efficiency (congestion, km driven, load factor)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Please assess the overall impacts of smart procurement practices, in terms of: *

	Very bad	Bad	Neutral	Good	Very good
Environment protection (emissions, noise)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Economic savings (costs, fuel/energy consumption)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Social benefits (health, accidents)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Network and delivery efficiency (congestion, km driven, load factor)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

...

Please assess the overall impacts of the Drivers behaviour change initiatives, in terms of: *

	Very bad	Bad	Neutral	Good	Very good
Environment protection (emissions, noise)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Economic savings (costs, fuel/energy consumption)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Social benefits (health, accidents)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Network and delivery efficiency (congestion, km driven, load factor)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Do you have quantitative, ex-post evaluation data to support this evaluation? (Please provide link / document)

Long-answer text

Implementation process of the measures

Description (optional)

⋮

Who was the initiator of the measures? *

	The local authority	The private sector	Initiated in the stakeholder forum
Fleet Recognition Scheme (ECOSTARS)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Smart procurement practices (BuyZET)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Drivers behaviour change initiatives	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Are these measures framed in and supported within a broader planning vision, such as the local SUMP/SULP? *

- Yes, in the local SUMP
- Yes, in the local SULP
- No
- Other...

Are these 'soft' measures accompanying 'hard' measures (HPMs), such as infrastructure improvements, binding regulation, enforcement, monetary incentives, etc.? *

- Yes
- No

If yes, please specify which hard measure(s):

Regarding the measures discussed, have the upper governance levels put in place any favourable conditions for its/their introduction (top-down)? *

- National framework agreement
- EU/national planning guidelines (for SUMP/SULP)
- Regional/national funding schemes
- EU networks and projects
- Other...

The other way around, is there a mechanism in place at regional/national/EU level to aggregate and consolidate the contributions and findings you develop at local level through your stakeholder consultations and platforms (bottom-up)? *

Long-answer text
